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.

A New Streamlined Milk Ordinance

However great may be the need for the abatement of some evil, we cannot expect a remedy until somebody does something about it. We look back at the literature, at programs of conventions of milk sanitarians and dealers, at the accumulation of trouble from conflicting milk control procedures, and from overdeveloped regulatory ordinances, and wonder why John (or that convenient "they") does not correct the evil. Well, one man in New England took the initiative, and at long last, we are beginning to see some fruits.

For several years, the milk regulatory officials of the New England states have realized the plight of the milk producer. The latter can be compared to the dilemma of the chameleon which found itself to be sitting on a Scotch plaid. It tried to adjust itself to the color of its background—and died in the attempt.

In an effort to alleviate the difficulty of the milk producer who had to ship milk in several states and numerous municipalities, the northeastern men held several informal conferences to find a common ground for sanitary requirements. They progressed far in drawing up a series of requirements to which all in that area can subscribe. Its provisions are intended for permanent application, even when the present war emergency has passed.

While this measure was developing (and probably stimulated by it) the United States Public Health Service Sanitation Advisory Board met in Washington in December, 1942, and formulated the Emergency Sanitation Standards for Raw Milk for Pasteurization, purely a temporary measure to relieve milk shortage difficulties attendant on the present war emergency. It is printed in full on page 101 of this issue. It makes no attempt to cover any other phase of milk control than production of raw milk for pasteurization.

As in all compromises, we can be quite sure that the new ordinance will not please everyone, and in all probability, it will not be completely satisfactory to anyone. However, we believe it to be a laudable attempt to prepare an ordinance that should go a long way toward making available milk from any one section of the country for use in any other—aft all, the great desideratum.

There are several provisions which would seem to be hurdles to general acceptance namely: the requirement that bacteria counts should not exceed two hundred thousand per milliliter, the requirement of cooling to only 60° F., the requirement for rating farms by the USPHS rating procedures and forms, the
necessity for washing the udders with chlorine solution, and the washing of
milkers’ hands before milking. It is not likely that these provisions will
objected to because of their inherent irrelevancy, but on account of the inad-
bility of increasing the farmer’s labor now when the labor situation is so ac-

Milk regulatory officials just have got to come to agreement on san-
requirements. When conflicting provisions are enforced, such procedure ad-
ties to the world that milk sanitarians do not un what exactly the real estab-
lished is not in conflict with itself. When contradiction in two requirements
encountered, then we can be quite sure that somebody is either ill-informed
has an axe to grind. Either situation is intolerable. Milk sanitarians must
their own house in order before they can convincingly tell industry how it on
 carry on. Unless they do, the public looks on and says, Bah!

J. H. S.

Milk Sanitation—Where Is It Going?

In our last issue, we discussed editorially the position of the trained
sanitarian as determined by the military. We are in receipt of a letter which
we present herewith:

“For the sake of the record I might say that I was graduated from
the University of California, College of Agriculture, in dairy science
work in 1932. Since that time I have worked for the largest certified
dairy in the west; one of the largest milk plants; the Los Angeles City
Health Department (as Laboratory Technician and Milk Inspector);
the Orange County Health Department (in charge of milk inspection);
and I am now with the State of California, Bureau of Dairy Service.

About a year ago I wrote Washington, D. C., and offered my
services to the armed forces with the request that I be placed in work
for which I was qualified. I was finally told that they were in
need of veterinarians and sanitary engineers, but that they had no place
for me; however, they would file my name with ten million others and
if they ever had cause to need me I would be notified. I then decided to
contact one of the local officers who were in charge of milk work for
their district or camp. Time after time I received the same answer,
‘Yes, we could use a man with your qualifications, but—you are not a
veterinarian.’

‘Finally I contacted one Colonel and offered my services as an
enlisted man with the thought that I might do the work and let someone
else get the credit. After some correspondence it was my understanding
that the Colonel had sent in a request for my services in the Veterinary
Corps, and I was to report to San Francisco (a round trip of better
than 100 miles) for some routine examinations. The examinations
were taken and I returned home expecting a call any day. First one
month went by and then another. I had just about forgotten the whole
thing when I received a letter that read, ‘This is to advise that authority
for your immediate enlistment in the Army Air Forces has been
received from the Adjutant General, Washington, D. C.’

“After some more correspondence it finally developed that the
Colonel had asked for me in the Veterinary Corps and his request, by
the time it had gone through the governmental ‘red tape’ mill, was so
that the House has passed a bill giving us some recognition and I hope
the boys who are left at home will keep up the good work.”

In other instances, milk sanitarians have asked the same questions: ‘What
is the future for milk sanitarians? What is the use of planning a career in this
field and taking college training in it if at the end we are afforded no
professional recognition?’

Do not blame the military. The fault is our own. The milk sanita-
tarian, devoted to his work, has been assiduously developing the fields of milk sanitation
and technology without paying much attention to their public (and pro-
fessional) relations. He now wakes up to find that he is a maverick—if you
please. Well, shall we take a brand? What brand? It looks as if the military
are ‘sold’ on a certain brand. Milk sanitarians, what do you say? Will you
take it lying down?—‘it’ being the brand and the let-down and the frustra-
tion and the discouragement. If you don’t like it, then say so, and say it LOUD.

J. H. S.

Meat Inspection Removed From B. A. I.

The transfer of the Meat Inspection Division from the Bureau of Animal
industry to the Livestock and Meats Branch, Food Distribution Administra-
tion, comes as a shock to the old timers in food control. After the first surprise,
we think that maybe the risk attendant on the transfer from a successful per-
fomance to an untried one (in these difficult times) might work out for the
better after all. We are reminded of our perturbation when the inspection part of
the former Bureau of Chemistry was separated from the investigatory and
research parts. Our experience shows that food inspection must be integrated
with food investigation and even research. However, the new Food and
Drug Administration is doing an excellent job. In view of this showing, we
are inclined to think that maybe the powers-that-be in Washington are doing a
wise thing in removing administrative matters from the highly investigative
ones. The two constitute entirely different lines of thought, although the success
of both depends on their intimate integration. Unless we advance in our knowl-
dge of both, we are likely to slip backward in the quality of our food control (or
in drug work). If the meat inspection service can do actually any
thing else, for that matter). If the meat inspection service can do actually a
better job in its new setup, then the transfer is advisable. In doing this, it
will be paced by the excellent performance of its sister organization in the food
and drug work.

J. H. S.

* The House bill be refers to deals with dieticians—Editor.
Reported Food and Water Poisoning In 1941

The new compilation of disease outbreaks in 1941, conveyed by food and water, as reported to the Public Health Service by the state and territorial authorities, continues its rate of increase of both outbreaks and deaths. Milk and milk products dropped back a little, but other foods forged ahead. The net result is that the number of outbreaks has now reached 316, as against 249 in 1939, and the number of deaths were 106 as compared with 28 then.

The data in Table 3 shows that dairy products still constitute our most potent source of food-borne outbreaks (except water). Note how pies and pastry now almost equal the number of cases from dairy products. Of the six outbreaks traced to pasteurized milk, four revealed faulty procedure in the plant. In spite of all that has been said and done to insure proper plant performance, milk plant operators still seem inspired by Satan to do the most amissible acts. In one case, the operator left continuously open the valve between the pasteurizing tank and the bottle filler. However, in two of the outbreaks due to pasteurized milk, the means of infection or character of the faulty pasteurization could not be shown. None of the six ice cream outbreaks incriminated any commercial ice cream but were traced to products that were unpasteurized or infected by the manufacturer. The canned milk was evidently infected in the home. The cheese outbreak was caused by a locally manufactured product.

We are accustomed to see botulism traced to home-canned products, but here we note two outbreaks attributed to commercially canned mushroom sauce and to corn. The notes in the present compilation are too meager to be convincing as to the vehicle. These reports are being checked further for later report in these columns. Most of the "food poisoning" outbreaks in which the causative organism was identified were caused by the Staphylococcus albus aureus. About as many of these were associated with meat as with pastry vehicles.

Trichinosis reportings are on the increase. Particularly noteworthy are the large mortality rate and the wide distribution of the cases.

And still people are dying from eating insecticides—instead of the roaches. The notes accompanying this compilation of the USPHS make interesting reading to the food control official as well as to the social worker and to the nutritionist. In spite of all that has been said and written on how to handle foods, there is ample evidence that the task still demands more lines upon lines more precepts upon precepts.

The epidemiological evidence which attributes many of the outbreaks to certain food products is about as uncertain, to say the least, as the normal situ-

TABLE 1
Comparative Number of Outbreaks in 1941, 1939, 1938

<table>
<thead>
<tr>
<th>O</th>
<th>C</th>
<th>D</th>
<th>O</th>
<th>C</th>
<th>D</th>
<th>O</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1941</td>
<td>60</td>
<td>1,190</td>
<td>24</td>
<td>43</td>
<td>2,254</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>1939</td>
<td>37</td>
<td>935</td>
<td>4</td>
<td>41</td>
<td>2,599</td>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td>1938</td>
<td>14</td>
<td>1,10</td>
<td>53</td>
<td>148</td>
<td>3,782</td>
<td>12</td>
<td>70</td>
</tr>
<tr>
<td>Undetermined Vehicles</td>
<td>20</td>
<td>505</td>
<td>24</td>
<td>17</td>
<td>1,203</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>340</td>
<td>6,848</td>
<td>165</td>
<td>249</td>
<td>9,748</td>
<td>28</td>
<td>168</td>
</tr>
</tbody>
</table>

O = Outbreaks. C = Cases. D = Deaths.
In this connection it will be interesting to food control officials to learn the result of the new procedure that is being inaugurated in New York City. There the Health Department is undertaking the education of food manufacturers and food handlers in the important matters of food sanitation. This places the responsibility of proper food handling squarely on the dealer. It is a procedure that has worked well in milk control. Health officers have found that the milk companies themselves could do a better job in the sanitary handling of their milk when the Health Department held them responsible and cooperated with them, than when the Health Department tried to police an enlarging shed in the face of increasing technical intricacies in milk processing and handling. What has been so successful in one branch of the food industry might well be applied over the whole. New York is trying it. We wish them Godspeed.

J. H. S.

Associated Illinois Milk Sanitarians

When the Illinois Public Health Association was formed, slightly more than two years ago, milk sanitarians connected with city (other than Chicago) and county or district health departments organized a session in that organization. But this limited the membership to milk control officials.

On October 29, 1942 (during the American Public Health Association meeting in St. Louis), a group of milk sanitarians met in East St. Louis, and laid plans for a state-wide organization of Illinois milk sanitarians. At that same hour the Executive Board of the I.A.M.S. was formulating the procedure—subsequently officially approved—for the affiliation of such organizations with the I.A.M.S.

In December, an organization meeting was arranged for in Chicago on January 18. A constitution and by-laws were adopted, and the Journal of Milk Technology was designated as the official organ. This new group is the first to apply for affiliation status. Action on its request is now pending.

This great north central territory needs such an active organization. We commend the initiative of its leaders in bringing into being such a potentially powerful factor for the advancement of milk sanitation.

J. H. S.
DAIRY SCIENTISTS GO TO CENTRAL AMERICA

Dr. Dahlberg of Geneva Experiment Station One of Party to Study Dairy Industry in Americas

Dr. A. C. Dahlberg, head of the Dairy Division at the New York State Experiment Station at Geneva, has been granted leave of absence by Cornell University in order to carry on a special mission in Central America and the northern part of South America for the United States Department of Agriculture and the Office of the Counsellor on Inter-American Affairs of the State Department.

The request for Doctor Dahlberg's services came from the Department of Agriculture, and the undertaking has to do with the better nutrition program of the Americas to help the war effort.

Doctor Dahlberg went to Washington for instructions and left for Central America to accept leave of absence by Cornell University in order to carry out a personal contact with nearly six thousand milk pasteurization plants in Illinois. His wide and varied experience in the dairy field fits him admirably for his new post. Close personal contact with nearly six hundred dairy plant operators in Illinois and of counsel with government and educational officials, dairy plant operators, and dairy plant operators in an aid to stimulating milk production, increasing dairy manufactures, and improving dairy practices.

Dr. R. E. Hodgson, an authority on dairy cattle formerly with the Washington State College and now with the U. S. Department of Agriculture, will accompany Doctor Dahlberg. Most of the travel will be by plane.

In 1937, Doctor Dahlberg attended the World's Dairy Congress in Berlin as an official delegate from the United States.

LAVEN GOES TO WASHINGTON

S. V. Layson has resigned as Milk Sanitarian in the Illinois Department of Public Health, Springfield, to accept a position in the Priorities Section, Dairy Branch, Food Distribution Administration, Washington, D. C.

During the fifteen years that Layson has been the head of the Milk Sanitation Section in Illinois, and responsible for the administration of the Milk Pasteurization Plant Act and the Grade A Milk Act, no milk-borne disease epidemics have been caused by pasteurized milk. The consumption of pasteurized milk has increased from a relatively small amount until at the present time 85 percent of the urban milk supply in the State is pasteurized. He has gained a national reputation in the field of public health milk sanitation. He is Chairman of The Dairy Farm Methods Committee of the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS.

Secretary-Treasurer of the newly formed Associated Illinois Milk Sanitarians, a member of the Executive Council of the Illinois Public Health Association, a member of The American Dairy Science Association, and of Gamma Sigma Delta, the Honor Society of Agriculture.

Layson is a graduate of South Dakota State College and the University of Illinois. His wide and varied experience in the dairy field fits him admirably for his new post. Close personal contact with nearly six hundred milk pasteurization plants in Illinois for many years has familiarized him with the problems and needs of the industry.

An Epidemic of Food Poisoning Due to Pasteurized Milk

FRED W. CAUDILL, M.D., M.P.H.
Director, Division of Communicable Disease, State Department of Health of Kentucky

AND

MELVIN A. MEYER
State Milk Sanitarian, Bureau of Foods, Drugs and Hotels, State Department of Health of Kentucky

On May 11th an investigation was made of an unusual illness chiefly among children, that was occurring in a town of 8,000 population in Central Kentucky. All affected had nausea, vomiting, varying degrees of prostration, and a few had diarrheae. For the most part, the attacks were mild, varying in duration from one to three or four hours. A hasty survey, made at the time that the illnesses were occurring, indicated that all who were sick were obtaining milk from one supply. A few days later, a more complete investigation of the outbreak was made. Not only the milk route of the suspected dairy, but the routes of two other large distributors in the community, were made the subject of study. The suspected dairy will hereafter be referred to as dairy A, the other two dairy being referred to as B and C, respectively. Time did not permit investigation of each customer on each of these 3 routes.

In the 33 families on the route of dairy A were 112 persons, 32 of whom had been sick. This gives an attack rate among these persons of 28.6 per cent.

In contrast were the 21 families on the route of dairy B, in which were 80 persons among whom there were no illnesses, and the 11 families on the route of dairy C in which were 41 people among whom there were no illnesses. This data is summarized in Table 1.

<table>
<thead>
<tr>
<th>Number of Families</th>
<th>Number of Sick</th>
<th>Attack Rate per 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy A 11 33</td>
<td>19 33</td>
<td>28.6</td>
</tr>
<tr>
<td>Dairy B 21 80</td>
<td>0 0</td>
<td>0</td>
</tr>
<tr>
<td>Dairy C 11 41</td>
<td>0 0</td>
<td>0</td>
</tr>
</tbody>
</table>
In the families obtaining milk from dairy A were 32 children under 10 years of age and 80 individuals above this age. Of the 32 children, 23 were sick, giving an attack rate of 71.9 per hundred in this age group. Among the persons in these families over 10 years of age only 9 cases occurred giving an attack rate of 11.2 per hundred. From this it is obvious that the disease attacked young children much more frequently than it did older children and adults. This high rate in children under 10 years of age is probably attributable to the fact that children of this age are more regular milk drinkers in families purchasing milk. This data is summarized in Table 2.

**Table 2**

<table>
<thead>
<tr>
<th>Attack Rate by Age—Dairy A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age by Number of Persons</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>0-9</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

The families on the route of dairy A obtained their food supplies, other than milk, from 10 different groceries. Families living in one section of the town naturally purchased foods, other than milk, from their neighborhood grocery, while those living in another and separate section of town just as naturally purchased their foods, other than milk, from the grocery nearest to them, there rarely being any source of food supply common to two such groups of families. The only two items common to both such family groups were milk and water. Water is easily ruled out as the medium of transmission by the fact that the illnesses were limited entirely to families obtaining milk from dairy A, no cases occurring in the families obtaining milk from dairies B and C, although the families on all these routes were using a common water supply. Further, some of the 33 families obtained their food supplies from as many as 4 entirely different groceries. These facts make it unlikely that any food other than milk from dairy A was the medium through which the causative agent was transmitted.

Of the 32 people who were sick, 25 were able to furnish quite accurate information as to the time of day when the suspected milk was last taken and the time of day when onset occurred. The interval of time between last taking the suspected milk and the onset of illness ranged from 1 to 7 hours, with an average of 4 hours. This short incubation period strongly suggests that the etiological agent was a pre-formed toxin. If the etiological agent had been an organism the incubation period would likely have been longer.

**Summary of Investigation of Plant**

The investigation of the pasteurization plant and dairy farms of dairy A was made by the State Milk Sanitarian. This investigation revealed that, at the time of the outbreak, the milk of dairy A was being taken, according to the best information obtainable, from 102 cows; of these, 98 were distributed into 4 different herds and milked in as many different barns by different people, were examined; 4 had been sold for slaughter subsequent to the outbreak because of admitted sanitary difficulties with udders. Approximately 300 gallons of milk were being taken daily from these herds and pasteurized at a central pasteurization plant. Two hundred quarts of this milk were being labeled Grade A raw milk, in spite of the fact that it was pasteurized.

All the barns showed gross lack of attention to proper sanitation. Two of them had no milk houses at all; two had milk houses in poor state of repair. The water supplies of all were considered poorly safeguarded. Milk was being strained in the barn at all four places. A milking machine was being used at only one and this machine was in a very dirty condition.

Milk stone was present on utensils, particularly the pasteurizing vat, showing the etiological agent was a pre-formed toxin. Pasteurization would account for the fact that no staphylococci could be isolated from the pasteurized specimens obtained on the day the illnesses occurred.

**Summary and Conclusions**

1. Epidemiological investigation revealed that all cases of illness occurring in individuals making up the 65 families investigated, obtaining milk from 3 dairies, were in 33 families that obtained milk from dairy A.

2. The attack rate among individuals obtaining milk from dairy A was 28.6 per 100.

3. The disease attacked children under 10 years of age more frequently than older children and adults. This is probably attributable to the fact that children of this age are more regular milk drinkers.

4. The barns and pasteurization plant of dairy A were found inadequate and in poor sanitary condition.

5. Nine of 98 milk producing cows were found to have physical evidence of udder infection. Four cows had been sold from the herd because of admitted udder difficulty.
6. Forty-two of the 98 specimens of milk taken on strip-cup tests from the 98 cows showed non-hemolytic staphylococci. Three of the 42 specimens gave abundant growth of non-hemolytic staphylococci. The organisms from 2 of these 3 specimens were found to be toxin-producing staphylococci. The organisms from 1 of these 3 specimens were found to be coagulase negative. Since most of the individuals of these 3 specimens were found to be coagulase negative, they were not tested for toxin production.

7. No staphylococci were isolated from milk taken on strip-cup tests from the pasteurized specimens taken from the pasteurized specimens taken from the milk route on the day that most of the illnesses occurred. This was probably due to the fact that the organisms were killed by pasteurization after the milk had been allowed to remain in the vat overnight at temperature as high as 76°F. It is not likely that the heat of pasteurization would, however, have destroyed the toxin produced by these organisms.

Two-Stain Method for Direct Bacteria Count

P. H. H. Gray

Department of Bacteriology, Macdonald College, McGill University
Quebec, Canada

A two-stain solution has recently been developed, with especial reference to differentiating capsules on bacteria. The solution has also been found to be applicable to staining milk films. The solution is prepared as follows:

A. 1% aqueous methylene blue.
B. 1% aqueous basic fuchsin.

Mix A and B.

Milk films, either of raw milk, or of pure cultures of bacteria in sterilized milk, are dried and treated (if not skim milk cultures) with xylene, which is washed off with methyl alcohol, and then xylene and methyl alcohol. Bacteria and other cells are stained blue. Serum solids and casein are stained pink.

The stain has not been tested in routine bacterial milk counts. It has an apparent advantage over the Broadhurst-Paley stain in that there is no eye-strain in picking out the cells; it may be considered to have an advantage over the Broadhurst-Paley stain in that it is easier to prepare.

The solution has given good results with raw market milk, both fresh and sour, and with pure cultures of acid-forming and inert bacteria in milk, e.g., Streplococcus lactis, Str. salivarius, Lactobacillus bulgaricus, L. casei, and acid fast bacteria of the genus Mycobacterium.

Report of the Committee on Sanitary Procedure

C. A. Abele, Chairman
City Health Department, Chicago, Illinois

Your committee has operated under serious handicaps during 1942. The construction of milk pasteurizing equipment has virtually been discontinued; consequently, new developments in equipment are not being noted. The only real activity in this line is the search for alternative materials to replace critical metals.

Because of these circumstances the committee was called upon during the year to consider only one subject—glass piping, one type of substitute for metal milk piping.

The nature of this product, the design of the connections needed, and the manner of its use, have been described in the Journal of Milk Technology (1), and by a speaker on the program of this meeting (2).

Although a number of experimental installations of sections of this type of glass milk piping have been made about the country, only a few members of the committee have been in position to make a critical study of operations; and there has been no opportunity to study, except perfunctorily, those parts of the connections which differ from approved standard fittings, because of the nature of their composition is still in a state of flux.

Members of the committee who have had an opportunity to study glass tubing in operation desire, however, to amplify the account of advantages of glass piping in the Journal, description, and also to call attention to certain disadvantages which should be made known to prospective users.

In addition to ease of cleaning and ready visibility of the inner surface, listed in the Journal description, visibility of the rate or condition of the flow through the section constitutes a very practical advantage in certain specialized situations. When a section of glass piping is placed on the suction side of a regenerator, leakage which permits the incorporation of air is readily detected. When a section of this piping is placed in the flow-diversion line of a flow diversion valve, incomplete drainage of the line is revealed. The installation of a section of this piping in any horizontal milk pipeline will reveal incomplete filling of the line with bactericidal solution, which is a frequent cause of inefficiency or failure of this type of bactericidal treatment.

It has been claimed that leakage at the joints of glass piping is minimized by the resiliency of the gaskets used, and that a high degree of flexibility of the pipeline results. The use of connections of a similar type would undoubtedly have the same effect upon metal piping; consequently, reduction of leakage at joints, and increased flexibility of the line, can hardly be claimed as advantages inherent to glass piping.

Some of the disadvantages of glass piping are inescapable; others are less obvious.

1. Susceptibility to breakage is the main disadvantage. A section of this piping cannot be carefully dropped into the wash vat or swung around without regard to the proximity of a column or massive stationary equipment, nor can fittings be tossed into a vat into which such pipes have been placed, without dire consequences. The connections of a metal pipe line in which a section of glass piping is to be inserted must all be tightened before the glass-metal connections are made, else the torque or shock caused by the application of a wrench or the striking of a blow may—and probably will—crack the glass section or chip the bead at an end.
2. Glass piping is not suited for use in lines connecting which is not firmly fixed in position; that is, which is subject to jars or slight movement, such as suspended drop-tanks or movable pumps. Lines including glass sections should preferably be suspended from hangers, unless quite short.

3. The danger of chipping the beaded ends of glass pipe sections in wash-vats encourages the practice of leaving the gaskets in place, which might result in a tendency to neglect cleaning under the gaskets.

4. Fracture of the end bead, and chipping of the appearance of particles, of glass in the pipes is not suited for use in lines including glass sections in wash-vats especially dismantled for washing. More time is distributed in glass bottles, it is preferably dismantled for washing, more time is required for dismantling, washing, and assembling such pipe lines. These potential disadvantages singly or in the aggregate do not, in the opinion of the members of the committee who have studied the matter, constitute justification for opposition by milk sanitarists to the use of glass piping as an alternate for metal milk piping, in the light of existing knowledge on the subject.

Members of your committee have undertaken to canvas the situation with respect to dairy farm equipment, for the purpose of ascertaining the possibilities for substituting for the metals currently used in their manufacture, but without striking success.

The use of plastic materials for making milk piping is under experiment and test. The substitution of glass for metal in the construction of milk piping awaits only the granting of priorities for and the construction of the necessary molds and dies.

The committee deems itself compelled, because of the current and increasing degree of inability to obtain replacements or additional milk plant equipment, to impress upon all milk sanitarians their responsibility to insist that processors of milk exercise the greatest care in the operation and maintenance of plant equipment, in order that it may continue in satisfactory service for as long a period as possible.

The committee has completed an action initiated by the 1941 committee. This has consisted of the notification of the Howe Sanitary Motors Company, of Howell, Michigan, that Howe Sanitary Motors, built in frames Nos. 204, 224, 225, and 254 meet the 3 A specifications for sanitary motors, as published in the Journal of Milk Technology, January–February, 1942, pp. 32–34. The Dairy Industries Supply Association, and the International Association of Milk Dealers, have been notified of this action.

C. A. Abele, Chairman
C. D. Daley, A. W. Fuchs
W. D. Dotterer, G. W. Grim
H. C. Erickson, M. E. Parker
A. C. Fay, Sol. Pincus
M. R. Fisher, G. W. Putnam
C. W. Weber

BIBLIOGRAPHY

Serious Flaws in Milk Control Policy Which Impair Our War Effort
L. C. Bulmer
Director, Bureau of Food and Dairy Inspection, Jefferson County Board of Health, Birmingham, Alabama

Today, more than ever before in our history, there is growing public disapproval of the manner in which the American city milk supply is being administered. It can scarcely be looked upon as a permanent solution that has been precipitated entirely as a result of the present National Emergency, although it is a problem which concerns it enormously. Many years before Pearl Harbor, it was evident to some that there was mounting a tide of criticism in this country of the high price of milk. And before the war, a large number of the more alert public officials, including milk officials, conscious of public opinion, had already started to face a most searching investigation into the question of the city milk supply.

With America's entrance into the war, it seemed at first as though the milk issue would be postponed indefinitely. People had more pressing matters to concern them. The price of most foodstuffs began to spiral upward, and milk, in this regard, was not unduly conspicuous. And, besides, the public seemed almost overnight become more conscious than ever of the importance of the nutritional aspects of milk and its products. But, with the same economic impediments present as before the war, which obstructed them as they do now the free action of the heart of market milk production, it was naturally not to be expected that the milk question could remain for long out of the public eye. You cannot cure a disease, which requires a surgical operation, by ignoring it. And so we recognize now the same old trouble breaking out once more, but this time in another spot, in the form of an acute milk shortage.

Before casting any reflections upon others, it behooves us first to take stock of our own responsibilities as milk sanitarians and look for anything that we are dealing with or have done, that may affect the present serious problem in regard to the procurement of an adequate supply of palatable, safe milk at a reasonable price to meet the ever pressing needs of the Army and our many large centers of industrial population.

The Nutritional Angle
Unquestionably, the most serious defect at the core of administrative control of city milk supplies in America today, is the manner in which the nutritional angle of the problem is being either overlooked, or totally ignored by the vast majority of Boards of Health. This seems true, with but a few illustrating exceptions, all the way from the United States Public Health Service, right down to the board of health in our smallest town.

This is a pitiful situation. For twenty long years we have been in possession of scientific facts pertaining to newer knowledge of nutrition, and have understood the important relationship of increased consumption of...
milk and its products to the public health. And yet, with the exception of a few health departments there has been very little, if anything, done about it, and many seem to have completely closed their eyes to the question of whether this advice is even practical, economically speaking or attainable. That is, of course, until we have radically changed our present conception of the aims and purposes of public health milk control. Obviously, the poor man with a large family cannot even hope, at present, to comply with this one-shoulder-shoulder-sor-oftalked-of idea of something about the economics of the milk question.

If I were asked to express an opinion as to the most necessary single amendment to the Standard Milk Ordinance, or to any of the other nearly two thousand conflicting milk ordinances in America at the present time, I would venture this suggestion: Make clause one of every milk ordinance read as follows: "It shall be the duty of the health officer not only to insure a safe, unadulterated milk supply for the community, but it shall be also his responsibility to at all times perform such duty in a manner that will in no way obstruct or hinder the procurement of a plentiful supply of milk, at a price that is within the reach of all classes of people."

In the absence of much needed unification of milk regulations in this country, this thought is not submitted in the belief that it is either practical, or that it could be made effective, pending much closer coordination of our entire public health milk control system than we have today. It is presented rather to illustrate what our public health policy in milk control ought to be, if we are to get in line with our over-all modern day knowledge on the milk question. And such knowledge seems to present two fundamental public health truths of the city milk supply which unfortunately have not yet been fully assimilated by all concerned. These are:

**Solved:** Milk Safety! There is no longer any great or mysterious problem to be considered in providing a safe city milk supply. Indeed, science solved this angle of the milk question long ago. It is now only a matter of applying such technical knowledge as we have in a practical, realistic manner.

**Unsolved:** Milk Nutritional Angle! The real public health milk problem of today is clearly linked to nutrition. And it seems that our present tragic disregard of this fact is not only seriously impairing, but actually threatening, the national nutrition program which is, of course, so vital to our War Effort.

So many things happened in 1939 including the march of Nazi Germany into Poland, and the plunging of Europe into a sea of flames, that it is rather difficult to recall a number of important events of that year, particularly in respect to science. But in 1939 there were two great pieces of technical work made available, by which, if carefully reviewed and weighed together, present a most complete and comprehensive summary of correlated facts, or should I say, a birds-eye-view of the sum-total of our modern day technical knowledge over the past twenty years, in respect to the entire question of food in relation to human life. I refer to Shrader's extensive work, Food Technology, which embraces the entire field of the subject and where the milk question never loses its true significance, and to Food and Life, a wonderful contribution by the United States Department of Agriculture, devoted completely to a discussion of all angles of the nutritional side of the food problem, from the point of view of both humans and animals. And it is the complete picture, so clearly presented through these two timely and forceful works of science that has caused me to have a completely new conception of what should constitute the aims and purposes of official milk control, and this could not be accomplished until my older view on the subject were re-examined and modified where necessary.

Let us consider a quotation from McLester's *Nutrition and the Future of Man*:

"In the past, science has conferred on those people who avail themselves of a newer knowledge of infectious diseases, better health and a greater average length of life. In the future, it promises to those races who are taking advantage of the newer knowledge of nutrition, a larger stature, greater vigor, increased longevity, and a higher level of cultural attainment. To a measurable degree, man is now master of his own destiny, where once he was subject only to the grim hand of Fate."

The point to be made, of course, in respect to McLester's quotation, is that the truth he so eloquently expresses in regard to nutrition, is unfortunately not one that is embraced as a part of the philosophy which underlies our public health milk control policy in America today.

**The Question of Aesthetics**

Let us look a little deeper into this question of aesthetics in relation to curtailment of the flow of milk for market purposes. It is often said that the terms "aesthetics" and "milk quality" are used loosely and mean different things to different people. This is true, but there is only a slight confusion in the term "aesthetics" meaning something different to one and the same person, particularly in public health circles.

Take some sanitary engineers, for example. Their aesthetic tastes are not so keen as those of some of their fellow citizens who have a fine sense of what is beautiful. But these aesthetic tastes are not to be determined by a rule, no matter how fine it may appear, but have common-sense enough to apply, in a practical way, the knowledge that they have placed into our hands.

The beauty, however, of the positive control over a milk supply as received at a pasteurization plant, as contrasted with the inflow of water at its treatment plant is this: Water cannot be rejected as a rule, matter how bad it is; whereas we can actually stand on the platform at a pasteurization plant with our acidimeter, sediment tester, our simple equipment for the methylene blue test, and with our microscope and the various other technical devices that laboratory research has placed into our hands, we can determine to within more than ninety-nine percent of accuracy whether or not milk is free from adulteration, from sediment, carries no more than a reasonable bacterial content, possesses good taste, and otherwise whether or not it is a pure, decent, wholesome product fit to be pasteurized. We may reject it if it is not. We can do all this without even having ever set foot on the dairy farm from which we have derived, very much in the same manner as science has now enabled a pilot to fly blindly to any part of the earth, if he will but use the technical instruments with which he is blessed. We may overcome many difficulties in our milk work, if we will but stop being antiquated in this fast moving world.
The experiment of trying to obtain aesthetically pure Certified Milk has produced no positive results in approximately half a century. Indeed, many practical-minded eminent physicians today recommend pasteurizing this product. Moreover, other equally eminent physicians prescribe evaporated milk now for infant feeding, which, of course, has no official aesthetic requirements whatsoever. And since the price of fluid milk at this time is practical beyond the poorer classes, the question presents itself as to which laboratories are justified in expending such much time and effort in continuing our present day follow-your-nose dairy farm inspection system in an idle search for aesthetically clean milk for pasteurization purposes.

This is not to argue that farm inspection is entirely unnecessary, but rather to emphasize the value of these unprofessional endeavors. Dairy farm inspection is to be derived from concentration on education in respect to methods, rather than focusing so much attention on expensive premises and equipment. It seems clear that in many of our fast growing milk sheds, where sources of milk production are scattered over a vast area, local boards of health with limited finances, inadequate and frequently inexperienced personnel cannot expect to conduct such education in a worthwhile manner, and that where they try to do so, it is often at the expense of more important activities—particularly, adequate platform inspection and proper constant supervision over the pasteurization process and subsequent handling of milk.

In cities where milk is permitted by law to be sold in its raw state, farm inspection, of course, is necessarily a responsibility of the board of health which should not be relinquished. But, in the presence of pasteurization of the product it would seem that farm inspection should be considered the definite responsibility of industry. Indeed, in the face of rigid platform inspection, it would undoubtedly pay industry to assume such responsibility, and we may be sure that a pretty thorough job would be made of the undertaking as a safeguard against instant rejection of products, which, of course, has no official aesthetic requirements whatsoever. And since the price of fluid milk at this time is practical beyond the poorer classes, the question presents itself as to which laboratories are justified in expending such much time and effort in continuing our present day follow-your-nose dairy farm inspection system in an idle search for aesthetically clean milk for pasteurization purposes.

It seems proper to refer to the fact that such administrative policy is headed down to state and city boards of health frequently from the United States Public Health Service, which itself has such organization in respect to milk control. Indeed, through its own limited organization, with no nicely balanced technical personnel, it has no alternative but to extend its advisory milk service through its corps of sanitary engineers, many of whom do not even pretend to be milk specialists. The said Service, as we all know, possesses several highly esteemed milk specialists, but for the scope of the job it undertakes, the organization for the work is neither balanced nor adequate. This serious handicap in itself makes the position of the United States Public Health Service on the part of the United States Public Health Service is a matter that is felt directly and indirectly in milk control matters throughout the country.

Bearing in mind that experience has demonstrated that it takes practically a lifetime to make a dairyman, it is impossible for a dairyman to be qualified to be a milk specialist with little or no technical qualifications or experience in dairy science, trying to spring up like mushrooms overnight. I think it is only appropriate to quote in part, three most amazing statements from reprint #2051 of the Public Health Reports dated March 31, 1939, of the Public Health Service:

First the admission that "Practically none of the graduate sanitary engineers in the field today included a study of milk sanitation in their undergraduate courses," (this is still true). Yet, irrespective of this fact, the advice follows: second, "where possible, milk control work should be a function of the State sanitary engineering division," and to make up for shortcomings, so to speak, the final word of advice is: third, "those sanitary engineers who have already graduated and who are now engaged in or may in the future wish to undertake milk sanitation work should either attend post-graduate courses in milk sanitation or one or more of the milk sanitation short courses or seminars which are being conducted by various State boards of health and the Public Health Service."

In other words, get wise, even though through a short-cut. Again may the question be asked: is there any doubt that we have a public health milk problem wherein the nutritional angle of the consumer, and the economics of the dairy industry are lost sight of? Those of us who appreciate the splendid activities (insofar as they go) of the Public Health Service, both past and present, in many spheres of endeavor, particularly in research, public health nursing, epidemiology, et cetera, must naturally conclude that official milk control is just not one of the long suits of this high ranking federal agency. But despite this conclusion, the fact remains that anything that the Public Health Service says or does, in respect to the milk question, is apt to be magnified in the eyes of many, mainly because it is from the United States Public Health Service. It seems highly probable that the Public Health Service itself is not truly conscious of this, or
otherwise it would, we may be sure, exercise more appropriate safeguards in this respect.

I do not propose to touch here upon the delicate question in official milk control of the merits and demerits of sanitary engineers, veterinarians, and dairy graduates or even laymen, many of whom (I refer to the laymen) occasionally make more useful practical applications in their milk control work than do those with academic training. The truth is, all are necessary. And on the other hand, it seems folly to speak of which of these professions have contributed most to the solution of the milk question thus far, since the answer to that argument is self-evident. The reply is that it is not the sanitary engineer, veterinarian, or the dairy graduate in the true sense of the term, but on the contrary, none other than the laboratory bacteriologist and chemist in research. This is not an opinion; this is history.

Another self-evident fact that seems worthy of note is that milk control is not a matter or a field but is a matter or a field of engineering. As such, it is not subject to the same faulty organization of milk control. This is a true statement. It is with such thoughts in mind, we trust it will, toward the entire problem.

Firstly, the sphere of influence of the United States Department of Agriculture is perhaps not felt to the extent it should be, in framing public health policy. This is to be regretted because of the broadness of experience in the fields of nutrition and dairy economics. Secondly, the influence of the United States Public Health Service in milk control matters is considerable, and probably much beyond the scope of this organization actually desires or can do justice to, due to inadequate organization and facilities.

Thirdly, the influence of the Office of the Surgeon General of the United States Army, through its Veterinary Corps, is felt in a positive and most unmistakable manner. The average Army veterinarian, though not a veterinary, does want to tear things up or to disturb the atmosphere, but, no less, he is comparable rather to a very kindly, good-natured sort of a bull, who finds himself unexpectedly in a china shop. What to do about the matter he is still not quite sure, but until he makes up his mind, it would be well if we all kept our fingers crossed. To return to the United States Public Health Service, Rosenaur states: "Public health administration in the United States is a police power which rests with the states. The federal government, however, plays an important part in coordinating, cooperating, demonstrating, investigating and educating. This is the function of the Public Health Service." It will always remain a very deep mystery to some of us, how anything of such a controversial nature as the Standard Milk Ordinance ever escaped past the proverbial watch dog of this august organization, with all of its lofty ideals as to aims and purposes; originally intended, of course, to promote public health coordination of the forty-eight states rather than to split the majority of these states wide apart on a purely debatable issue.

The Standard Milk Ordinance has been with us for practically twenty long years. It has had a fair trial, and it comes nearer unifying milk control in America today than a decade ago. Throughout this prolonged period of time, approximately only one-third of the states of this country have adopted it, whereas there seems no longer any likelihood that the majority ever will, within our time, or within the period of this grave National Emergency, unless the Public Health Service makes a realistic approach, as we trust it will, toward the entire problem.

Because it is the United States Public Health Service, however, my feeling is that despite all the other reasons we should endeavor to find ways and means of retaining the Standard Milk Ordinance in some modified form for sentimental reasons, out of our respect, if for nothing else, for the prestige of this important federal agency. After all, I trust we are almost all agreed that we need uniform regulations, and with a wholesome degree of compromise on all sides, I see no reason why the Standard Milk Ordinance should not be utilized as the framework about which this end may be attained.

CONCLUSIONS

It is with considerable reluctance that I place myself in the position of being critical of our present day system of public health milk control. Like many of you, I have been associated with this particular system for a long period of time, and have had an opportunity over these years to study its virtues and its faults. Our present uncoordinated system of milk control constitutes not only a serious blot upon the enlightenment and prestige of public health authorities throughout America, but in addition, it is jeopardizing the economical side of farm dairy control, often with no true public health purpose to be served, while losing sight of the growing public health need of more adequate supervision and control of milk as received at the plant, and of its subsequent processing and handling.

3. That due to faulty administrative policy on the part of many state and city boards of health, official milk control is at present improperly organized, and the technical personnel engaged is frequently lacking in well-rounded experience, with a result that both the economical and nutritional angles of the milk problem are being seriously mishandled.

4. That many of the obstacles delaying adoption of unified regulation and a more coordinated system of milk control, in this country, may be attributed to the same faulty organization of milk control as referred to in conclusion number three.

5. That while it would seem important for control over all final milk safeguards to remain in the hands of city departments of health, including determination at the plant of the fitness of milk for pasteurization purposes, that is, pending the creation of some appropriate state system of milk control, economical considerations, otherwise point to the advisability of divorcing farm inspection entirely from the scope of activities of local health departments and consideration being given to the wisdom of placing it in some way under the broader experience and influence of the United States Department of Agriculture, through a new form of organization to be studied and set up.

(Continued on page 100)
The Relationship Between the Temperature of Pasteurization (holding method) and the Appearance of Cooked Flavor in Homogenized Milk

BERNARD SPUR

Milk Research Laboratory, Children’s Hospital of Philadelphia

Homogenization not only introduces into milk a new “creamy” or special “homogenized” flavor element, which to most people makes the milk more palatable, but also tends to suppress or counteract any developed cooked flavor from over-pasteurization. In other words, homogenization of milk could make possible pasteurization by the holding process at a slightly higher temperature than the usual one without danger of developing a cooked flavor. This property could prove useful in the sanitary safeguarding of milk, since the bacterial count tends to fall in proportion as the heat treatment of pasteurization becomes progressively increased.

The problem of flavors in milk has always been difficult because of the individual factors involved. Even when evaluations are confined solely to the so-called cooked flavor, the problem of obtaining complete uniformity of judgment is almost insuperable. The reason is that every person has his own idea about flavor and no two persons have the same sensitivity towards change in flavors. Nevertheless, a trained person can develop a rather stable and fine sense for milk flavors. Experts, as a rule, will be able to agree on off-flavors within a certain not-too-wide range. If a sound judgment is to be obtained, it is particularly important to state at what temperature the milk sample was tested, as the tasting temperature is a dominating factor in the detection of off-flavor. Too often the

value of flavor experiments has been greatly reduced because of neglect of this fact.

As change in milk flavor is connected with chemical processes, it might be possible to replace the unstable human taste with a chemical test. Such a test has been developed for the cooked flavor (1)—depending on the creation of sulfhydryl in milk during the heating process. The sulfhydryl compounds seem to be responsible for the cooked flavor and can be detected by help of a special reagent. But as the final judgment is to be given by the consumers, the public, who rely entirely on their individual tastes, it is easy to see the limited value of a chemical test, which in the last instance has to be compared with the human taste to determine its range of usefulness.

Since the following experiments were carried out by a person experienced in milk testing, they may be of interest in contributing to the problem of how much heat treatment can be applied to homogenized milk during pasteurization if cooked flavor is to be avoided.

To study the flavor problem, a number of experiments have been carried out on market homogenized milk in Philadelphia.

In the first set of experiments, typical samples of market milk were selected from twelve dairies using different holding pasteurizing temperatures (Table 1). In all the cases, pasteurization preceded homogenization of the milk. The samples were investigated for cooked flavor. To prevent any influence on the test from advance knowledge about the temperature to which the milks had been exposed, the pasteurizing temperatures used were not revealed to the flavor investigator until the whole experiment was finished. The heating temperatures are those applied by the dairies, and have the exactness possible to obtain in a commercial dairy plant. The milk was pasteurized at a temperature of 70°F.

Since the milk is cooled down immediately after leaving the homogenizer and hence exposed to the higher temperature here only a short time, the heating effect from the pasteurizer must be regarded as the dominating factor in the production of a cooked flavor. With increasing pasteurizing temperature there is a clear tendency toward increased numbers of tests with cooked flavor. But the observations show that a pasteurizing temperature up to 150°F. is satisfactory for homogenized milk even if the milk now and then should reach the temperature of 156°F. during later passage through the homogenizer.

To obtain a confirmation of this preliminary test, samples of homogenized milk were flavor-tested over a long period of time (Table 2). One dairy performed the pasteurization of the milk after the homogenization in one of its plants (A1), and pasteurization of the milk before homogenization in another plant (A2). It is an interesting fact that 3% percent of the samples showed cooked flavor in the homogenized-pasteurized milk while no cooked flavor was detected in the pasteurized-homogenized milk. Although these few tests are not enough for any generalization, they indicate that with constant time and temperature of holding there is less tendency for the

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of Cooked Flavor in Homogenized Milk (Preliminary Tests)</td>
</tr>
<tr>
<td>(July-August 1940)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dairies</th>
<th>No. of tests</th>
<th>Pasteurizing temperature</th>
<th>Homogenizing temperature</th>
<th>% Tests with cooked flavor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>130</td>
<td>150°F.</td>
<td>150°F.</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>150°F.</td>
<td>150°F.</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>116</td>
<td>3°F.</td>
<td>0°F.</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>150</td>
<td>156°F.</td>
<td>156°F.</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>150</td>
<td>156°F.</td>
<td>161°F.</td>
<td>2</td>
</tr>
<tr>
<td>F</td>
<td>150</td>
<td>156°F.</td>
<td>156°F.</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>150</td>
<td>156°F.</td>
<td>156°F.</td>
<td>6</td>
</tr>
<tr>
<td>H</td>
<td>119</td>
<td>156°F.</td>
<td>156°F.</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>688</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
appearance of a cooked flavor when pasteurization preceded homogenization. Some confirmation may be found when Dairy E and Dairy F are compared. Each used the same pasteurizing temperature. In homogenized-pasteurized milk, 4 percent of the samples showed cooked flavor while no cooked flavor samples were recorded in pasteurized-homogenized milk.

But on the other hand, Dairy C showed 2 samples and Dairy D showed 4 samples with cooked flavor although their pasteurizing temperatures were recorded as 148°F. and the pasteurization was performed before homogenization. It is possible that the holding temperature in these few cases accidentally might have exceeded the customary pasteurizing temperatures, or error may have been introduced by virtue of the relatively inexact flavor test even though performed by one and the same individual. Tables 1 and 2 taken together show a clear tendency toward increasing cooked flavor samples when higher pasteurization temperatures are applied. It must be stated that the extensive experiments recorded in Table 2 show a much more favorable picture than the limited experiments recorded in Table 1. The maximum cooked flavor samples for a pasteurizing temperature of 155°F. is recorded as 14 percent in Table 1. and only 7 percent in Table 2.

SUMMARY

Experiments indicate that homogenization of milk makes it possible to apply pasteurizing temperatures by the holding method up to 150°F. without any danger of developing a cooked flavor in commercial market milks. Furthermore, there is a slight indication that at this temperature there is less danger of the appearance of a cooked flavor when pasteurization precedes homogenization rather than when homogenization precedes pasteurization.

REFERENCES


HOLM SUCCEEDS ROGERS

Dr. George E. Holm, biochemist in the U. S. Bureau of Dairy Industry since 1920, has been appointed chief of the Division of Dairy Research Laboratories to succeed Dr. Lore A. Rogers, who retired in August, having completed more than forty years in dairy research work in the U. S. Department of Agriculture.

machine parts. They are given a cold rinse right after milking, then taken apart and scrubbed, after which they are put in a bucket with washing powder and boiled one minute, they are then steamed for 4 minutes and stored dry. The pulsator is washed in vat, put on a steam jet for 5 minutes, and oiled once a week. The hose is steamed for 4 minutes. Before adopting this practice the dairyman's liners lasted 5 to 6 weeks. His liners last for 90 days under his new method for cleaning.

It has been suggested that the Committee on Standardization of Technological Procedure of our Association should make a study of milking machines, and should set standards of easy cleaning so that machines which are so constructed that they cannot be cleaned easily may be disbarred from the market.

Thermophilic and Thermoduric Bacteria. The presence of these organisms in pasteurized milk is a matter of concern; the problem presented by them has been ably discussed before this Association in several different papers. No new facts can be added to those already developed, but it seems pertinent to recapitulate the points that have been brought out in regard to these bacteria and their control.

In the first place the difference between thermophilic and thermoduric germs should be clearly kept in mind. Thermophilic organisms are lactobacilli, streptococci, and spore bearers, and originate from the soil, bedding, and feeds; they are likely to be prevalent in winter when animals are housed and their coats become dusty. They not only survive pasteurization at the temperatures usually employed, but they multiply at these temperatures, consequently they are distinctly a plant problem and their presence in large numbers in pasteurized milk indicates faulty processing. They are prone to develop in milk pasteurized by the holding method when the milk is held too long in the vat, or when vats are refilled for pasteurization without first cleaning them, for the foam left over from the preceding pasteurization is likely to seed the milk with these organisms. While it is true that the responsibility for their appearance in pasteurized milk in large numbers is the fault of the plant operators, it is also true that they come originally from the farm. It is easy for milk to be contaminated with feed or with dirt where strict cleanliness is not observed.

Thermophilic organisms have no public health significance other than that they may develop to such an extent that the legal limit of bacteria may be exceeded. However, they may produce abnormal flavors in milk, and in severe cases may even cause it to sour, but flavors and odors do not occur until thermophiles reach millions per milliliter. Small numbers of thermophiles in pasteurized milk, that is less than 10,000 per milliliter, are not a cause for concern because a large percentage die off in storage at low temperatures.

Thermoduric organisms grow over a wide range of temperature; in contradistinction to the thermophiles, they do not multiply at normal pasteurization temperatures, but they do survive pasteurization. They represent a mixed bacterial flora; the commonest thermodurics are micrococci. The next most common are the streptococci, after them come the sarcinae, and least common of all are certain spore-bearing bacilli.

The micrococci are regarded as coming from the normal cow's udder. Gibson and Abdal-Malek report that pasteurization tests indicate that the micrococci in aseptically drawn milk are destroyed by heating at 63° C. (145° F.) for 30 minutes which would lead one to expect them to be greatly reduced in numbers by pasteurization by the holding method. Hileman, Leber, and Speck find that "the higher bacteria counts in milk pasteurized by the high-temperature short-hold method
as compared with the low-temperature long-hold method are largely due to the ability of certain species of micrococcci to survive the former method of pasteurization in greater numbers. The most common species of micrococci among those found in milk pasteurized at high temperatures are M. candidis, M. epidermidis, M. iuteus, and M. vulgaris. However, other species were encountered less frequently. These micrococci make up the predominant flora of dirty milking machines, strainers, and pails on farms, and about half of the thermophilic flora isolated from milk cans. The work of Harding and Wilson, and of Alice Breed indicates that micrococci make up about 75 percent of the flora of the normal cow's udder. They studied 226 cultures and found that six of the seven species encountered in commercially pasteurized milk in the work reported here made up about 60 percent of the micrococci of the udder, or over 45 percent of the total flora of normal udders. The principal source of the bacterial contamination of the rubber tires of a milking machine is probably the milk itself. Moreover, many of these species of micrococci can survive inefficient hot water sterilization just as they can survive pasteurization. Robertson reports that many of them apparently also can survive sterilization by chlorine sterilizers and by salt brine. Merely swashing pails and cans with disinfectant solution does not sterilize them; time is required for the disinfectant to act. Unlike thermophilic organisms, the micrococci are responsible for his milk may become contaminated with these organisms by contact with poorly cleaned moist equipment on which these organisms develop in enormous numbers. Also, unclean moist milk cans, particularly those kept with lids on in warm places, are likely to furnish thermurorics abundantly. It has been found that cooling waters at 58° to 60°F. in which stirring rods have been rinsed are an important source of thermurorics. Their presence in pasteurized milk indicates that the raw milk came from farms where sanitation was poor. Macy and Erickson made an extensive study, covering four seasons, of thermurorics in milk from the St. Paul-Minneapolis milk shed. They found that thermurorics varied in numbers in relation to the season and the quality of raw milk. They will be found in both low and high count raw milk, but a greater proportion of the poorer quality milk will be difficult to pasteurize. In summer 40.5 percent of the samples showed less than 5,000 bacteria per milliliter whereas in winter this figure rose to 80.1 percent. These data indicate that larger numbers of thermurorics in milk may be found in summer milk, usually because of contamination of utensils or faulty cooling. Therefore, when these organisms occur in pasteurized milk the source of the trouble must be sought on the farm. The inspector who is endeavoring to apply corrective measures should pay particular attention to milking machine parts, different pieces of dairy equipment, milkseams, cracks, crevices, broken solder, milkstone, and unclean milk cans. Careful producers will clean and sterilize plant-washed cans, especially if they have stood some time under warm humid conditions.

While the source of thermurorics is the farm, the number of these organisms in milk is greatly affected by milk plant operations. Prolonged heating of milk at temperatures below that of pasteurization gives them opportunity to multiply. A preheater may increase their number, or a clarifier at the end of a three hour run at 130°-135°F. may show millions of thermurorics in the milk remaining in the bowl. It appears that prompt cooling of the milk is of importance in keeping down thermurorics. Also, it should be noted that they are more likely to cause trouble in high-temperature short-time pasteurized milk, than in vat pasteurized milk, because they can withstand higher temperatures with shorter holding better than they can lower temperatures with longer holding. Prucha says the remedy to eliminate or reduce the number of these organisms in milk to a point at which they will not be a problem is very simple:

1. Have good equipment and utensils with smooth surfaces and no crevices, open seams, or other hiding places.
2. Wash the utensils and equipment properly so that their surfaces are smooth and free from bacterial food.
4. Avoid prolonged heating of milk at temperatures above 100°F. and below 145°F.

Thermuroric organisms are of little public health significance in pasteurized milk. Their presence usually indicates milk contaminated by contact with unclean equipment on the farm, or milk heated in the plant for some time at sub-pasteurization temperatures. They may survive pasteurization in numbers great enough to prevent the milk staying within legal bacterial limits. Therefore, when thermurorics are found in the pasteurized milk, farm and plant conditions should be investigated immediately.

The importance of the thermuroric and thermophilic bacteria from the standpoint of their effect on the phosphatase test has been pointed out by several investigators. Leahy and others have shown that certain bacteria produce phosphatase and have emphasized the need of caution in interpreting the results of phosphatase tests where excessive numbers of bacteria are present. Buck reports that a false positive phosphatase test was obtained from properly pasteurized commercially bottled milk. The bacterial phosphatase was produced by a non-pathogenic organism, Lactobacillus enzothermo­fibius. It was isolated from the products of four Baltimore dairies and was found in pasteurized milk, cream, and skim milk. The organisms grow rapidly in skim milk and other media at temperatures of 112° to 126°F. (45° to 53°C.) within 1½ hours. Skim milk obtained from a dairy plant and used for standardizing, produced a false positive phosphatase test when the thermoduric were in sufficient numbers. Raw milk heated for separating may be a contributing factor for promoting the growth of this and other thermurorics. "The practice of separating route return pasteurized milk for standardizing, with thermo­uroric or thermophilic organisms present, may be considered as a continuous reincoculation process which may explain many phosphatase tests attributed to manual and mechanical defects in the dairy plants, when actually the false positive phosphatase has been produced by a bacterial phosphatase enzyme from a thermophilic organism."

Baber and Frazier found that good cream correctly pasteurized and stored at 39°-50°F. after 3 or 4 days gave a positive phosphatase reaction due to the development of bacterial phosphatase by bacteria that survive pasteurization and grow slowly in the stored cream. They point out that milk phosphatase may be distinguished from bacterial phosphatase because it is inactivated by pasteurization at 145°F. for 30 minutes whereas bacterial phosphatase may withstand temperatures as high as 170°F. for the same time.

Difficulties with milking machines, and difficulties in controlling thermurorics are the principal complaints presented to your committee. Other items of sanitation were mentioned. These will be briefly taken up as follows:
The care of milk utensils is important. It is emphasized that bacteria grow fast on moist surfaces, and that consequently prompt drying of cleaned equipment is indicated. In this connection, two members of the committee have questioned the wisdom of requiring cleaned utensils to be kept in the milk house; they point out that the animal house is generally nearly saturated with moisture which gives little opportunity for utensils to dry thoroughly after cleaning. They favor keeping washed equipment where it can be dried by the sun and wind, and they maintain that it and all moist equipment should be sanitized before being used. The cleaning and sterilization of milk cans is doubtless the most important problem of dairy sanitation. There is no sense in taking the utmost care to produce clean milk on the farm or to process it painstakingly in the plant and then to contaminate it by putting it in a foul can. Yet this is done daily on all milk sheds. The problem is an involved, difficult one which has been studied by bacteriologists, chemists, detergent manufacturers, and from the angle of costs. The latest solution offered is the “Conservation Method” which promises among other things, cleaner and more sterile cans, reduction of thermoduric, thermophilic, lipolytic, and proteolytic organisms, and enormous reduction in costs.

Other members of the committee urge careful attention to the tinned farm equipment which under present conditions is likely to need repair or retinning. In fact, since dairy equipment is now difficult to replace or repair it should be handled with the utmost care.

Others are concerned about the cooling of milk. Some would not permit the acceptance of uncooled morning's milk at milk plants. Others emphasized the necessity of cooling milk promptly, particularly at the end of summer when ice supplies in some communities are apt to be depleted. Others report trouble in winter with high count milk of farmers having insulated tanks or electric refrigeration, for the reason that some dairymen do not then use these conveniences but rely on cooling their warm milk by setting the cans in water which soon warms up and never reduces the temperature below 65° or 75° F., or they rely on cooling in the barn which is a poor conductor; at 30° F. it will not cool milk to less than 65° F. in less than 6 to 8 hours, even when it is stirred.

Another member of the committee is concerned with the pouring of milk in the barn. He points out that if the milk house is some distance away, or even if it is near by and the passage from the barn to the milk house is not covered, there is danger of the milk becoming contaminated with dust or rain in transporting it. He advocates putting the milk house close to the barn and providing a covered passage way, or to have a milk room in the barn itself. This question of forbidding the pouring of the milk in the barn deserves some consideration. Probably all inspectors would be inclined to hold a provision of this sort is necessary, otherwise milk is likely to be exposed to serious fly contamination in summer time, and if the milk is long exposed in a barn reeking with odors the milk is likely to become off flavor. On the other hand, the desire to reduce those using milking machines in sanitary surroundings to carry each milk container to the milk house as it becomes filled. In a clean barn it would seem that the producer ought to be permitted to keep a covered can handy to receive milk from the machines; this can should be taken to the milk house as soon as it is filled. In fact, this is common practice.

Another member of the committee advocates the insulation of milk houses so that they will be comfortable and useful in cold climates in winter. He also believes that attention should be given to the possibility of back siphoning of water at drinking fountains. He emphasizes the importance of inspecting dairies at milking time.

Apparently chlorine will soon be available to dairymen for disinfection, but it has been suggested that some consideration should be given to the use of substitutes for it in case it is not.

Other members advocate standardization of dairy farm methods and of technological procedure. Some of them feel that the Standard Ordinance of the United States Public Health Service offers the best promise of standardization of methods, but they feel the ordinance needs severe pruning out of everything that cannot be demonstrated to concern milk quality and milk safety. As was noted in last year's committee report, dairy farm inspection is being criticized in certain quarters as being unproductive of important results, as being concerned with aesthetics instead of with milk quality, and as having added materially to the cost of milk. Apparently the terms “aesthetics” and “milk quality” are used loosely and mean different things to different people. One of the committee members (Byers) gives his conception of milk quality as “A clean, wholesome product, normal in food value, and containing proper nutritional value, palatable, and served attractively in any form.”

Fisher (St. Louis) does not believe that milk inspection is responsible for the increased retail prices in St. Louis. The inside labor of the milk plants was unionized and paid increased. Prices paid labor in general in St. Louis has advanced. As shown by auditor's audit of the dairies' books, the demand for milk is greater than the supply.”
for milk has increased since the standard ordinance was adopted.

A member of this committee (Bulmer) has written the committee at length in regard to the necessity of cutting out items of milk inspection which cannot be shown to affect milk quality and safety. He maintains that the inspection of milk should be conducted in a manner that will not add unnecessary cost to milk production. We have before us a difficult problem. It is easy to say that milk inspection has added to the cost of milk to consumers, but it is difficult to say how much it has added, and still more difficult to agree on what may be regarded as unessential in milk inspection as now being conducted.

**EVAPORATED MILK INDUSTRY QUALITY PROGRAM**

The Evaporated Milk Association has been active in improving the quality of milk accepted for manufacture by its members. A member of this committee (Parfit) outlines the procedure as follows:

**Foreword**

In discussing this question of milk quality for manufactured milk and its relation to fluid milk, this point must not be overlooked—namely, the fact that the supervision that has been placed over fluid milk has been done because fluid milk when used by the consumer has a greater possibility of containing disease organisms than does the product prepared from what is termed manufactured milk. For example, the possibility of diseases organisms in evaporated milk is nil, whereas the number of epidemics that have been due to the ingestion of cheese (except fresh cheese), butter (except in some cases of farm butter), and in powdered milk, according to the literature, very, very few. The introduction of the phosphatase test as a measure of pasteurization has shown in the case of fluid milk and ice cream that because of the nature of the product we cannot depend upon the commercial application in all cases to render milk free of disease organisms. Thus, the control of fluid milk and milk for ice cream because of the nature of the manufacturing process and the finished product must be more carefully controlled from a disease standpoint.

1. Within the dairy industry everyone will concur that milk should be produced in a clean manner, maintained in a clean condition, and in a condition of minimum deterioration. In the program inaugurated by the Evaporated Milk Industry which I am administering, that is our definite objective. To do this we are following a prescribed program throughout the United States. Incorporated into the program are the opinion of the Sanitary Standards Committee of the Evaporated Milk Industry, the good qualities of many of the federal, state, and city milk regulations.

2. Details of compliance to the Evaporated Milk Industry quality program have been set forth in the code which has been adopted as the method of procedure by over 90 percent, according to volume, of the manufacturers of evaporated milk. The program is directed by an administrator and field assistants. The administrator is assisted by a Sanitary Standards Committee that represents the industry. The program is voluntary, but the administrator is empowered to cooperate with federal, state, and city regulatory authorities.

3. In brief, the details of the actual working of the program are as follows:

Each evaporated milk plant, depending upon the number of producers, maintains a number of fieldmen and quality men. The responsibility of these men is to—

A. Inspect producers' farms and determine if the following practices are in continuous use:
   1. Cleaned cows,
   2. A clean milking barn, parlor, or place where milking is regularly done,
   3. Cleaned milking utensils of proper construction so that they can be maintained in a clean condition.
   4. Milk of each cow strained through a single service filtering pad exclusively.
   5. Killed and stored in a tank supplied for this purpose.

If the above practices are not found the fieldman is required to make a re-inspection within a definite time period. On re-inspection being successful, the producer is empowered to shut off the producer from the given market.

B. Every can of milk on receipt at the plant is checked for appearance and odor.

C. At least once a month a methylene blue test is run on a mixed sample secured from each producer, and at least once a month an off-bottom sediment test is run on each can of milk produced.

(1) Methylene blue test. Those patrons who have less than a two-hour filtration time are informed of the condition. Their milk is tested weekly or bi-weekly to test the causes of the high bacterial count. If the patron, with the aid of the fieldman or quality man, has been unable to correct the cause, the patron is rejected from our market.

(2) Sediment test. If, in off-bottom can testing, the milk is found in Class 3 or 4 it is considered a standard; if in Class 3 the shipper is put on probation; if in Class 4, the milk is rejected and returned to the producer. Any milk from a patent that falls into Class 3 or Class 4 for the first time of sediment testing is retested on the following shipments. If within the seven tests that are made the patent has been unable, with the help of the fieldman, to maintain his milk Class 1 or 2, such a producer is rejected from the list.

D. A uniform system of records pertaining to conditions existing on the farm and the results of platform inspection is maintained at each plant. The validity of these records is checked by men operating from the Evaporated Milk Association Office as well as authorized regulatory officials.

The administrator of the Sanitary Standards Code of the Evaporated Milk Industry passes on the work and the programs of each individual company and employs assistants that are constantly in the field judgments the methods and progress that each company is making. It is his duty to direct the companies thinking along lines of sanitation and to inform the companies as to improvements that should be made as well as factors which may affect their sanitary programs. It would appear that an industry such as the Evaporated Milk Industry is capable through sanitary standards that they have set up within the industry to police its own and so the industry has inaugurated the first country-wide, industry-wide, sanitary program that involves over 90 percent of the commodity manufactured.

**Bovine Diseases**

**Tuberculosis.** The tuberculosis eradication campaign of the Bureau of Animal Industry has been successful, and the amount of bovine tuberculosis has been reduced to a point where it is not of grave concern in those areas that are maintaining regular tuberculin testing, and that are pasteurizing milk.

**Bangle's Disease.** Bang's disease is caused by the bacterium *Brucella abortus* which is pathogenic to man and animals. In cattle the infection is called Bang's disease, in man Brucellosis or Undulant fever. The Bureau of Animal Industry inaugurated a program of testing herds for Bang's disease, with the view of ultimately getting rid of this ailment, which is infectious, which reduces reproduction, and which reduces production in herds infected with it. As in the case of tuberculosis, the inauguration of the program has met with opposition from some, but it seems to have been in the main successful. Most herds have a few Bang cows, some proved to be 50 percent or more infected so that the losses by slaughter in these herds was severe. In some areas farmers have succeeded in having testing of their herds made optional, but in others the program is being carried on without interruption. It seems to have been demonstrated that where hearty cooperation has been
Mastitis is a disease of the udder that can be acute or chronic. It is caused by bacteria and usually affects dairy cows. The disease can lead to severe losses for farmers.

**Acute Mastitis**

Acute mastitis is characterized by a rapid onset of clinical signs, such as fever, milk fever, and udder swelling. It is caused by Streptococcus agalactiae, also known as Strep. agalactiae. This organism is a common inhabitant of the udder and can cause severe udder infections and mastitis, particularly in newborn calves. Proper milking technique is important to prevent the spread of infection.

**Chronic Mastitis**

Chronic mastitis is a more prolonged form of the disease, often caused by Staphylococcus aureus. This organism can cause recurrent infections and can be more difficult to treat. Chronic mastitis can also lead to chronic infections that can persist for months or even years.

**Prevention and Control**

Preventing mastitis involves good milking practices, sanitation, and proper herd management. Regular monitoring of milk quality and health of the herd can help identify and treat cases of mastitis in a timely manner. Vaccinations and antibiotic treatments may also be necessary to control the disease.

**Conclusion**

Mastitis is a significant economic and public health issue for dairy farmers. Understanding the causes and prevention methods is crucial for maintaining healthy herds and ensuring the safety of milk produced for human consumption.


Morris, C. G. What Shall Be the Price of Milk? 1940.


6. That a stage has been reached where the situation points to the necessity of the immediate appointment of a National Technical Commission embracing milk sanitarians, dairy economists, and nutritionists to study the entire field of milk control, including the whole question of trade barriers, and with powers to act. This step should not be for the purpose of setting up just one more agency, but rather with a view of eliminating many agencies, and of giving those others now in the field—many of which are at present with widely conflicting interests, some of them selfish.

Finally, it is my firm belief that if boards of health and milk sanitarians concerned fail to examine frankly evident truths pertaining to factors that are in any way responsible for the present market milk situation in this country, it is to court disaster, and to speed the inevitable economic consequences involved directly and headlong into the arms of Congress. I would be as regretful as other milk sanitarians to see this happen, especially, if it should come precipitately and without guidance, which may be the case in the event that boards of health are unable to find ways and means of presiding properly over the matter and find a solution.

And, in the absence of our ability to do the job ourselves, the fact is inescapable that anything which threatens the welfare or proper maintenance of the nation's milk supply, particularly in war-time, is actually a matter that gravely concerns the Congress of the United States.

REFERENCES


2. United States Department of Agriculture Yearbook. 1939.


Emergency Sanitation Standards for Raw Milk for Pasteurization

Foreword

These Standards were approved by the U. S. Public Health Service Sanitation Advisory Board December 4, 1942, and are recommended by the U. S. Public Health Service as a basis for the acceptance of interstate shipments of milk for pasteurization during the war emergency. The Standards are similar to those for grade A raw milk for pasteurization of the Milk Ordinance and Code Recommended by the U. S. Public Health Service (Pub. Health Bulletin No. 220, 1939 edition), with such modifications as were considered necessary to render them applicable to different climatic conditions and to reduce the use of critical materials.

The term "health officer" as used herein shall mean the health authority having jurisdiction, or his authorized representative. Where the health officer is not the milk sanitation official the term "health officer" should be changed accordingly wherever it appears in the following text.

A convenient summary of the following sanitation standards for producing farms may be found in the Emergency Milk Plant-Producer Inspection Form prepared by the U. S. Public Health Service for use with these Emergency Standards. For a summary of the receiving station requirements of these Standards, see inspection form 6978-C which may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 40 cents per 100.

ITEM 1R. COWS, TUBERCULOSIS, AND OTHER DISEASES

Except as provided hereinafter, a tuberculosis test of all herds and additions thereto shall be made before any milk therefrom is sold, and at least once every 12 months thereafter, by a licensed veterinarian approved by the State livestock sanitary authority. Said tests shall be made and any reactors disposed of in accordance with the requirements approved by the United States Department of Agriculture, Bureau of Animal Industry, for accredited herds. A certificate signed by the veterinarian or attested by the health officer and filed with the health officer shall be evidence of the above test: Provided, That in modified accredited counties in which the modified accredited area system is applied to the dairy herds, the modified accredited area system approved by the United States Bureau of Animal Industry shall be accepted in lieu of annual testing.

Cows which show an extensive or entire induration of one or more quarters of the udder upon physical examination, whether secreting abnormal milk or not, shall be permanently excluded from the milking herd. Cows giving bloody, stringy, or otherwise abnormal milk, but with only slight induration of the udder, shall be excluded from the herd until reexamination shows that the milk has become normal.

For other diseases such tests and examinations as the health officer may require shall be made at intervals and by methods prescribed by him, and any
diseased animals or reactors shall be disposed of as he may require.

Public-health reason. This item is important because tuberculosis is one of the most important diseases of cows transmitted through milk supplies. Park and Krumwiede's figures indicate that in some regions about one-fourth of all cases of tuberculosis in children under 16 years of age were of bovine origin (Park and Krumwiede, The Relative Importance of the Bovine and Human Forms of Tuberculosis in the Different Forms of Tuberculosis, collected studies from the research laboratory, Department of Health of New York City, vol. 7, pp. 88-92, 1912-13). Rosenau states that it is estimated that perhaps 7 percent of all tuberculosis in man is of bovine origin (Rosenau, Preventive Medicine and Hygiene).

The organisms of tuberculosis get into the milk either directly from the udder or indirectly through cow manure. Manure may become a source of infection directly or may be the case of active intestinal tuberculosis, or by the case of respiratory tuberculosis as a result of coughing up the organisms and swallowing them. The infected manure may reach the milk by dropping into it from the udder, etc., during milking or otherwise.

In addition to the transmission of tuberculosis, it is generally considered that milk supplies may transmit infection to man from infected udders, contagious abortion, running sores, "lumpy jaw," etc.

Bovine tuberculosis is an important and, usually, contagious disease of the bovine milk secreting organ. Ordinarily the infecting organism is a streptococcus of bovine origin, but the condition may be caused by staphylococci or other organisms. Occasionally cows' udders become infected with hemolytic streptococci of human origin. When epidemic of scarlet fever or septic sore throat are traced to milk, the infecting organism is one of these. The toxins of the staphylococci and possibly other organisms in milk may cause severe gastroenteritis. Milk from badly inflamed udders is practically always of unsatisfactory sanitary quality.

Satisfactory compliance. The herd must have been tested with tuberculin by a United States accredited veterinarian, or one approved by the State livestock sanitary authority, within 12 months if no reactors were found on the last test, or within 6 months if reactors were found on the last test, except as noted above for modified accredited counties. Reactors must have been immediately excluded from the premises and must have been disposed of in accordance with accredited herd requirements. A certificate signed by the veterinarian and filed with the health officer is valid evidence of the T3 test. The reactor must furnish the health officer with a copy of the test charts, describing every animal and giving ear-tag numbers. Additions to the herd, as well as bulls and heifers, must be tested and reported as required above. Certificates signed by the local inspector or the effect of the test chap. giving the date of the original certificate and the name of the veterinarian who made the test, shall be valid.

The Bureau of Animal Industry of the United States Department of Agriculture and the State veterinarian will cooperate with the city or county boards of health in testing dairy cattle, provided certain requirements are met. The nature of these requirements can be ascertained from the State veterinarian. The health officer shall file his request for cooperative testing with the State veterinarian. He may properly refuse the testing for the benefit of the community agent, farm bureaus, board of trade, and civic clubs.

Evidence of satisfactory compliance with respect to diseases other than tuberculosis shall be based upon such physical examinations supported by such clinical or laboratory tests as may be deemed necessary by the control officials. Diseased animals found at any time shall be removed from the herd and no milk therefrom offered for sale. (Local inspectors should in this exemption, provided they are if necessary, to keep the cattle in the milking barn the floors may be bedded in order to prevent discomfort.)

Satisfactory compliance. This item shall be deemed to have been satisfied, when in the judgment of the inspector, conditions are such as to result in sufficient fresh air at all times and no overcrowding.

Item 3b. Dairy Barn, Air Space and Ventilation

Such sections of all dairy barns where cows are kept or milked shall be so arranged as to avoid overcrowding.

Public-health reason. This item is required in order to avoid overcrowding and to insure proper ventilation.

Satisfactory compliance. This item shall be deemed to have been satisfied, when the inspector, in the judgment of the inspector, conditions are such as to result in sufficient fresh air at all times and no overcrowding.

Item 3b. Dairy Barn, Lighting

A dairy or milking barn shall be provided with light and ventilation, and in such sections thereof where cows are kept milking, windows shall be provided and kept clean.

and so arranged as to insure adequate light properly distributed, and taken necessary shall be provided with adequate supplementary artificial light.

Public-health reason. Adequate light makes it more likely that the barn will be clean, and that the cows will be milked in a cleanly manner.

Satisfactory compliance. The milking portion of the barn shall be provided with windows or other openings sufficient in area and so arranged as to insure adequate light properly distributed. If glazed windows are used, they shall be kept clean.

Adequate artificial lighting must be provided for night milking. The inspector shall consider the requirement of adequate artificial light to be satisfied if the milking portion of the barn is so lighted that cleaning and milking operations can be efficiently performed.

Item 4a. Dairy Barn, Fences

The floors and gutters of such parts of all dairy barns in which cows are kept shall be so arranged as to avoid overcrowding.

Public-health reason. This item is required in order to avoid overcrowding and to insure proper ventilation.

Satisfactory compliance. This item shall be deemed to have been satisfied, when the inspector, in the judgment of the inspector, conditions are such as to result in sufficient fresh air at all times and no overcrowding.

Item 4b. Dairy Barn, Fencing

The floors and gutters of such parts of all dairy barns in which cows are kept shall be so arranged as to avoid overcrowding.

Public-health reason. This item is required in order to avoid overcrowding and to insure proper ventilation.

Satisfactory compliance. Plans and directions for laying dairy-barn floors may be found in Dairy Farm Improvement, published by the Portland Cement Association, Chicago, Ill., or in United States Department of Agriculture Farmers' Bulletin No. 1342.

The floors should preferably be of concrete, but may be of other similarly impervious material. Cork blocks or crosseted wood blocks, so long as these are impervious to water and permit no pooling of liquids or wash-water, are approved. Tight wooden floors and gutters may be permitted.

Only such portions of milking-barn floors to which cows have access shall be required to be surfaced with impervious material. Feed alleys are included in this exception, provided that they are not floored with wood or its equivalent and protected from washings or drainage from other parts of the barn floor. No portion of the barn floor shall be of earth unless it is separated from the milking portion by tight partitions.

It is recommended, but not required, that feed troughs be of smooth-surfaced concrete in order to facilitate bacterial treatment when necessary.

Although it has become general practice among modern dairymen to build milking-barn floors of concrete, some dairymen still hesitate to take this step for fear of possible injury to their cattle. This objection is answered by the experience of the great number of dairymen who milk on concrete floors. The danger of injuries is not great enough to counterbalance the many advantages of a well-drained, impervious barn floor. Concrete floors should be made waterproof in order to prevent slipping. When necessary to keep the cattle in the milking barn the floors may be bedded in order to prevent discomfort. Concrete floors in barns under construction or reconstruction should have curbs where the floor joins the walls. They are desirable in order to promote cleanliness in the angles of the floor and walls to avoid rotting of wall sills and stods.
4R (b). Floor Cleanliness

Public-health reason. A clean floor reduces the chances of contamination of the milk or milk pails during milking. The presence of other animals increases uncleanliness.

Satisfactory compliance. This item shall be deemed to have been satisfied if the barn floor is free from accumulations of filth or litter except such as have accumulated since the beginning of the last milking period; provided that the floor must be reasonably clean at the beginning of each milking period; and provided that gutters shall be cleaned at least daily. Pigs and fowl must be kept out of the milking barn. If horses and calves are kept in the barn, they shall be separated from the milking portion by stalls or pens which shall be cleaned daily.

When floors of milking barns are water, bedding containing more than one milking’s collection of manure shall be considered as equivalent to unclean floors.

Item 5r. Dairy Barn, Walls, and Ceilings

The walls and ceilings of all dairy barns shall be whitewashed once each year or painted once every 2 years, or oftener if necessary, or finished in an approved manner, and shall be kept clean and in good repair. In case there is a second story above the milking portion of the barn, the ceiling shall be painted. No feed shall be mixed in the milking portion of the barn. Feed which affects flies, if stored in the milking barn, shall be kept in fly-tight enclosures.

It is not required that the barn have four walls extending from the floor to the roof. A shed-type barn shall be approved, provided the requirements of Item 4r as to animals entering the barn are satisfied.

Barns newly constructed of wood shall be required to be painted or whitewashed soon after completion.

Whitewash formula. The following formula for whitewash has given satisfaction:

- Unslaked lime . . . . . . . . . . . . . . . . . . . . 2 lbs.
- Spanish whiting (barium sulphate) . . . . . . ½ lb.
- Salt . . . . . . . . . . . . . . . . . . . . . . . . . . 1 lb.
- Powdered glue . . . . . . . . . . . . . . . . . . 1 lb.
- Rice flour. . . . . . . . . . . . . . . . . . . . . . . . 3 lbs.

Add water so that it can be applied easily and thoroughly. For mixing and whitewashing instructions, see United States Department of Agriculture Farmers’ Bulletin No. 1452.

6r. Dairy Barn, Cow Yard

All cow yards shall be graded and drained as well as is practicable, and kept clean.

6r (a). Grading and Draining of the Cow Yard

Public-health reason. The cow yard is interpreted to be that enclosed or unenclosed area in which the cows are apt to congregate, approximately adjacent to the barn. This area is, therefore, particularly apt to become infested with manure droppings, and hence must be a public-health menace through the breeding of flies. The grading and drainage of the cow yard as far as is practicable are required because wet conditions are conducive to fly breeding, making it difficult to keep manure removed, and make it difficult to keep the cows clean.

Satisfactory compliance. This item shall be deemed to have been satisfied—

(1) When the cow yard has been graded and drained as well as local conditions permit. Low places must in all cases be filled in.

(2) When the wastes from the barn and milk room are not allowed to pool in the cow yard. Cow yards which are muddy due to recent rains should not be considered as defective.

6r (b). Cleanliness of the Cow Yard

Public-health reason. Manure and barn manure droppings are allowed to accumulate in the cow yard, except as noted, are conducive to fly breeding, and the cows will, because of their habits of lying down, be more apt to have manure-soiled udders.

Satisfactory compliance. This item shall be deemed to have been satisfied—

(1) When the cow yard has been graded and drained as well as is practicable.

(2) When the wastes from the barn and milk room are not allowed to pool in the cow yard.

(3) So stored as to be inaccessible to the cows.

Fly breeding may be minimized by the following recommendations of the United States Department of Agriculture, Bureau of Dairying, Milk Inspector Letter No. 104, May, 1926:

Any program to eradicate flies from dairies should begin with the elimination of breeding places. The premises should be cleared of piles of manure and other refuse, such as spoiled silage and accumulations of wet and decaying hay and straw. Even with the utmost care, flies cannot be entirely prevented from entering the barn, and destruction of these which do appear from under food and manure droppings, from manure piles thereof. The baited traps are used for catching the flies which do not bite, but get their nourishment from foods they can suck through their sucking mouth parts. Most of these are the common houseflies. The spray is used to kill or repel the biting type of flies that live on blood, which they obtain by piercing the skin of animals. The sprays and home sprays are examples of this type.

Last year the Bureau of Dairying, on its experimental farms at Beltsville, Md., with the cooperation of the Bureau of Entomology, made effective use of the fly-fighting measures outlined above. The Bureau recommends a box or compartment for the collection of manure. Box stalls were cleaned and scraped regularly. As a result, manure was not allowed to accumulate in the buildings for more than 3 or 4 days, and an effort was made to have the immediate premises quite free from accumulations of manure at least once each week. Cylindrical traps
like those described in Farmers' Bulletin 734, were set up as soon as the first flies appeared. They were baited with blackstrap molasses from sugar cane dilluted with 3 or 4 parts of water. The last was removed once a week and the traps emptied when the accumulation of dead flies was so great as to reduce serious danger. During the season the traps were taken once a week, or approximately every half million flies. The milk room was practically free from flies throughout the entire season.

In order to protect the cattle as much as possible from horn and stable flies, a spray was used. It was thought best to apply a spray which would not kill all the flies, but merely repel them.

A good killing spray may be made by suspending 5-10 pounds of unground pyrethrum flowers (inclosed in a double-thickness cheese-cloth bag) in a mixture of 9 gallons of kerosene and 4 quarts of fuel oil of 28-32 gravity. The mixture should stand 24 hours before being used. It may kill all the flies immediately, but many flies may be killed away and eventually die. Fuel oil is the ordinary low-grade oil that is burned in furnaces for heating, and usually the best is used.

The 28-32 gravity does not mean "specific gravity," but is a commercial term used in the oil business. If 28-32 oil is not available, use any fuel oil having a gravity of 30 and upwards.

When only small quantities of spray are needed, a concentrated pyrethrum extract may be bought. These need only the addition of kerosene and fuel oil to make them effective.

To apply this extract, an air-pressure sprayer was used which held about 1 gallon and could easily be operated by hand. In this sprayer, an attempt was made to catch them in a cloud of vapor as they swarmed up after the first spray struck them, and this was very effective. They were easily killed by the pyrethrum extract.

In applying this spray, a nozzle which will produce a very fine vapor should be used. This is facilitated by using plenty of pressure.

In spraying for stable flies, which are in many cases found sucking blood from the cows' legs, the spray was shot directly on the flies with good effect. Since the majority of the spray is kerosene, care was taken not to cover the cattle with it unnecessarily. Where they were not covered or brushed, or turned out in the hot sun immediately after being sprayed. By observing these precautions, no trouble was experienced from blistering.

Although in both seasons the horn flies had appeared in considerable numbers before the spray was used, their numbers were appreciably reduced after a week of daily spraying, and they were easily kept under control the rest of the season.

**ITEM 8R. MILK HOUSE OR ROOM, CONSTRUCTION**

There shall be provided a milk house or milk room in which the cooking, handling, and storing of milk and milk products and the storing of milk containers and utensils shall be done. (a) The milk house or room shall be provided with a light floor constructed of concrete or other imperious material, in good repair, and graded to prevent pooling or accumulation of water or slough. (b) It shall have walls and ceilings of such construction as to permit easy cleaning, and shall be well painted or finished in an approved manner. (c) It shall be well lighted and ventilated. (d) It shall have self-closing doors which, in the case of screen doors, shall open outward, and all other openings shall be effectively screened and if the milk with disease germs, which may multiply and become sufficiently numerous to spread disease to the consumers.

**Satisfactory compliance.** This item shall be deemed to have been satisfied if adequate natural or artificial light, reasonably evenly distributed, is provided and if the milk house is adequately ventilated.

**8R (c). LIGHTING AND VENTILATION**

Public-health reason. Ample light promotes cleanliness, and proper ventilation reduces the likelihood of odors.

**8R (b). SCREENING**

Public-health reason. Effective screening tends to prevent the presence of flies, which are a public-health menace. Flies may infect the milk with disease germs, which may multiply and become sufficiently numerous to spread disease to the consumers.

**Satisfactory compliance.** This item shall be deemed to have been satisfied if all doors are self-closing and all screen doors open outward, and all other openings are effectively screened wherever flies are evident, unless other effective means are provided to prevent the entrance of flies.

Broken, torn, or poorly fitted screens shall not be accepted as satisfactory compliance. Fly exclusion can be made more effective when screen doors open outward and all doors are provided with closing devices, such as spring hinges, pulleys, and other materials.

**Satisfactory compliance.** This item shall be deemed to have been satisfied if all doors are self-closing and all screen doors open outward, and all other openings are effectively screened wherever flies are evident, unless other effective means are provided to prevent the entrance of flies.

**8R (a). FLOORS**

Public-health reason. A well-drained concrete or other imperious floor promotes cleanliness.

**Satisfactory compliance.** This item shall be deemed to have been satisfied when all the floors and walls are in good repair and, except for light openings, are composed of:

1. Smooth-dressed lumber, sheet metal, or plated board, well painted with washable paint; or

2. Tile, cement blocks, bricks, concrete, or cement plaster, provided that the surfaces and joints are smooth.

The milk room shall not be required to be ceiled overhead unless floors cannot otherwise be kept out, as in the case of corrugated-metal roofing, where openings under the roof cannot easily be waterproofed, or unless the roof construction is such that the underside cannot easily be kept clean and free of cobwebs.

The inside walls of the milk room may be approved unsheathed, provided the inside surfaces of the outer sheathing and all framing surfaces are smooth-dressed and painted. This interpretation applies to partitions also.
tions with plans and instructions of the State board of health; or
(2) A chemical toilet or pit privy or other type of privy is provided, constructed and operated in accordance with plans and instructions of the State board of health in those States permitting the use of these types of toilets; and
(3) There is no evidence of human defecation or urination about the dairy premises except in the toilets provided for these purposes; and
(4) The toilet defects are not found in pit-toilet installations: (a) Evidence of caving around the edges of the pit; (b) signs of overflow or other evidence that the pit is full; (c) seat covers open; (d) broken, perforated, or unscrewed vent pipe; if used; (e) uncleanliness of any kind in the toilet building; (f) toilet room opening directly into milk room; and (g) evidence of light entering pit except through seat or seat cover is raised.
For details of recommended construction and operation of toilets, see the Milk Ordinance and Code Recommended by the U. S. Public Health Service (Public Health Bulletin No. 220).

ITEM 11R. WATER SUPPLY

The water supply for the milk room and dairy barn shall be properly located, constructed, and operated, and shall be easily accessible, adequate, and of a safe sanitary quality.

Public-health reason. A dairy farm water supply should be accessible so as to encourage its use in cleaning operations; it should be adequate so that cleansing and rinsing will be thorough; and it should be of safe, sanitary quality in order to avoid the infection of milk utensils.

A slightly polluted water supply used in the rinsing of dairy utensils and containers may be far more dangerous than a similar water supply used for drinking purposes only. Bacteria grow much faster in milk than in water, and the severity of an attack of given disease depends largely upon the size of the dose of disease germs taken into the system. Therefore, a small number of disease organisms consumed in a glass of water from a slightly polluted well may possibly result in no harm, but if left in a milk vessel which has been rinsed with the water, may, after several hours growth in the milk, result in a case of disease.

Satisfactory compliance. This item shall be deemed to have been satisfied—
(1) When the water supply is easily accessible to the milk house and the dairy barn.
(2) When the water supply is, in the judgment of the inspector, adequate in quantity to promote cleanliness.
(3) When no surface or cistern water supply is used except under conditions approved by the State board of health.
(4) When the source of water supply is a public water supply approved by the State board of health, or a spring, dug well, driven well, bored well, or drilled well which complies with the requirements of the State board of health.
(5) When there is no connection between the safe water supply and an unsafe water source through which it is possible to contaminate the safe water supply.

For details of recommended construction and operation of water supplies, see the Milk Ordinance and Code Recommended by the U. S. Public Health Service (Public Health Bulletin No. 220).

ITEM 12R. UTENSILS, CONSTRUCTION

All multi-use containers or other utensils used in the handling, storage, or transportation of milk or milk products must be made of smooth non-absorbent material and of such construction as to be easily cleaned, and must be in good repair. Joints and seams shall be soldered flush. Woven wire cloth shall not be used for straining milk.

Public-health reason. Milk containers and other utensils not having flush, joints and seams, smoothly cleaned, and accessible surfaces, and not made of durable, non readily corrotable material are apt to harbor accumulations in which undesirable bacterial growth is produced.
Satisfactory compliance. This item shall be deemed to have been satisfied if:

1. All multi-use containers, utensils, and other equipment are constructed of smooth heavy-gauge material with a not readily corrodbile surface, of a shape that will make cleaning easy, and with all joints and seams soldered flush.

2. The use of agateware or unstutstancial milking pads is not acceptable. The enamel of agateware is subject to chipping, and many unstutstancial pads rarely have the seams filled with solder, and in addition rust easily.

3. Woven wire cloth milk strainers are not used.

4. Single-service filters are used where available.

Item 13R. Utensils, Cleaning

All multi-use containers, equipment, and other utensils used in the handling, storage, or transportation of milk and milk products must be thoroughly cleaned after each usage.

Public-health reason. Milk cannot be kept clean in contact with unclean milk vessels and utensils.

Satisfactory compliance. This item shall be deemed to have been satisfied if all multi-use containers, utensils, strainer cloths, and other equipment have been:

1. Exposed for at least 15 minutes to at least 170°F, or for at least 5 minutes to at least 200°F, in a steam cabinet equipped with an indicating thermometer located in the coldest zone.

2. Exposed to a jet of steam for at least 1 minute;

3. Immersed in, or exposed to a flow of, a chlorine solution of sufficient strength for at least 2 minutes, or rinsed with a chlorine solution of twice the strength of the approved strength (For Approved strength of chlorine solutions see below);

4. Immersed in hot water at 170°F, or for at least 2 minutes, or exposed to a flow of hot water at 170°F, for at least 5 minutes, or scalded with boiling water;

5. Exposed to hot air at a temperature of at least 180°F, for at least 20 minutes in a properly designed oven or hot-air cabinet equipped with an indicating thermometer located in the coldest zone;

6. Milking machine rubber parts have been treated with an 0.5 percent lye solution; and

7. If the washing is done elsewhere than in the milk house, utensils are rinsed in the milk house before use, with a chlorine solution of twice the strength approved for immersion.

The inspector should satisfy himself that the efficiency of the process is such as to produce cans having a residual bacterial plate count of not more than one per cc. of capacity.

Any equipment touched by the inspector shall be again subjected to bactericidal treatment before being used.

Approved strength of chlorine solutions. Sodium hypochlorite solutions used as bactericidal rinses on dairy farms and at milk plants must be discarded when the strength is reduced to 50 parts per million of available chlorine. Hypochlorite solutions employed as bactericidal sprays must be made up to an initial concentration of sufficient strength so that the excess which runs off or collects in the equipment contains at least 50 parts per million.

Solutions made from compounds containing chloramine or chloramine-T have a slower bactericidal action than hypochlorites containing equal concentrations of available chlorine. The former must, therefore, be made up to a sufficiently greater strength to produce a bactericidal effect within the required exposure period equivalent to that of the above hypochlorite concentration.

The chloramine and chloramine-T concentration necessary will vary with the different compounds.

Chlorine solutions once used shall not be re-used for bactericidal treatment on any succeeding day, but may be reused for other purposes.

The health officer shall satisfy himself by frequent test that the chlorine solutions being used are of the required strength. For a suitable test for chlorine strength and for details of applicable requirements on steam cabinets, steam jets, and treatment with chlorine solutions, see the Milk Ordinance and Code Recommended by the U. S. Public Health Service (Public Health Bulletin No. 220).

Item 15R. Utensils, Storage

All containers and other utensils used in the handling, storage, or transportation of milk or milk products shall be stored so as not to become contaminated before being used.

Public-health reason. Careless storage of milk utensils which have previously been properly treated is apt to result in contamination by flies and dust and thus to render them unsafe.

Satisfactory compliance. This item shall be deemed to have been satisfied when all utensils and vessels, including strainer cloths, are-

1. Left in the treating chamber until used;

2. Stored in the milk house in a place protected from contamination, including such articles as can be inverted. Storage racks shall preferably be constructed of metal protected against rusting.

Single-service filters shall be kept until used, in the original package, protected from contamination by storage in a suitable box or cabinet.

Item 16R. Utensils, Handling

After bactericidal treatment no container or other milk or milk product utensil shall be handled in such manner as to permit any part of any person or his clothing to come in contact with any surface with which milk or milk products come in contact.

Public-health reason. Carrying milk pails by inserting the fingers under the hood, carrying an armful of milk-can covers against a field shirt or jacket, carrying a strainer cloth over the shoulder or in a pocket, and similar handling of vessels and utensils undo the effect of bactericidal treatment.

Satisfactory compliance. This item shall be deemed to have been satisfied when none of the above or similar practices is in evidence.
ITEM 17r. Milking, Udders and Teats, Abnormal Milk

The udders and teats of all milking cows shall be clean and rinsed with a bactericidal solution at the time of milking. Abnormal milk shall be kept out of the milk supply and shall be so handled and disposed of as to preclude the infection of the cows and the contamination of milk utensils.

Public-health reason. Cows frequently contaminate their udders by standing in polluted water or laying down in the pasture or barnyard. Unless the udders and teats are carefully cleaned just before milking, particles of filth are apt to drop into the milk. Such contamination of the milk is particularly dangerous because cow manure may contain the organisms of tuberculosis, and polluted water may contain the organisms of typhoid fever and other intestinal diseases. Rinsing the udders and teats with a chlorine solution has the advantage of giving an additional factor of safety with reference to such disease organisms as are not removed by ordinary cleansing. It is valuable in the control of mastitis.

Abnormal milk may indicate mastitis or other diseased condition, and should therefore be kept out of the milk supply and away from the cows and the milk utensils.

Satisfactory compliance. This item shall be deemed to have been satisfied when the cows' udders look and feel clean at the time of milking, and if any abnormal milk is detected it is kept out of the milk supply and, so handled and disposed of as to preclude the infection of the cows and the contamination of milk utensils.

A number of states and cities have for years required that the udders and teats must, in addition to being clean, be treated with the previously described chlorine solution. Some authorities in cold climates fear that the use of water in extremely cold weather will, whether or not it contains chlorine, cause chapping. Long experience has proven that this objection does not hold for large quantities of water used over a large expanse of the unit and carried out by following the preliminary cleansing by scrubbing the udders and teats with a large cloth saturated with the chlorine solution. The cloth is then wrung as dry as possible and the bag mopped free of excess solution. After thus treating 6 or 8 cows, a fresh pail of solution should be prepared. Tests made by the Public Health Service gave quicker and more complete bacterial disinfection by means of a chlorine solution than with plain water or with soap and water.

It is recommended that the strip cup be used once and then discarded. An additional precaution not required by the ordinance, but which inspectors should encourage, is the discarding of the first several streams of milk from each cow. They can be discarded into a calf bucket and waiting the milk or soiling the floor. This practice will help keep the bacterial count of the milk low, as it is the first few streams of milk which contain most of the bacteria in fresh milk.

ITEM 18r. Milking, Flanks

The flanks, bellies, and tails of all milking cows shall be free from visible dirt at the time of milking.

Public-health reason. Cleanliness of the flanks is one of the most important factors affecting the bacterial content of the milk. Under usual conditions, the floor becomes caked with mud, dust, chaff, loose hairs, etc. Practically all of these materials carry bacteria and become contaminated during the process of milking. This may result in contaminating the milk with bacteria.

Satisfactory compliance. This item shall be deemed to have been satisfied when the flanks, bellies, and tails look and feel clean at the time of milking.

A satisfactory method of cleaning the cows is to go over each one with a stiff brush preferably using water freely at the same time to assist in the cleaning and to prevent dust. Grooming is facilitated by clipping the flanks, belly, and bag, and by cutting the brush of the tail so that it does not drag. The brushing of the part of the herd while other cows are being milked is undesirable because of the dust which may be raised. Therefore all brushing should be completed before milking is begun.

ITEM 19r. Milkers' Hands

Milkers' hands shall be clean, rinsed with a bactericidal solution, and dried with a clean towel immediately before milk ing and following any interruption in the milking operation. Wet-hand milking is prohibited.

Public-health reason. The reasons for bactericidal treatment of the hands of milkers are similar to those for bacterial treatment of the udders. In the course of the preparation for milking, the hands of the milkers come into contact with almost identical the same kind of materials as may have contaminated the udders. During the process of milking his duties and natural habits outside of the milking barn, the dairyman's hands must be assumed to have been exposed to body discharges. In addition, if the herd is allowed to stray, the milkers wear clean aprons this shall be considered as satisfactory.

Satisfactory compliance. This item shall be deemed to have been satisfied when:

1. The milkers' hands have been rinsed with water to which an approved bactericide has been added. (See item 14r.)
2. Hands are clean and dry at the time of milking. Hands may be considered dry when they have been wiped with a wrung-out cloth that has been used for applying the bactericidal solution.
3. Hand-washing facilities are available.

Public-health reason. Cleanliness of the milkers' hands is of the utmost importance. The first rinsing in the solution does not necessarily remove all bacteria. This item applies to the person who handles the milking machines and(apparatus) that removes them from the cows, and to the stripper.

A bucketful of bactericidal solution should be handy in the barn during milking. Every time a milker has finished milking a cow, he should rinse his hands in the solution and if possible wash dry before milking is begun. This item applies to the person who handles the milking machines and apparatus that removes them from the cows, and to the stripper.

Satisfactory compliance. This item shall be deemed to have been satisfied when the milkers' hands between the milking of individual cows.

ITEM 20r. Clean Clothing

Milkers and milk handlers shall wear clean outer garments while milking or handling milk, milk products, containers, utensils, or equipment.

Public-health reason. Because of the fact that the hands of all workers frequently come into contact with their clothing, it is important that the clothes worn during the milking and handling of the milk be clean.

Satisfactory compliance. This item shall be deemed to have been satisfied when milkers are found wearing outer garments that are not excessively soiled.

Washable overgarments are not required, but milkers should be urged to have one suit of overalls for milking and another for general work. The suits are changed just before milking. If milkers wear clean aprons this shall be considered as satisfactory.

ITEM 21r. Milk Stools

Milk stools shall be kept clean.

Public-health reason. Clean milk stools reduce the likelihood of contamination of milkers' hands between the milking of individual cows.

Satisfactory compliance. This item shall be deemed to have been satisfied when the milk stools are so constructed as to be easily kept clean, look and feel clean, and are stored above the floor when not in use.

The usual practice is to scrub the stools several times a week and keep them on hooks or pegs when not in use. Otherwise they are inevitably kicked around on the floor or in the gutters, or thrown into a corner, and quickly become soiled. Many dairies have for years used milk stools, which are easy to wash and keep clean.

Milk stools are frequently padded with old carpet or sackin for the comfort of the milkers. Such stools cannot be washed and cannot be kept clean. Their use does not comply with the requirements of these Standards.

ITEM 22r. Removal of Milk

Each pail or can of milk shall be removed immediately to the milk house or straining room. No milk shall be strained in the dairy barn.

Public-health reason. Keeping the milk in the barn until a large part of the herd has been milked is apt to expose it to flies and dust, and to delay cooling. Straining milk in the barn likewise exposes it to dust and flies.

Satisfactory compliance. To comply with this item:

1. Each pail of milk shall be re-
moved, as soon as it is filled, to the milk house or straining room; or
(2) Milk may be drawn from the milk pails or milking machine units into a 5 or 10 gallon milk can which shall be removed, as soon as it is filled, to the milk house or straining room. The can shall be provided with a cover which shall be removed only during pouring and shall be protected from contamination while so removed. The can shall be placed at such a distance from the cows or sufficiently raised above the floor (as in a cart) as to be protected from manure and splash.

(3) No milk shall be strained elsewhere than in the milk house or in a straining room provided for this purpose.

If the milk house and barn are too widely separated to make practicable the straining or milk in the milk house, the construction of a small screened straining room in or near the barn, but not opening directly into it, is satisfactory. The milk still has the advantage of cooling, though this can be reduced by taking every can full of milk to the room as soon as filled. Dairyhouse sometimes use the feed room of a similar enclosure for a straining room. This is not approved unless all feedstuffs or other materials are removed and the room so located that it does not open directly into the milking barn.

Pouring milk into conductors which are protected, as provided under item 6(e), shall be permitted.

ITEM 23r. COOLING

Milk must be cooled immediately after completion of milking to 60° F. or less, and maintained at that temperature until delivered and dumped, except morning's milk delivered before 9 A.M. Standard Time (10 A.M. War Time), and uncool night's milk before 8 P.M. Standard Time (9 P.M. War Time); or

(2) Milk not delivered before these time limits shall have been cooled immediately after completion of milking to 60° F. or less and maintained at that temperature until delivered and dumped: Provided, That

Satisfactory compliance. To comply with this item,
(1) Uncooled morning's milk delivered to a milk plant or one of its receiving stations for pasteurization or separation shall be delivered and dumped before 9 A.M. Standard Time (10 A.M. War Time), and uncooled night's milk before 8 P.M. Standard Time (9 P.M. War Time); or

(2) Milk not delivered before these time limits shall have been cooled immediately after completion of milking to 60° F. or less and maintained at that temperature until delivered and dumped: Provided, That

Satisfactory compliance. This item shall be deemed to have been satisfied if all of the above requirements have been met.

BACTERIAL STANDARDS

The plate count or the direct microscopic count of the raw milk or milk for pasteurization as delivered from the farm shall not exceed 200,000 per milliliter, or the methylene blue reduction time shall not be less than 6 hours, in more than one sample out of the last four samples taken on separate days. The corresponding limits for milk received at a pasteurization plant from a receiving station not over 200 miles distant shall be 300,000 per milliliter and 5 1/2 hours, respectively, and if over 200 miles distant, 400,000 per milliliter and 5 hours, respectively.

For details of cooling methods, see the Milk Ordinance and Code recommended by the U.S. Public Health Service (Public Health Bulletin No. 220).

ITEM 26r. MISCELLANEOUS

All vehicles used for the transportation of milk or milk products shall be so constructed and operated as to protect their contents from the sun and from contamination. All vehicles shall be kept clean, and all vehicles capable of containing milk or milk products shall be transported with milk or milk products in such manner as to permit contamination.

The immediate surroundings of the dairy shall be kept clean and free of health nuisance.

Public-health reason. If milk is transported in vehicles which are not clean or which do not protect it from the sun and from contamination by dust, etc., its bacterial content may be increased.

Unclean dairy surroundings may affect the milk directly or indirectly.

Satisfactory compliance. This item shall be deemed to have been satisfied if all of the above requirements have been met.
by the United States Public Health Service.

These standards may be found in Public Health Bulletin No. 220, page 82 of the 1939 edition.

For a summary of the receiving station requirements see inspection form 8978-C, which may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 40 cents per 100. Sample copies may be secured from the U. S. Public Health Service.

**TANK TRUCKS AND TANK CARS**

**Milk tank trucks and tank cars** shall be of approved sanitary construction. They shall be thoroughly cleaned after each use and subjected to an approved bacteriological process before being used. After bacteriological treatment they shall be so stored and handled as not to become contaminated. While containing milk or cream they shall be marked and sealed in the approved manner.

For each tank shipment a bill of lading containing all necessary information shall be prepared in triplicate and shall be kept on file by the shipper, the consignee, and the carrier for a period of 5 months.

(3) After bacteriological treatment, tanks shall be stored and handled in accordance with items 15r and 16r so as to avoid recontamination.

(4) After loading, all openings shall be sealed with lead seals at the point of filling, and such seals shall remain unbroken until the product is delivered into the custody of the consignee. When the opening is sealed, the label (tag) shall be so attached that it cannot be removed without breaking the seal.

All sealing of openings of transportation tanks attached to trucks shall be made outside the dust-proof housing. Where milk or cream is placed in a tank at more than one shipping plant or station in order to receive its full capacity, the seal placed at the inlet by the prior shipper shall be broken, and the inlet shall be resealed by the subsequent shipper, following his loading in such a manner as securely to attach his tag and the tags of the prior shippers. In such cases, each shipping plant operator shall comply with these requirements in so far as his shipment is concerned.

(5) The words "Milk and Milk Products" shall be painted on a conspicuous manner on all transportation tanks or railroad box cars containing such tanks.

(6) A bill of lading shall be prepared in triplicate by the shipper for each transportation tank, and shall contain the following information in a clear and legible manner:

(a) Name of the operator of the transportation vehicle.

(b) Date of shipment.

(c) Name of the operator and the location of the place of shipment.

(7) The words "Milk and Milk Products" shall be painted in a conspicuous manner on all transportation tanks or railroad box cars containing such tanks.

(8) A bill of lading shall be prepared in triplicate by the shipper for each transportation tank, and shall contain the following information in a clear and legible manner:

(a) Name of the operator of the transportation vehicle.

(b) Date of shipment.

(c) Name of the operator and the location of the place of shipment.

(9) The words "Milk and Milk Products" shall be painted in a conspicuous manner on all transportation tanks or railroad box cars containing such tanks.

(10) A bill of lading shall be prepared in triplicate by the shipper for each transportation tank, and shall contain the following information in a clear and legible manner:

(a) Name of the operator of the transportation vehicle.

(b) Date of shipment.

(c) Name of the operator and the location of the place of shipment.

**REQUIREMENTS WITH RESPECT TO PLANTS SUPPLYING RAW MILK**

The producing farmers supplying a receiving station or a pasteurization plant shall be considered as satisfactorily complying with the milk sanitation requirements of these Sanitation Standards, if (1) they have within the preceding 12 months been awarded by the milk sanitation authority of the shipping state a rating of 90 percent or

practice, greater frequencies are desirable. As often as possible, inspection of farms should be made during milking time, and of receiving stations while milk is being received.

"Deck" examinations shall include organoleptic, strainer dipper, and sediment tests, as follows:

(1) Every can of milk is examined on the receiving platform by a qualified plant employee for odor associated with excessive bacteria count, and by strainer dipper when indicated to be necessary to determine the presence of dirt or flakes characteristic of "garbage" milk.

(2) Milk which upon examination is found to be of unsatisfactory quality is kept out of the supply.

(3) Producers delivering milk of unsatisfactory quality are inspected within five days to determine and correct the cause.

(4) A sediment test is made of the unagitated milk in the bottom 2 inches of a representative can of each producer, and the producer is promptly informed of any tests showing excessive dirt.

(5) A record is kept at the plant for each producer, showing: (a) unsatisfactory findings upon examinations indicated above and number of cans of milk rejected; (b) action taken upon farm inspection and items violated; (c) bacteria counts or reduction times not meeting the standards herein; and (d) the dates of the above examinations and inspections.

**SANITATION RATING OF PRODUCING FARMS**

The producing farms supplying a receiving station or a pasteurization plant shall be considered as satisfactorily complying with the milk sanitation requirements of these Sanitation Standards, if (1) they have within the preceding 12 months been awarded by the milk sanitation authority of the shipping state a rating of 90 percent or
more in accordance with the principles of the U.S. Public Health Service milk sanitation rating procedure, and on the basis of the weights assigned to each item, as shown on the Emergency Milk Plant-Producer Rating Form prepared by the U.S. Public Health Service, (2) the rating procedure actually employed by the state rating authority has been checked and approved by the U.S. Public Health Service.

Public health reason. The health officer of the receiving community will wish to know not only whether the source community is operating under these Emergency Standards, but also whether these Standards are being adequately enforced. The milk sanitation rating procedure referred to affords him such information. A rating of 100 percent means that all farms included comply with all of the applicable requirements of these Standards; if not, the rating is decreased by an amount proportionate to the amount of milk sold by the violators and to the relative weights of the violated items. A rating of 90 percent represents satisfactory compliance. (For a description of the rating procedure, see Methods of Making Sanitation Ratings of Milk Sheds, Reprint No. 1970 from the Public Health Reports of Aug. 12, 1938.)
Legal Aspects

Renovated Butter

Process or renovated butter—Federal regulation of, effect on State action.—(United States Supreme Court; Cleaver Butter Co. v. Commissioner of Agriculture and Industries of Alabama, et al., 135 U. S. 148; decided February 2, 1942.) The plaintiff company was engaged in the manufacture of renovated butter from packing stock butter, one-fourth of the company's packing stock. The company shipped interstate 90 percent of its finished product. The production of renovated butter was taxed and regulated by the United States and was also regulated by Alabama. The defendant Alabama officials, who had the duty of enforcing the Alabama laws regarding renovated butter, entered petitioner's factory and, in a little more than a year, seized on 16 separate occasions a total of over 20,000 pounds of pack butter, the material from which the finished product was made. The defendants also seized some butter moving to the factory in interstate commerce and also some butter swept from the factory's hands. The company sought to enjoin the defendants from acting under the State statute, either to determine the wholesomeness of the material in the hands of the manufacturer and to regulate sales of the finished product within the State. The State took no action. The Court held that the material was properly marked for commerce by acquisition of the material in San Francisco, and that law. The Court held that the material was properly marked for commerce by acquisition of the material in San Francisco, and that law.

Milk Ordinance Provisions Upheld

In a suit to enjoin the enforcement of certain provisions of the California City and County milk ordinance prohibiting, in effect, the sale of unpasteurized milk, with the single exception of certified, the California Supreme Court has rendered a decision with interesting public health implications.

According to Public Health Reports (December 11, 1942), the ordinance in question provided that market consumption of milk should constitute (a) certified milk, (b) guaranteed pasteurized milk, (c) graded pasteurized milk, and (d) unpasteurized milk. The two standards of the former (c) and the latter (d) were also regulated by Alabama. The plaintiffs, who were interested in the sale of unpasteurized raw milk being permitted in San Francisco, first contended that the ordinance was invalid because it conflicted with the State law as embodied in the agricultural code. They asserted that the State's regulation prohibited the sale of four grades of market milk—certified, guaranteed pasteurized, grade A raw, and grade A pasteurized—and that the ordinance prohibited the sale of four grades of market milk—certified, guaranteed pasteurized, grade A raw, and grade A pasteurized.

The plaintiffs' view was that the agricultural code of the State was completed and that there were no field of milk regulation that was applicable. Therefore, the State Court of California, however, held that it had long been established general regulations, a judicial corporation with subordinate power to act in the matter could make such additional regulations in aid and furtherance of the purpose of the general law as might seem proper to the necessities of the particular locality and as were not in themselves unreasonable.

The latter court in its opinion said: "The controversy comes to this: The Federal law required a strict sanitary inspection of all factories and storehouses where process or renovated butter is manufactured, packed, or prepared for market, and of the products therewith and materials entering into the manufacture of the same, i.e., packing stock butter. But, as we have seen, the Secretary of Agriculture of the United States examines the packing stock butter. The Commissioner of Agriculture and Industries of Alabama claims authority under the State statute to condemn packing stock butter held for renovation. Does the State's claim interfere or conflict with the Federal power?" The Court determined that the State's claim did interfere or conflict with the public health aim of the Federal legislation. It pointed out that the manufacture and distribution of milk in interstate and foreign commerce must be subjected to the control of the Federal government, which, because of its dual-State activity, could not be effectively regulated by isolated compensation for purposes of production of milk. The Court took the result to be free of ingenuity which the Court found in the State's argument that the material was left free to act on the packing stock supplies prior to delivery into the hands of the manufacturer and to regulate sales of the finished product within the State. However, the material was definitely marked for commerce by acquisition of the material in San Francisco. The Court held that the material was properly marked for commerce by acquisition of the material in San Francisco. The Court held that the material was properly marked for commerce by acquisition of the material in San Francisco. The Court held that the material was properly marked for commerce by acquisition of the material in San Francisco.
JOURNAL OF MILK TECHNOLOGY

Official Publication of the
International Association of Milk Sanitarians

(Association Organized 1911)

Editors
W. B. Palmer, Managing Editor
Orange, N. J.

J. H. Shraeder, Editor
Wollaston, Mass.

Associate Editors
C. A. Abele
Chicago, Ill.

P. B. Brooks
Albany, N. Y.

Sarah V. Dugan
Louisville, Ky.

J. G. Hardenbergh
Chicago, Ill.

M. A. Heintzman
Ventura, Cal.

J. A. Krenan
Chicago, Ill.

Ernest Kelly
Washington, D. C.

F. P. Klessig
H. N. Parker
Chicago, Ill.

G. W. Putham
Chicago, Ill.

F. M. Scales
New York, N. Y.

H. R. Thornton
Edmonton, Alberta, Can.

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

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

Advertisements: All correspondence concerning advertising, reprints, subscriptions, and all other business matters should be addressed to the Managing Editor, W. B. Palmer, 25 North Day Street, Orange, N. J.

Messengers: All correspondence regarding manuscripts, editorials, news items, announcements, and other reading material should be addressed to the Editor, J. H. Shraeder, 25 East 53d Ave., Wollaston, Mass.

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 on Milk Technology, and other matters should be addressed to the Secretary of the Association, C. D. Young, Secretary, State Department of Health, Albany, N. Y.

INTERNATIONAL ASSOCIATION OF MILK SANITARIANS

President, C. A. Abele...........................................Chicago, Ill.
First Vice-President, R. R. Palmer...........................................Detroit, Mich.
Second Vice-President, R. G. Ross...........................................Tulsa, Okla.
Third Vice-President, W. D. Tiedeman...........................................Albany, N. Y.
Secretary-Treasurer, C. S. Leete...........................................State Office Building, Albany, N. Y.
Association News

Associated Illinois Milk Sanitarians
A New Organization

Milk sanitarians representing the dairy industry, municipal and state health departments convened in Chicago, January 18, for an educational program and luncheon.

"The Conservation Method of Washing Cans with Acid Cleaner" was discussed by V. Schwarzkopf, Lathrop-Paulson Company, Chicago. The speaker stressed the importance of clean cans in the production of milk of good quality. The preservation of quality milk is of particular value to persons interested in clean milk. The script is technically correct and photography splendid.

"What Are Bacteria?" a sound slide film presented by J. A. Keenan, Jr., General Laboratories, Madison, Wisconsin, could leave no doubt in the minds of the audience as to the part bacteria play in our daily ration of milk. The malevolent laugh of the villain might be disturbing to the slumber of audiences, but would tend to put the fear of dirt in the minds of adults listeners. This, after all, was the desired result.

"The Principals and Practice of Better Milking," by Dr. George H. Hapson, DeLaval Company, New York City, was especially presented for milk sanitarians. The theme was the proper cleaning of milking machines.

Dr. Hapson's text might be stated that he must know how to do it himself. He stressed and demonstrated the idea that his milk sanitary's job is to teach milk producers how to clean and care for milking machines so that top quality milk will be produced the year round.

About 150 persons from Illinois, Indiana, and Wisconsin attended the meeting.

At the close of the educational program a business session was held for the formal organization of the Associated Illinois Milk Sanitarians. A constitution and by-laws were adopted and officers elected as follows: President, H. W. Weeks, Chief Sanitarian, Champaign-Urbana Health District, Champaign, Ill.; Vice President, Leo Schorsch, Supervisor, Chicago Board of Health, Chicago; Secretary-Treasurer, S. V. Layson, Milk Sanitarian, Division of Sanitary Engineering, State Health Department, Springfield, Illinois; Auditor, Frank V. Lee, Director, Elgin Health Department, Elgin, Illinois, and Dr. H. C. Wiley, District Superintendent, The Borden Co., Chicago. W. D. Dotterrer, Director of Laboratories, Bowman Dairy Co., Chicago, and C. A. Abele, Chief, Farm Inspection Division, Chicago Board of Health, were elected members of the Executive Board.

The avowed object of the Association is to develop uniform and proper supervision and inspection of dairy farms and milk plants, and to encourage improvement in the quality of dairy products and the technological development of dairy equipment and supplies. Any person interested in the objects of the new organization may become a member.

S. V. Layson.

Michigan Association of Dairy and Milk Inspectors

At the annual meeting of the Michigan Association of Dairy and Milk Inspectors, Dr. E. H. Parritt, formerly of Purdue University and now in charge of quality work for the Evaporated Milk Association, talked "turkey" on the lack of a constructive quality program for manufacturing milk in Michigan. Such frank discussions on the shortcomings of our present system of regulation were presented for the audience.

In his talk at the general session, he discussed the subject of "Problems in the Production of High Quality Milk" with particular reference to war time conditions. His frank criticism of the confusion which exists among quality control officials as to what constitutes adequate rules and regulations and the making of certain quality tests and their interpretations was well received.

Retiring President Holiday appointed a committee which met with Doctor Parritt at the College on December 4th to discuss means and ways of attacking the problem of improving manufacturing milk supplies in Michigan.

Dr. Mallman discussed how best to use the laboratory in milk control during war time.

The Michigan Department of Health has formulated two inspection forms to be used in the enforcement of the new Michigan Milk Ordinance, one for pasteurization plants and one for producer farms. The activity and results of the work of this Association are reflected in the fact that one of its members, Dr. Fabian, is a recent past president of the International Association of Milk Sanitarians, and another member, Dr. R. R. Palmer, has just been elected first vice-president of the International.

H. S. Barnum
Secretary.

New York State Association of Milk Sanitarians

Herbert G. White, milk inspector for the New York State Department of Health stationed at Bellefonte, Pa., was inducted into the army on January 11, 1943.

A trend toward less efficient operation of milk pasteurizing plants, perhaps a result of the manpower shortage and the wearing out of essential equipment, is reported by the New York State Department of Health. The summary of the results for 1942 of the examinations of samples of pasteurized milk and cream fail to show the usual improvement in the percentage of satisfactory phosphatase test results on samples of pasteurized milk in fact, a comparison between laboratory results for the first half and last half of 1942 shows slightly less satisfactory phosphatase test results during the second half.

More alarming is a pronounced increase in the number of positive coliform results on samples of pasteurized milk, cream, and milk products. It is believed that this is indicative of poorer operation of pasteurizing plants.

Harvey Tower Davis, a son of E. Harvey Davis, Milk Inspector for the New York State Department of Health, with headquarters at Corry, Pa., was killed in an accident while on a routine flight over the Gulf of Mexico near Perry, Florida, on January 12, 1943.

Mr. Davis graduated from the Lake Charles, Louisiana Army Flying School as a pilot and had the rating of Second Lieutenant in the Army Air Force.

Every effort is being directed toward checking these dangerous tendencies.

W. D. Teedeman
Secretary-Treasurer.
Philadelphia Dairy Technology Society

The Philadelphia Dairy Technology Society held its regular monthly dinner meeting on February 9 at the Robert Morris Hotel in Philadelphia with an attendance of 34.

The speaker of the evening was Dr. J. C. Kakavas who gave a very interesting and instructive talk, illustrated with beautifully colored slides, on the result of using homogenized sulfanilamide-in-oil in the treatment of bovine mastitis. Great interest was shown in Dr. Kakavas' work by the number of questions raised during the discussion following his talk.

W. S. HOLMES, Secretary.

COMMITTEE TO STUDY MILK ORDINANCES AND REGULATIONS

At the St. Louis meeting of the International Association of Milk Sanitarians, the following motion of Dr. P. B. Brooks was adopted:

BE IT RESOLVED: That the President appoint a committee of from five to seven members of the Association, to study milk ordinances and regulations which it considers fairly representative of those in effect throughout the United States, and to formulate a set of standards and requirements covering the production and handling of raw milk for sale and use in its raw state; raw milk for pasteurization; the process of pasteurization; and pasteurized milk; and to require in such standards and requirements only those which the committee considers essential and necessary to insure a safe product of acceptable quality.

BE IT FURTHER RESOLVED: That the committee be directed to report its conclusions to the membership of the Association at the earliest convenient time, not to exceed one year from this date; and that the report be published, except with the majority approval of the active membership of the Association.

President Abele has appointed the committee as follows:

J. W. YATES, Chairman
A. W. FUCHS, P. F. KRUEGER
H. L. DELOZIER, C. S. LESTE
O. A. CHIGGIOLE

A number of advisers or consultants will be named to assist this committee in the consideration of technical details.

New Members

INTERNATIONAL ASSOCIATION OF MILK SANITARIANS

ACTIVE

Alexander, Leslie F., Milk Inspector, Health Department, 400 Calumet Avenue, Aurora, Illinois.
Arlington, Robert H., Assistant Milk Sanitarian, 1700 Health Department, 21 East Van Buren Street, Joliet, Illinois.
Brown, Oden E., Assistant Milk Sanitarian, State Department of Public Health, 521 North Fifth Street, Auburn, Illinois.
Cox, Joe, Inspector, East Side Health District, 500 Missouri Avenue, East St. Louis, Illinois.
Dahl, David V., Assistant Milk Sanitarian, State Department of Public Health, 1531 26th Avenue, Moline, Illinois.
Donders, John, Dairy Inspector, Pure Farm Dairy Co., 1412 North LaVergne Avenue, Chicago, Illinois.
Grossman, Harvey, New York City Health Department, 2515 East 19th Street, Brooklyn, New York.
Gust, Alex A., Milk Inspector, 519 Cummings Avenue, Waukegan, Illinois.
Helmreich, M. F., Field Man, Kraft Cheese Co., Beaver Dam, Wisconsin.
Hendle, Willard, Manager, Illinois-Iowa Milk Producers, 2449 27th Street, Moline, Illinois.
Lee, Frank V., Health Officer, Health Department, Elgin, Illinois.
Lindberg, Frank, Milk Sanitarian, Health Department, Oak Park, Illinois.
Lindsay, Robert R., Milk Sanitarian, 505 S. Fifth Street, Champaign, Illinois.
Lowry, Mrs. Aileen, Milk Technician, 505 S. Fifth Street, Champaign, Illinois.
Meadows, James O., Sanitary Engineer, 1072 Third Avenue, Chicago, Illinois.
Minkin, Joseph L., Assistant Milk Sanitarian, State Department of Health, 2145A First Avenue, Sterling, Illinois.
Myers, Bernard E., Milk Inspector, 114 So. Loomis, Naperville, Illinois.
Nolan, Captain A. F. V., Office of the Station Veterinarian, Fort Dix, New Jersey.
Noshmuk, Dave, Extension Specialist in Dairy Mfg., University of Wisconsin, Department of Dairy Industry, Madison, Wisconsin.
Petersen, Morris, Peterson Laboratories, Caliform, New Jersey.
Sessions, W. M., Sanitarian, District Health Service, No. 9, Burlington, Iowa.
Weeks, Harry W., Supervising Milk Sanitarian, Champaign-Urbana Public Health District, 1705 Fifth Street, Champaign, Illinois.
White, Alvin H., Manager and Partner, The Dairy Laboratories, 210 East Lexington Street, Storrs, Maryland.
Whitman, W. J., Dairy Farm Inspector, East Side Health District, 408 S. 47th Street, St. Louis, Missouri.
Winter, L. H., Dairy Specialist, Cherry-Burrell Corp., 424 Normal Road, De Kalb, Illinois.
Wolinski, W., Dairy Inspector, Chicago Board of Health, 5204 N. Kimball Avenue, Chicago, Illinois.
Young, Vernon T., City Bacteriologist, City Board of Health, Wilmington, Delaware.
Zelenko, Nicholas F., Assistant Milk Sanitarian, State Department of Health, 5341 N. Winona Street, Chicago, Illinois.

ASSOCIATE

Myers, Bernard E., Milk Inspector, 114 So. Loomis, Naperville, Illinois.
Nolan, Captain A. F. V., Office of the Station Veterinarian, Fort Dix, New Jersey.
Noshmuk, Dave, Extension Specialist in Dairy Mfg., University of Wisconsin, Department of Dairy Industry, Madison, Wisconsin.
Petersen, Morris, Peterson Laboratories, Caliform, New Jersey.
Sessions, W. M., Sanitarian, District Health Service, No. 9, Burlington, Iowa.
Weeks, Harry W., Supervising Milk Sanitarian, Champaign-Urbana Public Health District, 1705 Fifth Street, Champaign, Illinois.
White, Alvin H., Manager and Partner, The Dairy Laboratories, 210 East Lexington Street, Storrs, Maryland.
Whitman, W. J., Dairy Farm Inspector, East Side Health District, 408 S. 47th Street, St. Louis, Missouri.
Winter, L. H., Dairy Specialist, Cherry-Burrell Corp., 424 Normal Road, De Kalb, Illinois.
Wolinski, W., Dairy Inspector, Chicago Board of Health, 5204 N. Kimball Avenue, Chicago, Illinois.
Young, Vernon T., City Bacteriologist, City Board of Health, Wilmington, Delaware.
Zelenko, Nicholas F., Assistant Milk Sanitarian, State Department of Health, 5341 N. Winona Street, Chicago, Illinois.
A fellow was in the other day—he'd been up in the city two or three days and eaten around different places. A restaurant he was in, he found a gob of dried egg or something on his plate. Then he went in a drug store to get a soda. He said after the glasses had been used they swashed 'em around in some messy looking water and gave 'em a quick rinse over a spout and put 'em back to work again. "And, my gosh," he says, "we're supposed to be so up-and-coming in health work here in New York State! Stuff like that," he says, "you'd think they'd do something about it."

Well, they are doing something about it but, as I told him, his not knowing it—that was a good illustration of what they're up against. Here in the village—that dish-washing picture " 'Twixt the Cup and the Lip": they ran it two nights. I had a piece in the paper and the Rotawanis Club—I got 'em a speaker on restaurant hygiene. And still this fellow hadn't heard anything about it. Getting this stuff over and getting it going—it's like the woman said about feeding spinach to her youngster: yes, she said, he'd eat it—if you put it in his mouth and then chewed it and swallowed it for him.

Of course up there in the city I s'pose there's upwards of a hundred eating places, including the soda fountains and so on. And they're changing help all the time, more or less. And the city health department—they've only got two or three sanitarians to cover milk and all the rest. The bulk of their time has to be put on the things that're most important from the health standpoint and that don't leave 'em an awful lot of time to work on the eating places. They usually try to get 'em started right; plenty of hot water and washing powder and seeing the need of it and all that. And then they check up on 'em once in a while to see how they're doing. But they can't stay there and wash their dishes for 'em—the inspectors can't.

When you get right down to it the best way to get these places to furnish clean eating tools is when the customer gets a glass or something that ain't clean to call the boss around and point it out to him—in a nice way, of course. I know the average person, the same as myself—they don't like to make a fuss about such things and get the reputation of being kickers. But if it's a good place the boss'll want to know about it and if it ain't—anyway, if they think you're a kicker they'll look out for your heels.

PAUL B. BROOKS, M.D.