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JOURNAL of MILK TECHNOLOGY

Volume 9 November–December, 1946 Number 6

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 the transactions.

Milk "and Food" Sanitarians

At the Annual Meeting just held in Atlantic City, New Jersey, October 24–26, the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS voted favorably on the proposed constitutional amendment which provides for changing the name of the Association to the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS. This affirmative action authorizes the Secretary-Treasurer to submit (within ninety days) the amendment to the membership for a mail vote. A two-thirds vote of the active members of the Association (who register their votes with the Secretary-Treasurer) is necessary for adoption. Other amendments also received affirmative preliminary action. All of these proposed amendments were edited by a special committee, authorized by the Association to be appointed by the President, for submission to the membership for the mail vote.

The Executive Board authorized the name of the Journal to be changed to the JOURNAL OF MILK AND FOOD TECHNOLOGY, to be effective beginning with the January-February, 1947, issue of Volume 10.

J. H. S.

Food Handler Training Courses

EDUCATION of food handlers is probably the most effective method of obtaining compliance with food sanitation standards. Employees of food establishments should have some knowledge of food-borne diseases and modes of transmission, should be thoroughly acquainted with food handling sanitation, should understand why they should not work any ill or with discharging or presumably infected sores or wounds, and why they should be meticulous about personal hygiene, particularly cleanliness of hands and finger nails.[1] Sanitarians have

[1] Ordinance and Code Regulating Eating and Drinking Establishments Recommended by the U. S. Public Health Service. *Pub. Health Bul.* No. 280, p. 49 (1943).

discovered that most food handlers will improve their methods and acquire sanitary habits if taught how; and that legal methods of enforcement may be reserved for the recalcitrant minority. The sanitarian who employs the educational rather than the policeman type of approach is the one who achieves the most permanent results.[2]

Beginning about 1936, public health workers started training courses for food handlers to provide greater protection from food-borne diseases. Pioneer work was done in Texas, Flint (Michigan), and New Mexico. Later, educational programs were developed by many other states and communities, frequently with the assistance of the U. S. Public Health Service.[3] From December 1942 to July 1946, 123 demonstration schools for employees of food handling establishments were conducted by the Public Health Service in cooperation with state and local health departments, local restaurant associations, and other civic groups, with a total attendance of 64,666. In addition, 19 schools have been attended by 9;701 employees of railroad and airline dining cars and commissaries; 19 schools for 1,813 food handlers on Indian reservations; 14 for 1,952 cafeteria employees at industrial plants; 11 for 813 dietitians and food handlers at hospitals; and 9 for 1,681 food handlers at Army and Navy installations. Most of these courses have consisted of two 2-hour classes or three 1½-hour classes, repeated as often as was necessary to accommodate the attendance.

Organized food handler schools are at present being conducted by 30 state and territorial health departments and by at least 89 cities and counties, most of them as a result of the impetus given by the Public Health Service demonstrations.

Suitable materials for food handler courses have been developed and are available from many sources. Among those developed by the Public Health Service are: (1) an outline of 6 lectures; (2) more than 175 lantern slides with descriptions of each; later replaced by (3) a series of four sound film strips entitled "Our Health in Your Hands"; (4) a pocket size illustrated manual of instructions for food handlers entitled "From Hand to Mouth"; (5) a series of 6 posters entitled "For Our Patrons' Health"; (6) a list of films on milk and food sanitation; and (7) just off the press, "Guide to Safe Food Service," a manual for use in organizing and conducting classes for food establishment employees.

Sanitarians who may be interested in organizing food handler schools in their communities should apply to their state health department or to the District Office of the U. S. Public Health Service for assistance.

A. W. F.

Public Health Service Disease Outbreak Reports, 1944

THE Public Health Service reports for 1944, the latest available, cover 36 outbreaks of illness attributed to milk or milk products, plus 5 "possibly conveyed through milk". A careful study of the reported data and observation as to important data in some instances not reported, again suggests that a larger number, perhaps, should have gone in the "possibly conveyed" list.

It is recognized, however, that the evaluation and classification of the many

[2] Fuchs, A. W. Sanitary Measures Hold Restaurant Customers. *J. Milk Tech.*, 8, March-April (1945).

[3] Andrews, John and Champion, Frances T. Guide to Safe Food Service. U.S.P.H.S. Feb., 1946.

evidently incomplete and inadequate reports received by the Public Health Service is a difficult undertaking. Those responsible for preparation of the lists have to use their best judgment, based on their studies of the original reports. They should be congratulated on doing as well as they do with the material available.

It is not too much to hope that the time will come when uniform and reliable epidemiological standards and conceptions will be generally accepted and applied. Then the job of the Service analysts will be simplified and their conclusions can be accepted with less reservations. In the meantime the reports are of definite value, if taken with the necessary "grain of salt".

DAIRY PRODUCTS

Of the 36 recorded outbreaks, 23 were listed under the head of food poisoning or gastroenteritis. Eight of these were attributed to sweet milk, 9 to ice cream, 3 to cheese, 2 to evaporated milk, and 1 to buttermilk. Notable among these were an outbreak of 104 cases in a Detroit hospital, attributed to cheddar cheese; one of 71 cases in Virginia, believed to have been traced to Colby type cheese; and one of 112 cases in a Troy, New York, school, attributed to ice cream, apparently home-made. As usual, staphylococci and inadequate refrigeration figured prominently among the causes of the outbreaks in this group.

Two gastroenteritis outbreaks involving 130 and 60 cases, respectively, were attributed to pasteurized sweet milk. The former occurred in a camp where general sanitation was reported as poor (the milk was dipped from a can). The addition of raw milk was suspected in the other.

Two apparently separate outbreaks of diarrhea of the new-born, which occurred in the same month in a hospital in Albany County, New York, were charged to "faulty technique in preparation of formula and nipples". There is some question in the mind of the writer whether these should have been included as milk-borne.

An outbreak of 13 cases of bacillary dysentery, reported from Fall River, Massachusetts, and attributed to pasteurized milk, was one of those which, judging from the record, should have gone under the "possibly conveyed through milk" heading. According to the reports, no cases were investigated; important information was lacking; and the answer to the question as to how the vehicle was contaminated was the statement "Possibly by handling stoppers of milk cans."

Two outbreaks of hemolytic streptococcus infection: one of 100 cases of epidemic sore throat in Minnesota, and the other 71 cases of scarlet fever in Wisconsin, were traced to raw milk from cows with udder infections. In both instances infected milkers were discovered. New York and Massachusetts, which usually have reported most of the outbreaks of this infection, evidently had none to report.

Of 4 typhoid outbreaks, 2 were traced to cheese. One of 79 cases, involving several California counties, was reported as due to the consumption of unpasteurized "green cheese". Colby cheese was responsible for 246 cases, involving 16 counties, in Indiana. Pasteurizing equipment ordinarily used, was reported to have broken down. Two small outbreaks of typhoid, and also, one of paratyphoid fever, were attributed to raw sweet milk.

Raw milk from infected herds was responsible for 3 relatively small outbreaks of undulant fever: one in California, and two in Iowa. Seventy-five per cent of the cows in the California herd were said to have been infected.

OTHER FOODS

Charged to foods other than milk and milk products were 288 outbreaks, grouped as follows: food poisoning or gastroenteritis, 250; chemical food poisoning, 8; botulism, 9; trichinosis, 7; typhoid fever, 7; bacillary dysentery, 3; epidemic sore throat, 1; paratyphoid, 1; disease not named, 2. The largest and presumably most serious was one of approximately 1,200 cases of hemolytic streptococcus throat infection involving personnel of a Minnesota industrial plant. Potato salad was believed to have been responsible.

Of the 8 outbreaks of chemical poisoning, 4 were attributed to accidental use of rat or insect poisons; and one of 20 cases to soluble antimony in the enamel of a dish used for storing grape-fruit juice. Home-canned food accounted for 8 of the 9 outbreaks of botulism. Pork sausage was mentioned in connection with 5 of the 7 trichinosis outbreaks; and pork in the other two.

The terms "food poisoning" and "gastroenteritis" were used by about an equal number of reporters of outbreaks in this group. This suggests, again, the desirability of agreeing on one term for general use.

Meats or meat products were incriminated or suspected in approximately half of these outbreaks. Pastries, including "creamed-filled", were charged with 33; salads, mostly egg and potato, 15, and fish or shell-fish, 13. Staphylococci were mentioned in connection with 100 outbreaks, aureus frequently being specified. It is of interest, here, to note that the outbreaks of food poisoning and gastroenteritis charged to milk and milk products amounted to only about one-tenth of the number charged to other foods.

Outbreaks attributed to foods other than milk and milk products were reported from 33 states, the District of Columbia, and 2 territories, Hawaii and Alaska. Those reporting the largest numbers of outbreaks were New York, with 91; California, 20; and Massachusetts, 19. States for which no outbreaks were recorded were Delaware, South Carolina, Rhode Island, Vermont, Mississippi, Arkansas, West Virginia, Nevada, Colorado, North Dakota, Montana, Wyoming, Oklahoma, New Mexico, and Arizona.

Thinking of the outbreaks classified as food poisoning or gastroenteritis, those of us who have been long associated with the practice of medicine or epidemiology can well recall when a general prevalence of gastroenteritis, especially in the summer and autumn months, was expected and taken for granted. Aside from a few outbreaks laid to water and the even less frequent identification of one for which some food was held responsible, outbreaks were not recognized as such. Within the past thirty years or thereabouts there has been a growing recognition of the fact that, when numbers of people in various areas suffer from gastroenteritis at the same time, it is practically certain that there are common causes.

It probably is safe to assume that the number of outbreaks actually occurring is far in excess of the number recognized, investigated, and reported. In at least one state reporting large numbers, the question is being raised whether too much time and effort are not being given to investigation of gastroenteritis outbreaks, at the expense of other more important epidemiological activities. Nevertheless, the investigation of these outbreaks has been contributing to our general knowledge of epidemiology and it is encouraging to note that, in an increasing number of localities, they are being recognized and investigated.

P. B. B.

C. Sidney Leete, Our Retiring Secretary-Treasurer

Ten years ago, when the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS held its meeting at Atlantic City, C. Sidney Leete was elected Secretary-Treasurer, succeeding Dr. P. B. Brooks, then Deputy Commissioner of Health of New York State. The President was J. G. Hardenbergh, now Executive Secretary of the American Veterinary Medical Association. He took over when the Association was feeling an expansionist pressure, most expressive of which were the cooperative program on sanitary fittings, the increasing use of other means than score cards and plate bacteria counts to measure sanitation, and the inauguration of the *Journal of Milk Technology*.

The Association had no financial reserve. Its membership totaled about three hundred. It published the papers that were presented at its annual meetings in a single book of Proceedings, with a circulation of about five hundred copies. Its membership was limited almost exclusively to territory along the Atlantic seaboard, with a few members in the South and a few west of Chicago.

During "Sid's" incumbency as Secretary-Treasurer, the Association has grown most surprisingly, now with a membership of two thousand extending to the west coast. The *Journal of Milk Technology* now issues over three thousand copies to a score of countries. The collaborative committee work on standards and ordinances is well established and favorably known. Sid Leete helped us over rough places, ran "interference" for us, in general encouraged us to keep at it. Always cheerful, always cooperative, always ready to listen to our troubles, he was a splendid official. "He governs best who governs least." He encouraged us to take responsibility—and then he stood by us.

Someone has said:

"The measure of a man's influence on science in his own and future generations may be taken (1) by his personal contributions to knowledge in his chosen field and (2) by his contributions to the organization of agencies, facilities, and institutions which serve to coordinate and implement the labors of others." Sid has done both.

He declined to let his name be considered for reelection as Secretary-Treasurer. We cannot blame him. Ten years of details of membership lists, changed addresses, missing copies of Journals, programs, etc., etc.—all outside of regular working hours! Ten years! He must feel like a balloon whose ballast has been cast out. But such faithfulness stems from a devotion that must be buried deep in his protoplasm; he cannot permanently slip out from under its urge. We need his enthusiasm, his perspective, his experience, his character, his friendliness. He remains one of us.

J. H. S.

Correction

IN the article entitled "Environmental Farm Sanitation" by Dr. Fred B. Welch, this Journal, September-October issue, page 287, we inadvertently omitted to state that Dr. Welch is City Health Commissioner for the city of Zanesville, Wisconsin. The omission is regretted.

J. H. S.

NORWAY REWARDS MAJOR FREDERICK H. DOWNS, JR.

Major Frederick H. Downs, Jr., Principal Sanitarian of the Alabama State Health Department, was awarded King Haakon VII's Freedom Medal on September 16, 1946.

He joined the staff of the Alabama State Health Department in 1925 and was employed principally in milk control work until December, 1941, when he went on active duty as a First Lieutenant in the Sanitary Corps of the United States Army.

Major Downs held the post of Sanitary Officer, Fort Sam Houston, Texas; graduated from the School of Military Government, Charlottesville, Virginia; spent thirty-two months in overseas service in North Africa and Europe during which time he was Sanitary Officer for AMGOT in Sicily, G-5 Section First United States Army in Rhineland and Germany campaigns; was a member of the SHAEF Mission to Norway and advisor to the Royal Norwegian Government on Public Health Sanitation, Sanitary Officer of the Seventh Army Western Military District of Germany, Medical Inspector of 35th Infantry Division; and was separated at Fort McPherson, Georgia, as a Lieutenant-Colonel on April 5, 1946.

In 1929 Major Downs joined the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS as an active member. He is also a member of the American Public Health Association, the American Legion, and Lambda Gamma Delta Honorary Agricultural Fraternity. He was president of the Senior Class at A. & M. College ('24), Lieutenant-Colonel of Cadet Corps, and in 1923, as a member of the Dairy Cattle Judging Team, won top honors in judging Jersey cattle at the National Dairy Show, Syracuse, New York.

Immediately after the German surrender, Downs, a major in the Army Sanitary Corps, went as a member of an Anglo-American mission to Norway. The mission brought in medical and food supplies, and helped Norway start her sanitary, hospital, and other health agencies to functioning in the trying days immediately after liberation.

That service won Major Downs the medal, with citation in English and in Norwegian, signed by King Haakon VII, voicing appreciation for "outstanding services rendered to the cause of Norway during the liberation."

The Oregon Program of Licensing Cheese-makers, Butter-makers and Pasteurizer Operators*

G. H. WILSTER

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THE licensing of cheese-makers, butter-makers, and pasteurizer operators is an important link in Oregon's dairy products quality improvement program. A law which provides for the licensing of cheese-makers and butter-makers has been on the statute books since 1917. In 1939 an amendment was made to this law requiring the issuance of licenses upon the passing of an examination conducted by the Oregon State Department of Agriculture. This provision greatly strengthened the law and has made it effective.

The production of Cheddar cheese has trebled since 1917. The average yearly production in recent years was nearly 30 million pounds. Butter production has doubled and reached 32 million pounds prior to the war. Inasmuch as during the prewar years, approximately 75 percent of the cheese and 33 percent of the butter manufactured was sold in California in competition with cheese and butter from a number of other states, dairy leaders in Oregon have recognized that it is necessary to market only products of a high and uniform quality, of correct composition, and possessing good keeping properties.

The compulsory milk and cream grading law enacted by the state legislature in 1937 provides for the grading of milk and cream when received at the factories and creameries and also provides for the licensing of the persons who are doing the grading, as well as for payment for the milk and cream in accordance with quality. Inferior quality milk and cream must be denatured by the addition of a red coloring matter, and must be tagged and returned to the place of origin. In other words, milk and cream unfit for human consumption cannot be sold at manufacturing plants in the state. The licensing of the men in the plants who are doing the manufacturing work was deemed necessary in order to raise the standard of proficiency of these men and for the manufacture of uniform products of correct composition.

These two laws, then, are very necessary in Oregon's program of orderly marketing of dairy products.

In 1945 a new law pertaining to the pasteurization of milk and milk products and licensing of pasteurizer operators was passed. With reference to the licensing provision, the law states that: It shall be unlawful for any person to be in charge of, supervise, direct, or engage in the operation of any pasteurization equipment unless he shall first have procured from the State Department of Agriculture a pasteurizer operator's license. It further provides that a pasteurizer operator's license shall be issued by the department to any person who shall apply for it in writing and pass satisfactorily an examination including an actual demonstration of his ability to operate pasteurization equipment in compliance with the provisions of the law and regulations pertaining thereto. The license is not transferable and is valid

* Presented during Wisconsin Dairy Manufacturers' Conference, University of Wisconsin, Madison, Wisconsin, April 18–19, 1946.

for one calendar year. The annual fee for the license is one dollar. A permit to operate pasteurizing equipment for a limited time may be granted by the department.

THE LAW PROVIDING FOR LICENSING OF BUTTER- AND CHEESE-MAKERS

The revised law as enacted in 1939 is as follows:

"For the purpose of this chapter of the Oregon Compiled Laws the term butter-maker and cheese-maker shall respectively mean and include any person employed in, engaged in, acting in or who may be employed in any butter or cheese factory who has charge of any supervision over the actual process of manufacturing butter or cheese, but shall not include a person employed in the butter or cheese factory for the purpose of aiding or assisting in the manufacture of such products. This chapter of the Oregon Code shall not affect a person making up a product produced on his own farm.

"It shall be unlawful for any person to engage in the manufacture of butter or cheese as a butter-maker or cheese-maker as above defined unless he shall first have secured a license from the State Department of Agriculture. Such license for butter or cheese-makers shall be issued by the department under certain rules and regulations as it shall prescribe relating to the qualification of applicants for securing such license. Such qualification shall include among other things previous record in operating and keeping in sanitary condition the butter or cheese factory in which he has been employed. The State Department of Agriculture shall also by regulation require the written and oral examination of any applicant for either or both a butter-maker's or cheese-maker's license in this state. Such rules and regulations shall be published in pamphlet form as prescribed by the Department of Agriculture statute.

"Application for a butter-maker's or cheese-maker's license shall be made upon an application blank furnished by the State Department of Agriculture. Upon receipt of any such application the department may, in its discretion, issue a permit to such applicant to carry on the work of butter-maker or cheese-maker for such period as may be prescribed therein not to exceed 60 days. Such permit shall have the full force and effect of a license to carry on the work of a butter-maker or cheese-maker during the period mentioned therein. At the time such permit is issued the department shall furnish to the applicant the rules and regulations incident to securing a license and also suggestions relating to the proper method of operating butter or cheese factories.

"Each application for such license shall be accompanied by a fee of $1.00 payable to the Department of Agriculture of the State of Oregon and no license shall be issued until such fee has been paid to said Department, by which it shall be transmitted to the State Treasurer to be deposited in the Department of Agriculture account to be used by the department toward the payment of salaries, costs and expenses in carrying out the provisions of this act. Such money shall be drawn upon vouchers with the approval of the Director of Agriculture endorsed thereon and audited by the Secretary of State, who shall draw his warrant on the State Treasurer. In case license is refused the fee accompanying such application shall be returned by notification of refusal.

"Each butter-maker's or cheese-maker's license shall be subject to revocation by the State Department of Agriculture if the butter-maker or cheese-maker, as the case may be, has violated any of the rules and regulations prescribed by the department, or has violated any of the laws of the State of Oregon in relation to milk or cream. or milk and cream products.

"Each butter-maker's or cheese-maker's license shall expire on the first day of July next succeeding the day of its issue.

"The State Department of Agriculture shall make such rules and regulations as may be necessary to carry into effect the provision of this chapter of the Oregon Compiled Laws and for the government of licensees under this chapter.

"Any person violating any of the provisions of this chapter of the Oregon Compiled Laws shall, upon conviction thereof, be fined not less than $25.00, nor more than $150.00, for each violation of this chapter."

QUALIFICATIONS AND REQUIREMENTS FOR CHEESE-MAKERS' AND BUTTER-MAKERS' EXAMINATION

In accordance with the law, the Division of Foods and Dairies of the Oregon State Department of Agriculture has prescribed the following regulations for the examinations:

CHEESE

1. A knowledge of the following Oregon laws:
   - Sanitary regulations.
   - Miscellaneous provisions relative to milk and dairy products.
   - Licensing of butter and cheese makers.
   - Duties of the Department of Agriculture in reference to Foods & Dairies.
   - Oregon Food Act.
   - Milk container brands.

Registration of private brands.
Registration of private brands for containers.
Milk, cream, and butter grades and licensing of graders.
Purchase of milk and cream standard glassware.

2. Ability to perform satisfactorily a practical analysis of cheese for composition, fat, and moisture.
3. Ability to demonstrate the methylene blue test and interpret its results.
4. Ability to demonstrate the fermentation curd test.
5. Ability to demonstrate satisfactorily the judging of cheese as to quality.
6. A thorough practical knowledge of the fundamentals of cheese-making, especially:
   The effect of the quality of milk on the finished cheese.
   Sanitation of cheese factories.
   Composition of milk.
   Preparation of starter.
   Rennet and factors affecting its use.
   Acid control.
   Composition control.
   Pasteurization of milk as used for cheese-making.
   Primary knowledge of yeasts, molds, and bacteria and how to control them.
   Common cheese defects, their cause and correction.
7. At least one year practical experience in a cheese factory.
8. Ability to demonstrate practically, the proper operation of the Babcock test unless the applicant has an Oregon license to operate the same.
9. Ability to calculate practical dairy arithmetic problems such as the value of milk and dairy products when weight, test, and values are given; standardization of milk for composition control; value of spillage and fat leakage losses, etc.; also the calculation of cheese yields.

BUTTER

1. A knowledge of the following Oregon laws:
   Sanitary regulations.
   Miscellaneous provisions relative to milk and dairy products.
   Licensing of butter and cheese makers.
   Duties of the Department of Agriculture in reference to Foods & Dairies.
   Oregon Food Act.
   Milk container brands.
   Registration of private brands.
   Registration of private brands for containers.
   Milk, cream, and butter grades and licensing of graders.
   Purchase of milk and cream standard glassware.
2. Ability to perform satisfactorily a practical analysis of butter for composition.
3. If applicant does not possess a butter grader's license, he must give satisfactory demonstration of the ability to grade the same.
4. A thorough practical knowledge of the fundamentals of butter-making especially:
   Neutralization and acid standards.
   Neutralization problems.
   Pasteurization of cream.
   Preparation and use of starter.
   Preparation, care, and cleansing of equipment.
   Control of butter composition.
   Common defects in butter and method of overcoming them.
   Primary knowledge of yeasts, molds, and bacteria and how to control them.
5. At least one year practical experience in a creamery or other acceptable dairy manufacturing plant.
6. Ability to demonstrate practically, the proper operation of the Babcock test unless the applicant has an Oregon license to operate the same. In either case the butter-maker must possess knowledge of the proper method of testing buttermilk for fat.
7. Ability to run quick tests for acidity.
8. Ability to calculate practical dairy arithmetic problems such as overrun calculations; the value of overrun losses; spillage losses; and the value of dairy products when weight, test, and unit values are given.

Examinations will be both written and oral. Ability to spell and use correct English will not be considered.

Directions as to how and where to obtain the above information will be sent anyone wishing it by addressing the Division of Foods and Dairies, State Department of Agriculture, Salem, Oregon.

METHOD OF CONDUCTING THE EXAMINATIONS

All the examinations are held in the Agricultural Building occupied by the State Department of Agriculture at Salem, Oregon. The examination committee has consisted of a member of the staff of the Division of Foods and Dairies, State Department of Agriculture, a member of the industry, and a member of the staff of the Department of Dairy Husbandry, Oregon State College.

The oral examination is divided into two parts, taking about one-half hour for each. One part covers the Oregon

laws as indicated in the requirements above, and the other covers the practical manufacture of cheese or butter. The plan has been to call in the applicants before the examining board of three men one at a time and quiz them for 30 minutes over the laws. Later they are given a half-hour quiz over the manufacturing methods. It is believed that this oral examination is the most important part of the whole examination. An applicant may not be able to express himself clearly in a written examination. He is usually able to answer questions verbally, provided of course he has a fair knowledge of the subject.

The questions asked are in all cases fair. No attempt is made to confuse the butter-maker or cheese-maker appearing before the committee, and only practical questions are asked. The examining committee does not expect the applicant to answer all questions, but there are a number of questions that should be answered correctly by all applicants. For instance, the committee expects all the applicants to have a fundamental knowledge of the sanitary regulations pertaining to cheese factories or creameries as well as a knowledge of the important tests used in grading milk. In view of the information available on the subject, the committee has also felt that applicants should know the correct methods to use for standardizing milk, for preparing starter, for pasteurizing milk, and for controlling the composition of cheese or butter. A lack of knowledge of the state and federal standards governing the composition of cheese or butter or standards for these products, is inexcusable.

Each applicant has been required to solve practical dairy arithmetic problems common in cheese factory or creamery operation. He has also been given between 100 and 200 true or false questions, which require the marking with a plus or zero sign for an answer.

In the event an applicant fails in the examination he is given an opportunity to appear again for another examination. During the past, examinations have been held twice a year. It is contemplated to give the examinations four times a year, or oftener if necessary.

The committee has refrained from recommending to the Department of Agriculture that a license be issued unless it is reasonably sure that the cheese-maker or butter-maker is sufficiently well informed to manufacture cheese or butter without getting into serious quality and composition difficulties. In some cases it has been necessary for the applicant to appear for the examination two or three times. About one-half of the men who have appeared have passed the first time. The reason for failure generally has been carelessness in preparing for the examination by not studying the laws and regulations, and bulletins and manuals dealing with the practical manufacture of cheese or butter.

A summary of the results of the butter- and cheese-makers' examinations as conducted under the present law as enacted by the 1939 legislature is as follows:

	Butter-makers	*Cheese-makers*
Total taking examination..	85	38
Total passing first examination	48	*16
Total failing on first examination	37	22
Failed twice	4	3
Passed on second examination	4	2
Passed on third examination	2	0

Reason for some of the failures is best shown by the results of March, 1941, butter-makers' examination:

Laws and Regulations	*Oral B. making*	*Written B. making*	*Lab. Pract.*	*Final Grade*
P	P	F	F	F
P	P	F	P	P
F	F	F	F	F
P	P	F	F	F
P	F	P	P	P
F	F	F	P	F
P	F	F	P	F

P=Pass.
F=Fail.

There was some fear at first that the committee would be unreasonable in its requirements. It is doubtful now if there is a single person in the industry who is not thoroughly sold on Oregon's program of licensing butter-makers and cheese-makers.

A number of persons representing the industry have participated in giving the examinations. They have even proclaimed that they would not care to hire some of the butter-makers or cheese-makers who have failed during the examination once, twice, or even three times. They know that it is not necessary to possess a degree from a collge or university in order to pass the examination, but they know that any cheese-maker or butter-maker who has prepared himself for the examination and who has had proper experience in a plant can pass the examination. It is recognized, however, that the attendance at college or university special dairy courses where the cheese-makers or butter-makers can obtain practical information is of great value in the training of young men for the cheese-making or butter-making profession.

It should be pointed out here that the cheese-makers or butter-makers who held a license prior to 1939 have not been required to take the examination. Most of those who have appeared for the examination have therefore been young men who have worked as helpers in creameries or cheese factories.

WHAT WILL BE THE EFFECT OF THE LICENSING LAW?

The dairy leaders who suggested that cheese-makers and butter-makers submit themselves to an examination prior to obtaining a license had in mind the gradual raising of the standards of proficiency of the cheese-makers and butter-makers as part of a long-time program of quality and composition standardization.

The proper enforcement of the law should:

1. Encourage young men to acquaint themselves with the laws that pertain to sanitation, grading, testing, and composition standards for milk, cheese, and butter.
2. Stimulate in assistant cheese-makers and butter-makers a desire to obtain a thorough knowledge of all phases of the manufacture of cheese and butter.

The ultimate goal is:

1. To raise the general standard of proficiency of the Oregon butter-makers and cheese-makers.
2. To manufacture the highest quality cheese and butter of correct composition.
3. To increase the demand for Oregon cheese and butter in out-of-state markets.
4. To increase the returns to the Oregon dairy farmers.

LICENSING PASTEURIZER OPERATORS

The applicant for a license must satisfy the examining board that he has a good knowledge of the following:

1. The law and regulations under which license or permit is granted.
2. Bacteria, yeasts and molds—what they are; where they come from; what they do; and how they may be controlled.
3. Flavor defects in milk or cream—their causes and control.
4. Pasteurizing and cooling.
5. Cleaning and sterilizing equipment and utensils used in the pasteurizing room.
6. Tests and problems:
   a. Reading knowledge of standard plate count, direct microscopic count, and phosphatase test.
   b. Ability to demonstrate Babcock fat test and acid test.
   c. Ability to work problems in
      (1) Standardization of milk and cream;
      (2) Neutralizing cream.

A list of the publications such as extension bulletins, manuals, etc., which contain information on the above may be secured from the State Department of Agriculture by each applicant for a license.

(Continued on page 338)

Platform Tests Which May Aid in Improving the Quality of the Milk Supply*

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THE effectiveness of platform tests in improving the quality of the milk supply has been the subject of much debate among inspectors and sanitarians for years. Some contend that platform tests have little or no place in milk supply control while others are equally insistent that if used properly, recognizing its limitations, it does have a very important place in improving the quality of the milk supply.

Experiences and beliefs of sanitarians who have worked both with farm and deck inspections are worthy of note. Tiedeman and Schacht (1937) and Tiedeman (1938) state that:

"The relative ineffectiveness of farm inspection has been revealed by the examination of milk delivered to plants. There have been many practical demonstrations of the value in improving milk quality of the application of simple tests to the milk at the receiving platform and rejecting unsatisfactory cans without attempting inspection of the farms. More improvement has been accomplished by using platform tests to point out the farms that need inspection and concentrating inspection there. . . .

"We believe that municipalities having limited funds for the quality control of milk delivered for pasteurization might well devote a considerable part of such money to the testing of individual cans of milk as received at plants and the rejecting of substandard milk, following up such rejection by a farm inspection designed to assist the farmer in finding and eliminating the cause for rejection."

Pincus, Abraham, and Tiedeman (1936) stated:

"It is evident that if we are to improve our milk supply we must supplement or to some extent replace the routine farm inspection with a systematic quality control on the platform."

Pincus and Abraham (1939) reported:

"It is evident that deck inspection is not only efficient, but also an inexpensive and rapid method of achieving our control aims. At best, an inspector can check twelve to fifteen dairies per day, seeing only a few of the cows, and in most instances merely produce inconclusive results as far as quality of product is concerned. While on the deck, he can examine the milk of several hundred dairies within three to five hours."

In the Question Hour at the Sixteenth Annual Meeting of the New York State Association of Milk Sanitarians, Hucker (1942) asked, "Why do health officials make platform tests?" To this Abraham replied:

"Platform tests are considered the best available means for detecting, in a practical manner, milk of unsatisfactory quality, and for preventing the inclusion of such milk in the supply.

"Other methods may pick out milk of poor quality but require special facilities and long periods of time. This would not enable the immediate rejection of the milk from the supply."

Platform tests would seem to be a part of a good inspectional program. Particularly is deck inspection important to those areas having limited funds to carry on the work. Many more producers may be reached through systematic platform inspection than is possible by farm inspection. Routine platform inspection is

* Given at Third Annual Dairy Inspectors' and Sanitarians' School, Michigan State College, East Lansing, April 8–12, 1946.

a means by which producers may be classified tentatively—not with the idea of ignoring the good producers entirely, but of ascertaining which producers need the most assistance in attaining high quality milk production.

TESTS EMPLOYED IN PLATFORM INSPECTION

The tests advocated for platform inspection are many and varied. Sommer (1946) lists the following intake tests for milk quality:

1. The sense of smell and taste
2. Temperature
3. Acidity test
4. Sediment test
5. Boiling test
6. Alcohol test
7. Indicator tests
8. Indicator-alcohol tests
9. Chloride content test

Armstrong (1945) used four platform tests, namely, flavor and odor, temperature, sediment, and acidity tests. Bryan (1944, 1945) suggested five platform tests on producer supplies—odor, appearance, flavor, sediment, and temperature. Pincus and Abraham (1939) studying the practical value of deck inspection as compared with farm inspection made use of the odor, strainer-dipper, sediment, and temperature tests. Tiedeman (1938) and Tiedeman and Schacht (1937) used essentially these same tests but classified the milk according to the microscopic count and methylene blue tests as well. Jansen (1935) used effectively the strainer-dipper test.

PLATFORM TESTS USED BY INSPECTORS

Milk inspectors and sanitarians actually on the job, while making use of a variety of tests and for various specific purposes, generally employ the sediment, temperature, and odor tests at the receiving platform. Less generally used at the platform are tests such as the methylene blue, microscopic, taste, and appearance. These facts were ascertained in a survey made of the milk inspectors and sanitarians attending the 3rd Annual Dairy Inspectors' and Sanitarians School, Michigan State College, April, 1945. Data secured in this survey are tabulated as follows:

Summary of Responses to Some Questions Pertaining to Platform Inspection Asked of Milk Inspectors and Sanitarians in Conference April, 1946

1. In your inspection program do you ever make use of platform or deck inspection?

Response	*Number*
Yes	46
No	3
No response	1

2. How frequently do you employ platform inspection?

Response	*Number*
Daily	1
Weekly	1
Two weeks	4
Six weeks	3
Monthly	19
Two months	5
Three months	3
Four months	3
Six months	3
Very infrequently	2
As regular as possible	1
When "kicking"	1
No response	2

3. What do you consider to be the chief advantage of platform inspection?

Response	*Number*
Detects poor quality of milk.. (Physical condition, appearance, temperature, off-color, cleanliness, sediment, odor, spoiled, poorly cooled and handled, condition of cows, transportation)	31
Rejects milk before it goes into supply	14
Get condition of cans	4
Psychological value to hauler, farmer, and plant operator..	1
Farmer and hauler can understand reason why milk is rejected	1
Helps in sanitation control...	1
Lets producer know quality so he can improve it	1
Samples taken before being molested by plant operator..	1
Re-check farm post-inspectional services	1

Arrive at an opinion of quality of individual producer	2
Determines quality of work of man in receiving room	1
Furnishes data for sanitarians to discuss with producer	1
Aids plant in controlling producers	1
Constantly watching for undesirable milk	1
One tool by which you can get maximum quality control	1
Quick check for abnormal milk	1
Puts producer on his toes by rejection of rejectable milk.	1
Gives fieldman and management a lead on source of trouble	1
Gives management a good system of records for future use and guide in program	1

4. List the tests which you use in platform inspection.

Response	*Number*
None given	3
Sediment	39
Temperature	36
Odor	33
Methylene blue	16
Samples for microscopic examination	10
Taste	9
Visual examination (appearance)	9
Producers' cans	6
Acidity	3
Lactometer	2
Plate count	2
Pasteurizibility	1
Viscosity	1
Color	1
Alcohol	1
Brom thymol blue	1

5. Which of the tests do you consider most important?

Response	*Number*
Sediment	20
Odor	14
Temperature	11
Methylene blue	9
Microscopic examination	5
Taste	3
Physical	2
Cans	2
Plate count	2
Specific gravity	1
Pasteurizibility	1

6. Which of the tests listed above do you consider to be least in importance?

Response	*Number*
No response	11
Temperature	14
Sediment	11
Odor	5
Taste	3
Methylene blue	3
Acidity	1
Sight	1
Uncertain	3

7. Do you have a definite system of recording platform test observations?

Response	*Number*
Yes	27
No	13
Partially	2
Not answered	10

FUNDAMENTAL PRINCIPLES AND EFFECTIVENESS OF VARIOUS TESTS

1. **The dipper-strainer.** The dipper-strainer test is based on the fact that properly handled, normal, high quality milk is homogeneous throughout and is free from any extraneous solid matter whether of milk or of foreign origin. The presence of any non-strainable material, therefore, indicates abnormal milk. Jansen (1935) used effectively this method of detecting poor milk at the receiving platform. He made use of a long handled two-quart dipper fitted with a 100-mesh bottom, manufactured by the Atlantic Stamping Company of Rochester, N. Y. In one sense this test is a higher-than-normal application of the appearance test. From his extensive use of this test Jansen concluded in part as follows:

"This utensil has become one of our most useful pieces of equipment in immediately detecting objectionable milk. It is not designed to replace bacterial count or other tests, but is one of the greatest aids we have added to our inspection to obtain quality of milk, or to quickly *and definitely* trace the source of any sudden trouble.

"This strainer-dipper is the only instrument that can be used on every can of milk

at the rapid speed of our modern day equipment, quickly obtaining results without holding up the plant operation. Strainer-positive milk is objectionable from the standpoint of quality. It is not normal and, therefore, should be eliminated. Strainer-positive milk denotes one or more of the following conditions:

Mastitis
Milk from stripper or fresh cows
Dirty cows and poor straining
Mixing of night's and morning's milk
Slow cooling
Poor cooling
Frozen milk
Dirty utensils and equipment
Old milk mixed in
Newly soldered cans that have been used without thoroughly removing all traces of soldering acids."

2. **The acidity test.** The use of the titratable acidity test in the detection of poor quality milk is based on the erroneous assumption that such milk always has a high titratable acidity and that good milk has a low percentage of acidity. Unfortunately those relying on the test often overlook the fact that milk varies widely in titratable acidity and that it is the *increase* in, or developed, acidity with its associated flavors which is objectionable. Thus a milk normally low in acidity may have considerable developed acidity showing a relatively low titre and yet be accepted as good milk by this method, when in reality the milk should have been rejected. For example, if the original milk titrated 0.15 percent acidity (which those using the test can never know) and when inspected had only 0.18 per cent acidity, the chances are the milk would have passed inspection. Such milk will likely have a pronounced high-acid odor which even the inexperienced platform receiving man can detect. Users of this test usually set an arbitrary standard for acidity above which the milk is rejected. Minimum standards often range from 0.18 to 0.20 of 1 percent titratable acidity. Obviously, much good, high solids milk may have an initial acidity at these levels and/or above. Hence by following these standards the inspector would often reject good milk. The acidity test has a place in the dairy industry, but its usefulness is not on the receiving platform.

3. **Appearance.** The appearance of the milk is one indication of its quality. In conducting other platform tests, the appearance of the milk may be noted without any loss of time or effort. The inspector should be aware of the items to observe such as (a) natural color of the milk (not pinkish indicating presence of red blood cells in large numbers); (b) viscosity and (c) presence or absence of churned fat, flakes, straw, flies, and other floating extraneous matter. The application of the test is so simple and the results so effective in eliminating certain types of poor quality milk that this test should be one of the routinely used platform tests, particularly in conjunction with other tests.

4. **Sediment.** Much use is made of the sediment test in platform milk inspection. Frequently the test is not performed according to the original procedure. Instead of taking a representative sample of the mixed milk, the sample is frequently taken off the bottom of the can with the idea of securing maximum sediment on the sediment pad. This procedure may be satisfactory for the object is to find out the amount of foreign material present. A great deal can be said about the sediment test, methods, procedure, and effectiveness in a milk quality program. Weckel (1942, 1943), reporting on studies on the measurement of sediment in milk, recognized that when sediment was of the soluble type it may not be possible to segregate milks of equal or of different hygienic qualities. Many inspectors believe that a sediment pad furnishes concrete evidence of the quality of the milk production and by its use secure action on the part of the milk producer. In this undoubtedly they are partly right. There is no denying the fact that the use of the sediment test is often an

effective method of securing better straining of milk on the farm, and to some extent, an improvement in the cleanliness of production. Improvement of the quality of milk on the farm by more efficient straining is highly questionable. However, it is recognized that foreign material in dairy products furnishes Food, Drug and Cosmetic Administration officials evidence of lack of sanitation. The sediment test, used extensively as it is, is often of limited value because the damage has been done when the sediment gets into the milk and straining only improves its appearance. Nevertheless, its psychological value is well recognized by all inspectors.

5. **Temperature.** Theoretically the temperature of the milk furnishes a good indication of the quality of the milk for it is generally known that temperatures have a direct bearing on the growth of microorganisms. The test is easy to make first by sensing the temperature with the hand, then by actually checking with a thermometer those which are not perceptibly "cold". The results give an indication of the extent of cooling, and when correlated with the type of cooling on the farm, furnish some knowledge of the protection from heat in transit. Rejection of milk on basis of temperature alone may mean the rejection of some high quality milk. If ordinance temperature standards are met in all cases, some producers may resort to sending in mornings' and nights' milk rather than nights' and mornings' milk, for time may not permit adequate cooling of the mornings' milk before the hauler arrives. The question of cooling mornings' milk is a big one involving many problems and should be considered in condemning milk on the basis of having a temperature above the maximum standard. Rejection of milk on the basis of temperature means that the inspector should be alert to the possibility that a greater production may be delivered the following day. The test is a good one to use on the receiving platform for it is simple and quick, and the results may be correlated with those of other tests, but it must be recognized that the test has certain limitations.

6. **Taste.** Tasting of the milk at the receiving platform as a quality test has no place for several reasons. First of all, one secures four taste sensations and four only, namely, sweet, sour, salt, and bitter. Of course, many flavors are noted by tasting, but knowledge of them beyond the four basic tastes are obtained through olfactory or smell sensations arising from the odoriferous substance having passed from the mouth to the nasal cavity. Thus, the odor sensations may be gained by smelling the milk directly instead of tasting it. Sweet milk in itself is not associated with any odor. Hence, other quality factors being excellent, such milk is odorless. Sour milk has a distinct odor which may be noted more readily by smell than by taste. Salty milk may or may not be associated with an odor. If the saltiness is due to late lactation milk, the chances are there will be little odor in the fresh product. However, if the saltiness is due to mastitis, the milk will very likely have an associated odor which may be detected upon smelling. Bitter milk will likely not have an odor. Furthermore, bitter fresh milk is rare and is not often the cause of milk rejection. So, in summary, even by tasting the milk, little is to be gained which could not have been noted otherwise and more readily by the odor test.

Other objections to the taste test on the receiving platform are that facilities often are not available for sampling and for expectorating. Also the milk is raw, which in itself may cause some milk inspectors to look upon tasting it with fear and dread, a state of mind which is not conducive to the best work.

7. **Odor.** The odor test of milk at

the receiving platform is simple, rapid, requires no special equipment and is highly reliable. A "supernose" is not necessary. However, the test has one major objection, namely, those who would use it often feel inadequate to the task. Those who use the test must know milk, its flavors and their causes. Such a guide has been proposed by Trout (1945). Knowing these flavors, a milk inspector can quickly and quite accurately segregate low quality milk so far as affected by high bacteria populations are concerned. The odor test likely will not detect milk of high sediment content, or uncleanly produced milk which has been promptly and adequately cooled unless an odor is associated therewith. As previously stated, probably the greatest objection to the odor test is fear of the test itself. In other words a fear of inadequacy on the part of the inspector.

The odor should be taken when the lid is first removed from the can. Some prefer smelling the lid, others the milk. If the odor is not "sensed" at first, the milk may be stirred and re-smelled repeatedly. If the milk is rejectable, the odor will persist. There is no fear of the odor escaping so that it may not be sensed repeatedly.

Gould and Jensen (1944) noted off odors in milk due to bacteria growth when the increase in acidity was only 0.01 to 0.02 percent and the bacteria population was as low as 1,300,000. Off odors due to bacteria are always associated with high counts. Furnia (1943) believed that bad milk could be detected nearly 100 percent of the time by odor, together with the use of the strainer dipper and other deck tests. Tiedeman and Schacht (1937) studying and correlating the odor test with other tests of milk found that

"Most of us were surprised at the comparative value of the results obtained by the odor test and no doubt this is the outstanding feature of the work. About 70 percent of the samples classified as unsatisfactory and very unsatisfactory by the direct microscopic test were recorded as having unsatisfactory odors. Of this same group of samples only 61 percent were reported as showing flakes or dirt on the strainer dipper, and only 54 percent reduced methylene blue in five and one-half hours or less."

They concluded in part as follows:

"The results of this work show that the odor test is of considerable value, particularly at Grade B plants. Mr. Lee has demonstrated to our satisfaction that there is an odor to milk associated with high bacteria count that may be used as a basis for rejecting milk on the receiving platform. Although the test did not reject as much milk as the direct microscopic, it did reject a large part of the high count milk and did not erroneously reject for bacterial odors any larger proportion of low count milk than the methylene blue test. Furthermore, the test revealed 'off-odors' other than bacterial which were undesirable from the standpoint of quality. Although quality is not of direct public health significance, it is of decided importance indirectly. If pasteurized milk does not taste right, people, particularly the children who need it most, will not drink as much milk as they would otherwise and may even turn to relatively unsafe raw milk if that is available and tastes better. It is believed that the test will be fair to the farmer and yet eliminate enough of the high count milk to accomplish material improvements in the supplies. Although this test should also be supplemented by a test for dirt, it is possible for the man who is smelling the milk to observe any dirt that may float on the milk. The test has advantages of requiring no equipment and of being easily and quickly performed, thus permitting the test to be made and unsatisfactory cans returned to the producer without delaying receiving room operations.

"We were inclined to feel, as you probably do, that perhaps the odor test required a 'superman' or 'supernose.' Since the completion of this work thirty-three field men of the New York City Department of Health have been successfully trained to use the odor test.

"This work convinced us of the value of the use of the odor test. Our conclusion was to recommend to plant operators the daily use of the odor test on patrons' milk to be checked every month or two by the city inspector. In addition, the plant operator was required to make strainer-dipper or sediment tests at least once a month and to make direct microscopic counts on samples from individual cans taken in groups on different days. These results were to be checked by occasional examinations by the city inspector."

CORRELATION OF PLATFORM TESTS WITH OTHER TESTS

Platform tests are not tests for milk quality sufficient unto themselves. They are a part of the inspectional program. They have their place and their limitations. Thus they should be used in conjunction with other tests more of a laboratory nature such as direct microscopic, plate count, methylene blue or resazurin. As the inspectors and sanitarians so well point out, there are many advantages in platform inspection other than the detection of poor quality milk.

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Control of Milk Watering*

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WHEN the control of the milk supply first became a public function, one of the gravest concerns of the regulatory bodies was the adulteration of milk by the addition of water. It is interesting to note a report by Professor C. F. Chandler, while chemist for the New York City Department of Health in 1869, who stated that to every three parts of pure milk sold in New York City, one part of water had been added.

The concentration on this problem over a period of years gradually brought about a marked correction in this type of abuse and as inspection methods became more refined the emphasis of health departments shifted more to the sanitary phase of supervision.

It was rather unusual to find a gross case of wilful adulteration of milk during the last ten years or more, and the total number of cases was relatively small as is illustrated by the accompanying table showing the number and percentage of adulterated samples of milk taken from New York City distributors during the last five years:

RESULTS OF CHEMICAL ANALYSES OF SAMPLES OF MILK TAKEN DURING DISTRIBUTION FROM DEALERS IN NEW YORK CITY

	1940	1941	1942	1943	1944
Total samples taken	7,469	7,219	7,306	7,161	7,463
Substandard *	46	111	60	107	134
Percent	0.61	1.53	0.82	1.49	1.8

* Substandard as to butterfat or total solids.

A great many of these samples were substandard by insignificant amounts.

In spite of the fact that such a large percentage of our milk samples conformed to butterfat and total solids standards, we nevertheless had no accurate way of knowing whether or not adulteration had taken place. In our routine analysis of milk samples to determine the percentage of butterfat and total solids, we frequently encountered results which showed the ratio between these two components to be abnormal, leading to the suspicion that our milk was occasionally being watered although it was in conformity with our fat and total solids standards.

It must be recognized that the basis of payment for milk in the New York City milkshed, according to the terms of the State-Federal Marketing Order, calls for a flat rate per hundred weight plus or minus a premium or deduction for every one-tenth of a percent of butterfat above or below 3.5 percent.

On this basis it can be mathematically figured out that when milk reaches a certain price it becomes financially profitable for a producer to water his milk provided he is not apprehended. The payment of a feed subsidy to farmers on the basis of every one hundred pounds of milk produced, merely gave added incentive to the urge of incorporating additional water to the milk.

*Presented at Twenty-second Annual Conference of the New York State Association of Milk Sanitarians, September, 1945.

FREEZING TECHNIC

The Department of Health had been trying to purchase a Hortvet Cryoscope for a number of years and was finally successful in obtaining one early this year. The Hortvet Cryoscope is an instrument used in making a very accurate determination of the freezing point of milk. Its value has been known to hilk sanitarians for about twenty-five years and the freezing point determination is an accepted method of the Association of Official Agricultural Chemists for the detection of added water, but probably as a result of over-confidence in the quality of the milk supply, its use by control officials has been generally neglected, or at least overlooked.

The freezing point of milk is a physiological constant which varies within relatively close limits. Distilled water will freeze at zero degrees centigrade while normal milk will freese at approximately -0.55° C. As water is added to milk, the point at which the mixture freezes approaches that of the freezing point of water.

Dr. Hortvet in one of his reports stated that "the freezing point figure is commonly cited as a gauge of asmotic pressure and the cryoscope determination is a well known convenient method of measurement. The osmotic pressure of milk is due generally to the lactose and soluble solids which it contains. The fat has no effect and the influence of the proteins is often negligible or too small for cryoscopic measurement."

In the use of this apparatus, about 30 to 35 ml. of milk is placed in a cylinder which is in turn immersed in a bath of ether held in a thermos-like container. By blowing air through the ether, the ether evaporates causing a rapid lowering of the temperature and freezing of the milk. The exact point at which milk freezes is read by means of a highly sensitive thermometer which has a range from +1° C. to -2° C. and is graduated into tenths and hundredths of a degree. The temperature is read directly to one-hundredth of a degree and accurately estimated to one-thousandth of a degree. The freezing point obtained is then compared to a figure of -.550° C. which is considered to be the average freezing point of normal milk, and the relative difference of the two freezing points is indicative of the amount of water added to the milk.

When we say that the freezing point is a physiological constant, we do not mean that every genuine sample of milk will freeze at exactly the same point. Investigators have found however that the vast majority of samples of genuine cow milk will freeze somewhere between -.530° and -.565°. When it comes to herd samples and the blended milk from many herds the variation found is even narrower. The Association of Official Agricultural Chemists recommends the use of a -.550° freezing point depression with a 3 percent tolerance to take care of samples which might naturally have a lower value whereas the English authorities recommend the use of -.530° as a standard for the freezing point depression of normal milk without the use of a tolerance. From a practical standpoint there seems to be little difference as to which standard is used.

As further evidence of the feasibility of using the freezing point determination as a gauge in detecting added water, investigators have shown that the breed of the animal, the period of lactation, season of the year and the feed of the animals have little appreciable effect on the freezing point and certainly not enough to disturb the acceptability of the method. It may be further noted that heating milk even beyond the pasteurizing point does not affect the freezing point depression.

PRELIMINARY SURVEY

When we first began to use the cryoscope on our pasteurized milk supplies in the city, we were somewhat disturbed to learn that a large number of samples showed freezing points in the

lower range of the tolerance provided for by the A.O.A.C. On the other hand samples taken after supervised milkings on our city dairy herds which are largely Holstein grades, were much closer to the –.550° figure. This could have meant adulterations in the plants, but examinations of numbers of samples taken from tank trucks on their arrival in New York City gave results which caused us to focus our attention on the country as a source of watered milk although we still did not know whether the trouble arose on the farms or at the receiving stations.

Although the cryoscope is essentially a laboratory instrument, our chemists believed it could be adapted for field use for investigatory purposes if not for routine use. We decided to send a team of chemists to the country to work with our field inspectors in order to gather information. We chose a section of the milk shed which was traditionally a low fat producing area and one which was considered suspicious on the basis of past chemical analyses. Since there is a limit to the number of samples that can be run with the cryoscope in one day and the number of producers delivering to the average receiving station is quite large, it was decided to sample the milk of every fifth producer making a delivery and to run interim samples taken from the storage tanks when they were one-quarter, one-half, and three-quarters full in order to judge whether watered milk was being missed because of the spaced sampling. Six points were covered in our first survey and the deliveries of 108 patrons were examined. The results were disturbing to say the least, for about 10 percent of the limited number of samples examined showed the addition of substantial amounts of water while another 12 percent of the samples of producers' milk examined gave results that made us suspicious of the addition of water.

We had not yet standardized our procedure in following up our results but in some of the worst cases we went to the farms to secure a sample of a supervised herd milking and in other cases obtained a sample of a subsequent day's delivery after the producer had been told of our findings. Corroboration was very striking in many cases. The volume of milk delivered dropped over one hundred pounds in a few days in the case of one producer while the percentage of butterfat rose more than 1 percent in one day in the case of another producer.

It now was left to be determined whether the results of our first survey were merely characteristic of the area covered or were indicative of a milk shed wide situation. We decided upon a broader survey covering a larger number of more widely dispersed plants. The results of this study followed a very similar pattern to the first one and we were very reluctantly forced to concede that a fairly large number of producers were resorting to the use of water to supplement their income. It also made us realize the immensity of our task in trying to check the actions of about 50,000 dairymen with a very limited number of chemists and with but a single cryoscope.

Since the War Food Administration through the Agricultural Adjustment Administration paid all milk producers a feed subsidy based upon the volume of milk produced, we tried to induce the Federal authorities to institute active control measures in these areas by putting on three or four teams of chemists equipped with cryoscopes to do actual field checking. They were unable to accede to this request however for lack of trained men, because there was some question of their authority to engage in such activities and for a number of other valid reasons.

It had been our intention to exclude all gross violators found on our investigations but since the Agricultural Adjustment Administration agreed to withhold feed subsidy payments for a three month period from any producer

against whom we submitted good evidence of watering, the Department of Health decided to keep the exclusion actions in abeyance. It must be remembered that we were still at war a few months ago and we did not want to force farmers out of the business of producing milk, which might have happened in many cases if their only milk market was taken away from them. Although the punitive phase of our problem appeared to be solved by the subsidy withholding plan, we were still far from the answer of how to control the practice.

PRESENT PROGRAM

In our policy of milk control we place certain obligations for the maintenance of our requirements upon the plant operators. The operator has a responsibility of seeing that the milk he accepts is in conformity with our standards, and his failure to measure up to this responsibility places the continued approval of his plant in jeopardy. Of course we know that the operators had no cryoscopes and no trained personnel to operate them. The companies were also loath to take individual action against producers for fear of driving them to other plants which might not be so conscientious and there was a tremendous fear of the repercussions which might follow an operator's accusation of watering milk if he were not in a position to sustain it by positive proof.

We finally decided to require the operators to make a series of three lactometer readings on every producer's milk in a one month period for the purpose of screening out suspicious cases. Any reading lower than 100 on the Board of Health lactometer was to be considered suspicious for our purpose and the worst cases were to be followed up by the operator supervising a herd milking and comparing this control sample with the earlier suspicious one. The lactometer results were also to be submitted to the Department of Health for our review so that when we went to check the plant we could concentrate our efforts on suspects rather than waste a great deal of time in running random samples.

Our lactometer screening is admittedly imperfect since we only regard as suspicious those reading below 100 Actually we have found many samples with lactometer readings of over 100 which showed the addition of substantial amounts of water and as we get farther into the work we will undoubtedly be in a position to develop better methods. As a matter of fact we are at the moment working on the possibility of using the calculated solids-not-fat content of milk as a basis of judging whether or not a sample of milk should be run with the cryoscope. Even with its limitations, however, the use of the lactometer can help in directing work with cryoscope to samples most likely to be watered.

The cryoscope technic is not the only one which may be used in detecting the addition of water to milk. In its use we have learned that one cannot always depend upon the producer reducing the volume of his delivery after the first cryoscope test to supply us with confirming evidence of watering. Nor does the butterfat always go back to normal immediately after our deck sample. Some people try to bluster their way through by continuing their illegal practice in the hope that it will be considered normal and others will gradually reduce the degree of adulteration over a period of time. It must also be recognized that occasional herds will give cryoscope values of $-.530°$ or a little lower, which, on the basis of the A.O.A.C. standard would mean a 3 to 3.5 percent adulteration.

However there is one effective way definitely to prove your case or absolve an innocent producer. The English term this procedure the "Appeal of the Cow" which in effect means visiting the farm shortly after the initial sampling, supervise the milking, and take another sample of this genuine milk for cryoscope examination. This gives a

truly normal value for the herd and comparison with the original result will give an accurate picture of the degree of adultertaion, if any.

FIELD EXPERIENCES

Some interesting experiences were encountered by our men in getting supervised milking samples. In one case a deck sample showed the addition of 25 percent of water. The company fieldman and our inspector went to the farm for the control sample, the fieldman watching the milking and our own inspector the milk house. We do not know exactly what happened but we have reason to believe that the fieldman was not as assiduous in watching the milking as he should have been for the resample showed a 10 percent adulteration. This was an incredibly low result for genuine milk and if true it would have been "one for the books" for no investigator had ever shown such a low cryoscope value (–.490) for true milk.

It was decided to obtain another control sample for checking. This time a sample of each cow's milk was taken and also a blended sample from the herd. The inspectors observed that the cows were not being properly stripped and the dairyman undoubtedly thought he was fooling the inspectors by naturally keeping some of the fat out of the milk. The cryoscope however could not be fooled. The values for all of the individual cow's milk and for the herd were within the normal range on this check sampling, although the butterfat content was still only 2.7 percent and the total solids 10.99 percent. Just by way of corroboration this producer's butterfat content went up to 3.7 percent within the next two days.

It may be mentioned at this point that investigators have found little appreciable difference in the cryoscope values between morning and evening milk. The differences which are found have no particular significance in our procedure since we follow the policy of taking punitive action only in cases of gross adulteration. We therefore consider it adequate to take either a morning or evening sample of milk from the herd for our control.

We have given some consideration to the modification of our procedures in order to increase our efficiency but changes will have to be made gradually. It would save us a great deal of time and money to have samples picked up by our district inspectors and shipped to our laboratory for examination. However, samples must be relatively fresh in order to get correct cryoscope values. If the acidity of the milk goes over 0.18, the samples should not be run since the cryoscope value would not be a true one. The error however would be in favor of the farmer.

We have demonstrated to our satisfaction that under good conditions it is feasible to ship samples to our laboratory for distances up to 250 miles but this was undoubtedly made possible because we were able to use tank cars or tank trucks for the transportation.

Another plan which may be considered would involve the use of two or three branch laboratories in strategic parts of the milk shed to which samples could be sent by all the inspectors within a given radius.

The third possible control step would place the burden of policing the farmers entirely upon plant operators. After sufficient study we could establish a plant standard of –.530 or –.535, for example, and merely run samples of milk shipped by tank upon arrival in New York City. Failure to meet this standard would result in a notice to the plant operator to discontinue shipping until such time as the milk was satisfactory. This would obligate the plant operator to check his producers and find out the ones who were adding the water.

We realize, of course, that it would neither be fair nor feasible to institute this last procedure at the present time since the operators do not have the trained personnel or equipment to do the job but such a step may be neces-

sary if milk watering by producers cannot be eliminated otherwise.

I do not want to convey the impression that the cryoscope method is the only means of controlling the watering of milk. It has its limitations as do the other methods. The copper-serum method has some value but it can pick out only gross adulterations of about 10 percent or more. It is also more difficult to use under usual field conditions because of the necessity of maintaining the samples at a relatively constant temperature.

Some agencies use chemical determinations of fat, total solids, and ash on deck samples, and compare the results with a controlled milking sample. We believe the cryoscope is better because there can be a greater normal variation in fats, solids, and ash over a three or four day period than there can be in the freezing point.

I would just like to close with a note which has a bearing on the accuracy of the cryoscope. We recently had a conference with Professor Herrington of Cornell University who has done a great deal of work with a cryoscope and asked him if he thought it would be necessary to check the accuracy of cryoscope findings by running ash determinations on suspicious samples. His reply was "that such a procedure would be equivalent to checking a micrometer with a tape measure."

DISCUSSION

Mr. Fee: During the past twenty-five years there has been a decline in the watering of milk by dairymen. However, some recent developments have encouraged the practice, particularly the relatively higher prices and the relationship between the base price and the butterfat differential. With a butterfat differential of 4 cents per point, it pays to water milk when the base price of milk is above $1.40 per hundred pounds. The base price has been much higher than $1.40 recently, and in addition, the Federal feed subsidy has had the effect of increasing the base price by an average of more than 50 cents per hundred pounds during the last year. Notwithstanding this I do not believe there has been a very great increase in the watering of milk.

In an extreme case a dairyman who was delivering about a ton of milk daily brought 600 pounds less the day after our inspector took a sample.

We are informed that a New York City chemist tested a sample of milk from an individual cow milked in the presence of the chemist and obtained a freezing point reading of –0.506° C. Ordinarily such a reading on a sample taken from mixed milk delivered to a plant would be interpreted as meaning the addition of 5 or 6 percent of water. Lythgoe in the JOURNAL OF MILK TECHNOLOGY reports readings ranging from –0.585 to –0.510° C. on samples of known purity. He says that the freezing point of milk is more susceptible to changes by the addition of water than are some other constants of milk, and that if watering is suspected on the basis of a freezing point, further examinations should be made to confirm this by using other methods—also that in all cases where figures are not far from normal, samples of known purity are desirable if not absolutely necessary.

Under the law our inspectors are required to take samples in duplicate and to offer one of them to the producer. Then if the official sample indicates watering, we are required within ten days to take a supervised herd sample before legal action may be taken. Our laboratory determines by analysis the fat, total solids and ash content in addition to the freezing point.

In many, or perhaps most of the cases, in which the cryoscope indicates that milk has been watered, water is actually present but there are exceptions. It is a serious matter to charge a dairyman with watering milk and we must be sure of our evidence.

Early in August our inspectors worked with New York City representatives in the examination of milk

delivered by 1,280 producers to 8 milk plants. On the basis of low lactometer readings, the New York City men took 107 samples, from which they selected 89 for examination by the cryoscopic method. As I recall the results, only 11 of these were regarded as watered, or suspected as watered. Duplicates of these 11 samples were analyzed by our laboratory. Four were found definitely adultered and 4 probably were adultered. In the case of the other 3, the evidence would not, in our opinion, indicate adulteration.

On the basis of this particular investigation, it would appear that considerably less than 1 percent of the producers delivering milk to the 8 plants were found to be delivering watered milk. It is of course unfortunate that watered milk is delivered by any producer, and we hope that by our combined efforts the amount of watering will be further reduced. On the basis of the investigations made by our department, which include the examinations of many thousands of deliveries annually, we are of the opinion that less than 1 percent of the producers have been delivering watered milk.

Mr. Corash: It is true that occasionally milk from a single cow will have an abnormal freezing point and these are the cases to which Mr. Fee refers. The number of abnormal samples narrows greatly when the milk from many cows is mixed in herd samples. It is the mixed milk which we have been finding abnormal. A review of the work of some investigators in England shows that not more than 3.5 percent of the samples from single cows gave freezing points below -0.530° C. We feel that Mr. Fee's findings that relatively few producers are watering their milk may in part reflect the effect of our previous investigations. The knowledge that tests are being made and violations found should tend to deter dairymen from adding water. We do not feel, however, that the situation should be minimized merely because the number of violators we have found represents but a small percentage of the total number of producers in the milk shed. It must be remembered that we have only tested the milk of a relatively small number of dairymen.

Mr. Fee: We make some 80,000 lactometer readings annually. There has been a slight increase in the percentage of samples showing watering during the past two years. Although there were more cases of watering in 1944 than in the previous year, there were 75 per cent more cases during the first eight months of 1945 than during the same months of 1944. As I have indicated, price has been an incentive recently. I am sorry to have to say that the watering of milk has not been confined to producers. We have found some milk dealers who have been adding water to milk.

Mr. Osterhaut: There is some evidence that producers are skimming cream off the milk as well as adding water to it, and when that is done, a normal lactometer reading results so that the adulteration would not be detected.

Mr. Fee: It is true that the removal of cream tends to offset the low lactometer reading which would normally result from the addition of water. However, when the lactometer is used by an inspector who is trained in milk inspection, he should discover such adulteration despite the fact that the lactometer reading itself may appear to be normal.

Postwar Milk Bottle*

V. L. HALL

Glass Container Manufacturers Institute, New York, N. Y.

SINCE my work over the past number of years has been the association field, I believe I have a keen understanding of the service which your organization is rendering to industry and to the people of New York State. I was glad to have the opportunity of being here today briefly to outline the post-war plans of the glass container industry in the field of milk containers.

The square milk bottle introduced last year is the bottle which our industry is recommending to the dairy trade and behind which it is putting its full energies. This bottle is being made in the regular sizes of two quart, quart, pint and half pint, and in states where permitted, the third quart and ten ounce sizes are being furnished.

Installations of this new line of bottles were not pushed prior to V-J Day because the milk bottle industry has been operating at full capacity, plus the fact that the case and equipment manufacturers were not in a position to handle promptly the changes in converting to the square bottle. Notwithstanding this, there have been many actual installations made during the past twelve months, and the glass manufacturers have a large backlog of demand which will be taken care of as rapidly as possible.

As an indication of the enthusiasm of the dairies for this new line, dairy companies that made first installations have since then converted either all, or a number, of their other plants. For example, the Sanitary Farm Dairies, Cedar Rapids, Iowa, which made the first installation, have converted several other plants. The Borden Company, with the original installation at Racine, Wisconsin, has put the square bottle in at their Milwaukee and Florida plants. The National Dairy Products Company has an installation at Wilmington, Delaware, and the Hood Company of Boston is now converting its operation.

Evolution of the Square Milk Bottle

The square bottle is not of recent origin as many people may believe, as this bottle was used in a limited way many years ago. However, at that time virtually twice the amount of glass was necessary to make a strong quart bottle. The present light weight square bottle has only become an actuality as a result of the tremendous technological developments in the glass container industry over the past ten years. To illustrate this point, ten years ago the quart milk bottle required 26 ounces of glass. This was reduced to 22 ounces without any pronounced change in design. Then in recent years the height of the quart bottle was reduced to 8½ inches, and the glass weight for the round design cut to 17¾ ounces. The final step was the development of the square bottle at the same height and weight, and equally as strong as the round bottle.

Of interest to your group is the fact that this square line was thoroughly engineered in cooperation with the technical people of the Dairy Industry Supply Association and the Milk Bottle Case and Cap Manufacturers. Several meetings were held with the manufacturers of bottle washers, fillers and cappers, who wanted to make certain

*Presented at Twenty-second Annual Conference of the New York State Association of Milk Sanitarians, September, 1945.

that the proposed design would function to the best advantage in the various makes of equipment. The final blue prints setting forth the specifications carried the notation: "Dimensions and shape considered and approved by DISA Technical Sub-committee on Square Bottles." Similar meetings with the case manufacturers resulted in the development of cases of the same width and length for all sizes of square bottles in order that the cases could be stacked together in the dairy trucks. Likewise the cap manufacturers were consulted. Knowing your interest in the means used for closing the milk bottle, I regret that one of the closure manufacturers is not here to cover this phase. The square line has been developed with a small opening, that is, 51 mm. and lower. The milk bottle manufacturers are recommending the 48 mm. Econopor style finish suitable for both metal foil and paper cover-all or sanitary closures, and the 45 mm. Dacro style, which is the metal crown cap. The great majority of the installations have been, and we have every reason to believe will continue to be, in these two style finishes.

HANDLING IN THE DAIRY PLANT

As I mentioned previously, the other dairy supply industries were consulted in the development of this bottle in order that the most efficient handling in the dairy plant could be provided. I know you are particularly interested in the washing operation in connection with all milk bottles. To handle the square bottle some adjustments are necessary in most, if not all, makes of washing machines. These adjustments have been worked out by the respective washing machine manufacturers, and the procedure has been to call the equipment manufacturers in when the installation is made. From the experience with the dairy operations mentioned, we can say that the washing operation for the square bottle is equally as satisfactory as for the round bottle.

While the design has the advantages of a square, due to the four side panels, there are actually no sharp angles on the inside of the bottle. The corners have a broad radius, which really gives the same effect as the round bottle. It has been found that the straight panels of the bottle, being at right angles to the other two panels, actually act as a baffle, breaking up the swirl and creating more positive splashing in the washing action.

It has been found that the square bottle generally handles better than the round through the conveying lines and star wheels because the square panels prevent spinning, which often results in scratched surfaces.

Another important feature is the space saving as compared with the round bottles. A case of round bottles is 47½ percent greater in area than the case for the square bottle. This means that by adopting the square container a dairy can increase its available storage and cooler space to the extent where 47½ percent more business could be handled than formerly in the same area. This space saving feature is of tremendous advantage in the delivery operation, which is the highest single cost element in milk distribution. With very slight adjustments to present-day delivery trucks, the carrying capacity can be increased as much as 50 percent.

While your group is interested only indirectly in dairy costs, the fact that the square line offers many cost savings accounts for the present demand on the part of the dairies for this line of bottles. The initial container cost is low, due to the light weight and greater degree of standardization, a low capping cost is provided through smaller openings, and the ease of handling and space saving features make possible substantial plant and delivery savings.

ADVANTAGES TO THE CONSUMER

When we consider the consumer's view, again the space saving features,

and ease of handling, favor the square bottle. Whether the consumer be a housewife, restaurant or retail grocer serving the housewife, the advantages remain. The average six foot refrigerator can hold 12 square quarts in the compartment formerly filled by 8 round quarts. Restaurant refrigerators which formerly held 50 round bottles can now handle 66 squares. In the case of the retail grocer, the square shape permits better packing with groceries in bags and in shopping carts.

CONCLUSIONS

In conclusion, it is our considered belief that the square milk bottle offers to the dairies and to the retailers and consumers advantages which make it the best container for milk. With the problems of higher costs being faced by industry and service trades, the economies possible by the use of the square bottle, we believe, are very timely, and will be helpful in keeping down the cost of the distribution of this important product.

THE OREGON PROGRAM OF LICENSING

(Continued from page 321)

The method of conducting the examination is as follows:

The State Department of Agriculture will appoint an examining board whose duty it will be to examine each candidate. The board will, at the conclusion of the examination, file with the State Department of Agriculture a report of the results of the examination. Only two grades will be given. (1) 75 to 100—Pass; and (2) less than 75—Fail. Those who fail may present themselves for a re-examination at such time and place as may be scheduled by the department. They must again take the complete examination.

The examining board shall consist of three men. One shall be a member of the Oregon market milk industry selected by the State Department of Agriculture, one shall be a member of the staff of the Division of Foods and Dairies, State Department of Agriculture, and one shall be a member of the Department of Dairy Husbandry at Oregon State College or a nominee by the head of the dairy department.

The examination shall consist of:

1. An oral examination.
2. A written examination.
3. A demonstration of the candidate's ability to operate a pasteurizer.

Part three shall be supervised by the Chief of the Division of Foods and Dairies or his deputy.

Candidates for the license must apply to the State Department of Agriculture at least 15 days before the examination is to be given for admission to the examination. On an appropriate form he (or she) must indicate the steps taken to obtain the information necessary in order to meet the six above-listed requirements.

The Future of Fiber Milk Containers*

FRED C. BASELT

American Can Company, New York, N. Y.

WHEN Mr. Corash extended the invitation to talk at this meeting, he also suggested the title. The word "future" touched a sensitive spot. As secretary of our company's postwar committee, it fell to my lot to obtain and study all predictions bearing on the outcome of the recent world disturbance and, especially the results thereof to our company. The batting average of forecasters has been discouragingly low so that anyone in his right mind would hesitate to join the ranks of those whose "necks stick out."

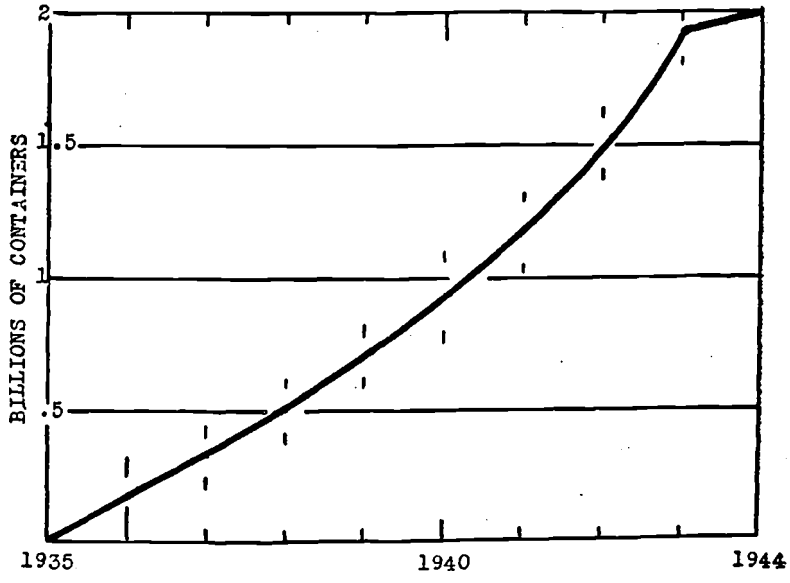
*Presented at Twenty-second Annual Conference of the New York State Association of Milk Sanitarians, September, 1945.

But as a member of our association of Milk Sanitarians, I am hopeful that the wrecking crew will pull their punches a bit, and I have for consolation the thought that should my guesses prove wrong, I shall not lack for company.

There are many things which should now be told and I am grateful to your committee for this opportunity.

Any of you who have studied engineering and are familiar with freshman surveying know that to project a line forward, a back-sight is necessary. In the present case, we need no more than a backward glimpse. The past is familiar to all of you and many of you have been active in determining

Figure 1
AN ESTIMATED 2,000,000,000 FIBRE MILK CONTAINERS WERE PRODUCED IN 1944 BY ENTIRE INDUSTRY



the course of the single trip fiber milk container and undoubtedly could do the subject more justice than your speaker.

The start of the fiber milk container came with the beginning of the twentieth century and its progress was marked by a number of trial operations. Most of these came in the 1920's. In the early and mid 30's, the industry at last achieved a firm footing. Its growth in the late 30's was impressive, as Figure 1 will show.

GROWTH OF MILK CONTAINER SALES UNTIL 1944

By 1944, 375 dairies throughout the nation were serving their customers with fiber milk containers. And it is estimated that in 1944 two billion fiber milk containers were produced and used in America. It can now be told that these containers were not only used for civilians but that appreciable quantities of homogenized milk were frozen in these containers for shipment to our armed forces abroad. The two billion containers produced in 1944 was not a measure of the demand but a measure of the ability of the industry to produce. The demand exceeded this figure by hundreds of milions. This volume of two billion containers was produced in spite of severe restrictions upon the use of paper and paraffin and in spite of the fact that no new equipment for the fabrication of these containers could be obtained. These restrictions came early with the advent of the rearmament program and the OPM and the resulting priority system. Stainless steel and skilled mechanics, that is machine tool builders, were both necessary for the building of machines for the manufacture of the container and the filling of them in the dairy. With these two vital factors denied the industry, the expansion almost came to a halt. One large company accepted no new business after 1940—fully a year before Pearl Harbor—because its existing capacities were entirely anticipated by contracts then in force. This situation tended to freeze the volume of business near the 1940 capacity throughout the war.

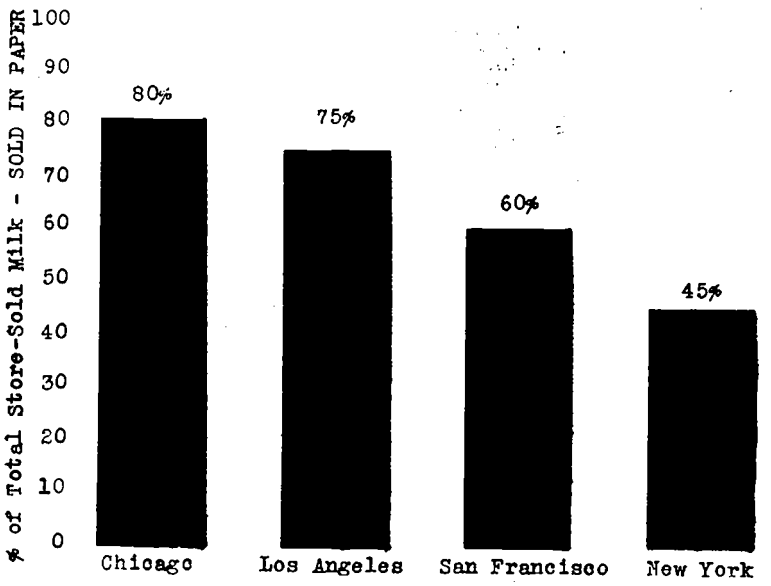
With its normal growth impeded for almost five years, the past record is not an accurate guide to the future. To estimate the future business, modern consumer and market survey technics were employed. Studies have been in progress for over two years and here is what Mrs. Housewife and Mr. Dealer say:

Nearly half of all the milk now sold through the stores in thirty metropolitan areas in the New England and Middle Atlantic states is purchased by housewives in fiber milk containers. Only a slightly smaller proportion of the total volume of milk sold in stores in twenty-two additional major areas in the Midwest is accounted for by paper. Even these impressive figures seem small when compared to the performance of fiber milk containers in certain urban centers. For example, in Chicago the studies disclosed that more than 80 percent of all the milk sold through the stores was purchased in paper. In Los Angeles 75 percent, in San Francisco nearly 60 percent, and in Metropolitan New York 45 percent. Figure 2 ilustrates these findings. This is a remarkable change in a distribution system long dominated by a traditional package, the glass bottle. And this change was made in the past ten years. During this decade, it was not enough merely to offer a new milk package. Many prejudices and superficial objections, investment in existing facilities, and much pure inertia had to be overcome.

CHARACTER OF DEMAND

Insofar as the postwar picture for paper milk containers is concerned, the important fact is not so much that an enviable sales record has been built but the fact that this demand for paper containers is on a sound foundation. Before the war, thorough analysis made it evident that the paper containers' success resulted from the simple fact that it satisfied a num-

Figure 2
IN THESE FOUR MAJOR MARKETS PAPER ACCOUNTS FOR 45%-80% OF TOTAL MILK SOLD THROUGH STORES.



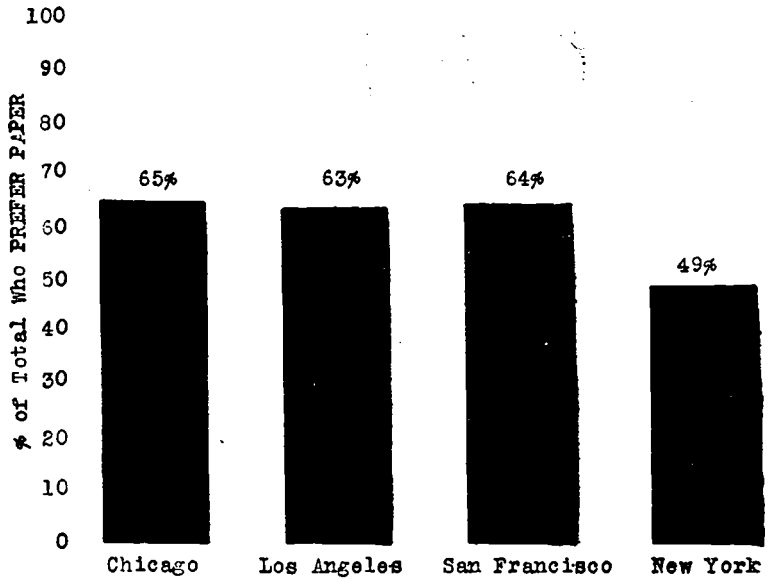
ber of important and basic needs and desires; namely, the wants of consumers, of milk dealers and of dairies. We are inclined to feel that no abnormal factors accounted for the continuous increasing demand for paper containers during the war, but that the war has emphasized the advantages and hastened a normal economic trend. Consumer surveys made during 1944 by an independent marketing research organization by interviewing housewives in New York, Chicago, Los Angeles, and San Francisco, ascertained their preference in reference to milk containers. These consumers were interviewed personally as they purchased milk in stores having available milk both in glass and in paper. Figure 3 shows us the results.

About 60 percent of the housewives in these larger areas which I have just mentioned stated that they preferred to buy their milk in paper containers. Their reasons are ones with which you are all familiar: no deposits and no returns, containers being easy to dispose of, no need for washing bottles, easy to carry, convenient and sanitary. Grocers were similarly interviewed in these four markets by the same agencies. Seventy-five percent said they preferred to sell milk in paper containers. They gave as their reasons the following: less handling, no deposits and return difficulties, a saving in refrigerator space, decrease in breakage. These reasons appear to be sound, economic reasons for preferring the paper container. Eighty-two percent of these grocers believed that their customers preferred to buy paper milk containers rather than bottles, and these are the grocers that meet their customers every day and know their wants.

An interesting, if, perhaps, extreme view was found in Los Angeles. Here, retail food store managers stated that it was virtually impossible to sell milk in glass as long as milk in paper containers were available.

The dairies stated they wanted paper

Figure 3
IN THESE FOUR MAJOR MARKETS - 60% OF ALL HOUSEWIVES DECLARED THAT THEY PREFER TO BUY MILK IN PAPER.



containers because they bring economies in weight and space, involve less handling, and have sizable economies in distribution. They also cited savings in refrigerator space and time saved on delivery routes. With some types of fiber milk containers, they further enjoyed the fact that they need not tie up large capital investment in expensive machinery.

The belief therefore seems justified that wartime demand for paper milk containers has not been a temporary one based on novelty appeal, lack of other containers or other transient reasons but that the paper milk container satisfies basic and important economic needs.

There are other factors which suggest that the limit of paper milk container usage has not been reached. There has been a continued high level of fluid milk consumption. The U. S. Department of Agriculture reports have indicated a continued upward trend since 1935 in civilian consumption of milk and cream. This Department estimates that per capita civilian consumption should approximate 198 quarts annually in 1945, a 26 percent increase over the 157 quarts consumed during 1935. Like many of our foods fluid milk consumption tends to vary with the national income. If a high level of economy prevails in the postwar period, it is likely that milk consumption can be maintained close to these record heights. This will, in turn, accentuate the potential market for paper milk containers.

A second factor is the continuing rate of increase of milk sold through retail stores in fiber milk containers. As you know, only a negligible quantity of milk in paper is delivered to homes. It is in the store deliveries that the convenience aspects of the paper containers have the greatest appeal. The modern trend of grocery sales is through the package store and the fiber milk container naturally finds its greatest use in these demands. This

point was studied at some length in 71 of the nation's major metropolitan milk markets. Fifty-four of these markets were in the East and the Midwest, where the average volume was close to 15 million quarts of milk daily. Forty percent of this volume was purchased by consumers at retail stores. Significantly, a decided trend towards increased store sales was found in 23 of these areas which accounted for 72 percent of the total store volume in these 54 store markets. West of the Rockies, stores sold milk for an even greater portion; or 50 percent of an average total volume of almost three million quarts daily. The proportion of milk sold through stores in seven metropolitan areas of the Far West, which account for 73 percent of the total store volume of the West Coast, was found to be steadily increasing.

In only 9 of the 71 markets included in the entire country-wide study was there a slight trend towards home delivery reported and these areas accounted for a very minor proportion of the total milk volume.

One of the objections leveled at paper milk containers has been that you can't see the cream line. The increasing popularity of homogenized milk is a definite offset to this resistance factor. In 63 of the 71 markets analyzed, homogenized milk was being sold. In 36 of the markets homogenized milk accounted for from 15 percent to 70 percent of the total milk sold. This last figure of 70 percent was found in Los Angeles. Homogenized milk accounted for 55 percent of the total in Chicago and slightly more than 25 percent in metropolitan New York and Northern New Jersey. The dairies reported that their inability to obtain homogenizers has prevented the normal increase in the sale of the item.

The results of these surveys are optimistic, but we should remember that the course of the nation's economy will have a profound effect upon the milk market; and here is the point at which we "go off the deep end."

The indications are that the paper milk container industry has yet a long way to go before reaching its full stature. The demand for the containers is sound. The acceptance by those who determine its success has been notable. Untouched, virgin markets still exist.

It is reasonable, therefore, to assume that the containers' prewar annual rate of growth may continue for several years following the lifting of all restrictions on production. This extrapolation indicates that within a year the production level should reach two billion eight hundred million containers annually. What the national economy will do to this figure is anybody's guess. Three billion fiber milk containers a year looks very probable. There have been serious considerations of possible ultimate values of 5 to 10 billion a year.

CHARACTER OF PACKAGE

So much for the volume of business. Of more direct interest to us as sanitarians is the package itself. Fiber milk containers are made of virgin pulp of a thickness normally referred to as a board and this is heavily coated with paraffin wax. Three types are recognized.

1. Those that are formed and paraffined in the dairy just before filling. They require a special machine which forms, seals, and paraffins the printed blanks.

2. There are also those which are pre-fabricated and shipped to the dairy where a special machine is required for filling.

3. There lastly is a type which is pre-fabricated and shipped to the dairy where the containers can be filled on standard glass bottle filling machines with but slight modification.

The importance of milk in the diet and the necessity for low cost distribution of milk dictate that a single trip milk container be low in price. The further necessity of bacteriological cleanliness demands that they be given a sterilizing treatment of some kind. These are important considerations and

we should pause a moment to examine them.

The cost is crucial. If containers cost twice as much as they do at present, there would be but few of them used and if they cost half as much it is my guess that milk would be sold in no other way. At, roughly, a penny apiece, an increase in cost of one mill per container, that is one dollar a thousand containers, would cost the consumer three million dollars a year on our three billion container estimate. Here's a challenge to research and here is where tremendous efforts are being made. The results of these efforts will not be felt for years, but it seems certain that they are bound to meet with success.

The necessity for bacteriological cleanliness is one which we Sanitarians appreciate and needs no emphasis. Dr. Rice (1) of Bucknell and Dr. Prucha (2) of Illinois and many others have called attention to the role which the paraffining operation plays in producing sterile containers. The paper stock in milk containers has never been found to contain pathogenic organisms as it comes from the paper machine. The drying machine temperatures are too high to permit these relatively heat sensitive organisms to survive. Wheaton, as reported by Tanner (3), sprayed the wet paper web with various cultures and showed that none of these organisms survived the drying operation. The only organisms which are found in paper stock are harmless saprophytes of no public health significance and are usually carried into the pulp by the potable waters used in the paper mills. The paraffining operation encases and seals these organisms within the container walls so that rinse tests constantly indicate that over 80 percent of the final containers are sterile. The remaining 20 percent contain about one-third of 1 percent of the permitted tolerance of one organism per milliliter capacity.

Doctor Rice (1) concluded that the degree of sterility of fiber milk containers was not dependent upon the melting point of paraffin nor the temperature of the paraffin application but that a closer relationship existed between the mechanical arresting of the bacteriological population in the paper than it does to the supposedly germicidal effect of the paraffining temperature. He concluded that the lowest possible paraffining temperature should be used.

Under these two limitations of cost and sterility, research to date has failed to find a substitute for paraffin coated virgin pulp fiber board. If the paraffin treatment is omitted another sterilizing treatment must be used and this places a severe handicap upon any substitute material. This does not mean that substitute materials may not be found, but to date they have not been. Furthermore, improvements of the paper board and the paraffin is constant, and a continuous improvement in the performance of these containers has resulted.

The design of the fiber milk container of the future demands economy of space. The rectangular shape is the best possible solution so we need look for no great changes in shape.

There has long been in the industry a desire for the dry external package which results from dry ice conditions. It is earnestly hoped that the industry will adopt to even greater degrees this method of cooling and shipping, since this is a step in the protection of public health.

Current studies on the detrimental influence of light upon flavor and vitamin content in milk indicate that an opaque container which prevents the transmission of light is desirable. Prucha (2) compared milk in paper containers and glass bottles and found that the paper container had less oxidized or burnt flavor than did the glass container and also that the ascorbic acid content was protected to a marked degree by the paper container. Theophilus (4) of Idaho found that the paper containers, exposed six hours in sunlight, permitted about a 6 percent

decrease in riboflavin in contrast to a 70 percent decrease in the clear glass bottle.

To summarize the physical aspects of the fiber milk container, I believe that we can count, for the foreseeable future, on their fabrication from virgin wood pulp coated with paraffin. Their shape will remain rectangular. An increase of opacity will be achieved. The maintenance, through improved handling methods, of an externally dry container, will better fulfill the goal desired by all of us as sanitarians.

For the immediate future, and it will be a bright one, we can expect construction of new manufacturing facilities serving new areas. We can expect extension and improvement of existing facilities through installation of new, additional, and improved manufacturing equipment.

By 1947 I predict that the industry will be able to produce from 3 to 5 billion fiber milk containers annually, an increase of at least 33 percent over 1944 and a possible increase over 1944 of 150 percent if the higher volume be attained.

After 1947—well, let's look toward that 10 billion figure for 1950.

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Common Causes for Inefficiency in the Ice Cream Industry*

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A GENERAL survey of many ice cream plants in all parts of the United States in the past few years indicates that many are operating with very inefficient methods. This is particularly true of plants of 500,000 gallons or less. It is encouraging to note that many are beginning to recognize this condition and are planning to modernize their operations. Such improvements will benefit the entire industry. Public confidence and acceptance always follow better operating methods and rigid products control.

There are, however, other reasons why methods of operation must be improved. Competition is sure to be very keen in the years to come. New firms will enter the field with considerable money and new ideas. There is much speculation as to who will comprise the ice cream industry of the future. Regardless of what happens, there will always be room for the efficient, well managed plant, large or small.

More stringent health regulations may be expected in the near future. Wages and hour laws will be enforced and modified to affect all types of work.

In the past when competition became keen the usual practice was to reduce wages and quality. In the future it may be impossible to do such things at will. Wages and quality regulations are here to stay. It is doubtful if the industry can expect to maintain wide operating margins in the future. Efficient plant operations and narrow operating margins will be the practice followed by successful operators.

There are many reasons why inefficiency exists in the ice cream industry, but in general it will fall into these categories:

1. The industry is still comparatively young. Many plants grew up from very small beginnings and have operated with little capital.
2. Until recent years there were few technically trained men in the industry. Many of these were young men and have spent the past 3–4 years in the military forces. Few trained men are old enough to influence policies as they will in the future.
3. Health officials have been rather lax in setting up and enforcing regulations in many sections of the country.
4. Quality control has not been fully understood by many ice cream manufacturers. They have been inclined to think of it as an expensive luxury rather than an essential part of their business.

The reasons why these inefficiencies exist were stated above. The following practices are the causes of these inefficiencies:

1. *Personnel.*

Personnel relations have not been good in the ice cream industry. Conditions have existed which did not attract good employees. Wages have been too low in comparison with other trades and hours have been long. Many jobs were unnecessarily a drudgery and a monotony. In spite of the

* Presented at University of Illinois Dairy Manufacturers' Conference, Urbana, November, 1945.

wages paid they prove costly in the end. The type of employees used were not adapted to the work. Better employees would have produced more work per dollar of wages.

Good dairy employees must be naturally clean and careful workers. They must be fairly intelligent to understand the handling of dairy products. Just as great care should be used in selecting employees as purchasing equipment. Unfortunately this is not always done. Good employees are the most valuable asset any business can possess. Without them the finest plant and equipment in the world will produce nothing.

Better understanding must exist between employer and employee in the future as to what each can expect of the other. Employees should understand that to be successful, a business must be able to merchandise products at a profit (at a price the public will pay).

Employers must realize that employees are most productive when they have economic security, wages that provide a fair standard of living, pleasant surroundings, and protection from accidents. Surely they cannot be expected to be satisfied with conversation and promises.

2. *Buildings and plant layouts.*

Many ice cream plants just grew up as Topsy. The business was started in a small plant and additions were made as needed. Little attention was paid to engineering and future plans. A great many plants were never intended for ice cream plants and are difficult to keep sanitary. The result in the end is always an awkward and costly operation.

Numerous plants have operations that do not synchronize properly. Either the homogenizer is too small for the cooler, the freezer is too far from the hardening room, or some other arrangement causes an awkward condition. Refrigeration systems are inadequate in many plants; lack flexibility in others.

One story buildings are preferred to multi-stores. They are more flexible and require less supervision. More floor space is obtained per square foot of building. The idea of having materials flow by gravity is not necessarily efficient or economical. Buildings should be constructed of empervious materials so they can be easily maintained and kept in a sanitary condition. Good lighting and ventilation should be provided. Departments should be so laid out that materials flow smoothly from one to the other. Getting ice cream into the hardening room quickly from the freezers is an important factor.

Better products and lower costs are obtained with line production methods. Each employee has a definite assigned job and lost motion is reduced to a minimum.

3. *Plant operations.*

All plant managers have not learned the importance of planning their work in advance. Operations are started each morning and changed during the day to meet conditions. When somebody discovers a certain item is out of stock production is switched to that item. The result is a lot of confusion and last minute changes. Such changes cause wash-ups and delays. Production costs are increased by reducing the production per hour. Occasionally plants still operate seven days per week. Careful planning could reduce this to 5–6 days per week. Cleaning and sterilizing are expensive operations. It costs no more to clean up a freezer after a thousand gallons are frozen than if only one gallon had been frozen. This costly practice should be closely watched in the winter time.

Good plant managers learn to plan their work in advance. A man who sits down at his desk each day and plans is worth twice as much as one who works with his hands all day. Few flavors each day and everything in readiness on time is the secret to smooth, low cost production.

4. *Hardening rooms.*

Small hardening rooms cause many operations to be very inefficient. No amount of planning could make such plants operate economically. Sufficient stock cannot be carried and a variety of flavors must be frozen each day. Unfortunately such operations usually result in poor quality because the ice cream is not properly hardened before it goes out to the trade. Sufficient hardening space is not expensive.

Capacity of a hardening room should be at least five days maximum production.

A maximum day production is about 1 percent of the total production for a year. Ice cream should be properly hardened in 12–14 hours.

Self-defrosting refrigeration units save space and labor in hardening rooms.

5. *Maintenance*

Preventive maintenance is not practiced in many plants. Many operators make the mistake of expecting their plant superintendents to be also a mechanic. Few men can be both good dairymen and mechanics. They are entirely different fields and require men of definite abilities.

Regular inspections and lubrication schedules should be set up for all equipment. It is better to prevent a breakdown than to have it. Temporary repairs are far too common in this industry. Good maintenance applies to buildings as well as to equipment.

Regular mechanics should be employed for engineering and maintenance work.

6. *Conveyors.*

Ice cream is handled without conveyors in too many plants. There are several good reasons why conveyors should be used, but the most important is to get ice cream into the hardening room faster when conveyors are used.

Some operators have the erroneous idea that conveyors are extra expense. Man cannot compete with electricity when moving materials. The average man can only generate 1/7 h.p. per hour. At that rate he can only earn about 10¢ a day when doing work that can be done by a motor.

Plant operations are better synchronized and standardized with conveyors. Products are conveyed exactly where wanted and brought to the operator without any thinking on his part. Extensive economies can be effected in refrigeration by conveying through small openings that can be air locked.

7. *Supervision.*

Plant operators make the mistake of not giving the superintendent authority equal to his responsibility. He cannot be held responsible for products and costs when he shares the operation of the plant with several people. Many operators hold the engineer and maintenance men only responsible to them. This leaves an opening for shifting responsibility because of split authority and is definitely a mistake.

A production man has many and important duties. To function properly he must have complete charge over everything pertaining to the plant.

8. *Cleaning operations.*

Washing and sterilizing operations are sadly neglected in far too many ice cream plants. The work is often assigned to a poor class of labor without any supervision. Materials and time are wasted and the desired results are not obtained.

The job is a chore and nobody likes to do it. The nature of the work makes it difficult to get anyone to supervise the work, much less do the work correctly. We must recognize that no operation contributes more to the quality of the final product. It can also contribute heavily to the cost of manufacturing.

Methods and materials should be adapted to each cleaning operation. Water softeners would be helpful in many plants. A planned sanitary pro-

gram is the most satisfactory. Employees should be given definite instructions for each job as to what and how much material to use.

Cleaning should be done by a regular crew assigned to that job. It is seldom correctly done when the regular day crew are required to do their own cleaning, unless they are allotted enough time. It requires time to disassemble, clean, and reassemble equipment and sterilize it. Take for example a continuous freezer.

Sterilizing solution should be checked daily to make certain the proper strength solution is used. It is a check on the material used and whether or not it is correctly done.

9. *Plant Accounting.*

Ice cream plants go from one extreme to another in using plant reports. Either they keep no records or use such an elaborate system nobody understands it. Many operators were taught the importance of proper records during the rationing period. Simple, accurate plant reports are the underlying basis of all cost reports.

In many instances cost reports are prepared showing an overall product cost. It is true they do furnish management with some information; however it does not point out the profitable and unprofitable items. Cost reports should show management where variations do exist.

The plant reports should account for all butterfat, serum solids, sugar, and other raw materials used. Accurate overrun reports on all products are a must. A systematic count of all products going in and out of the hardening room is necessary to prevent serious losses. Neglect of these basic reports causes serious discrepancies in many ice cream plants and also distorted cost reports. Inaccurate cost reports can leads to serious financial trouble.

Good accounting eliminates wastes, points out causes of variation in profits, and provides a check of quality standards.

10. *Quality control.*

Quality control seems to be generally misunderstood by ice cream manufacturers. Many seem to have the erroneous idea that it means installing a laboratory and employing a technician, no thought being given to the fact that laboratory tests are only measuring sticks to apply on the product. No definite plan is set up for controlling all processes and materials. The laboratory in these plants is used more or less as a cure all. In many instances laboratories are required to perform tests which are never used.

There are many practices which affect quality, but time will permit the mentioning of only a few.

Weighing and testing raw materials is overlooked by many ice cream plants. General procedure seems to be to assume a certain weight and test per can. Experienced dairymen know that weights and tests cary from day to day and can to can. The plant that practices such methods will never obtain uniform products and costs.

Products should be weighed and tested as received. All products should be weighed into a mix. If the proper weighing and testing procedures were used, many manufacturers would find that they could use raw materials they now feel they cannot afford.

Overrun control is a very necessary part of quality control. It affects both quality and costs. Many plants still do not realize the importance of overrun scales. They check overrun by volume determining the total ice cream made from the mix used. No attention is paid to individual items. One unit may have 120 percent overrun, another only 75 percent. Nobody knows whether the freezer man added ten gallons of water to the mix to get his volume or not. Purchasing and manufacturing on a volume basis is very dangerous. It is very easy to make up volume with water. Water cannot be used to replace butterfat and serum solids when a plant operates on a weight basis.

The most satisfactory method to con-

trol overrun is by the use of scales. They should be placed directly in the production line where they are convenient to use. A 30-pound dial scale for bulk and a 2-pound scale divided into quarter ounces for packages are most satisfactory. A good practice is to weigh individual packages and cans, instead of large packages and bundles.

A common error that is made is to operate freezer in tandem and check only the composite overrun. The composite sample may show the correct overrun. Yet one freezer may be operating at too high an overrun and another at too low an overrun. The result is ice cream of different color, body, and texture. To insure good quality it is a good policy to check individual freezer occasionally.

Another mistake made is to assume a certain weight per gallon of mix, usually 9 pounds because that figure is convenient. The average ice cream mix weighs 9.1–9.2 pounds per gallon. This may seem a smal item but in a plant making 100,000 gallons of mix a year it would amount to a difference of 2,174 gallons. Correct weight standards are also important in checking overrun at the freezer. If a pint of ice cream is calculated to be made from a 9.0 lb. mix and actually made from 9.2 lb. mix, a 100 percent overrun pint would really have about 104 percent overrun.

Fruits and flavors are used in many plants without any check on the amount used. These items should be carefully checked and reported. Using varying amounts results in poor uniformity and excessive costs. These items must also be considered when calculating overrun.

These and many more things affect quality and costs. Many industries practice quality control for protective measures. None need it more than the ice cream industry, because the product is so perishable and delicate in flavor. Operating without quality control is like flying an airplane without instruments. Everything is lovely until bad weather arrives.

SUMMARY

Many more things could be said about the inefficiencies in the ice cream industry. Most of the points mentioned may seem very elementary to the average operator. They are basic and the very foundation of a good operation. Most ice cream manufacturers believe they do all these things correctly. A thorough investigation would probably show that one thing or another is neglected because it seems so simple.

CP CONTINUOUS BUTTERMAKING PROCESS

Described at Buttermakers Symposium at University of Minnesota — September 26, 1946

Introduction

THE conventional method of making butter by means of the batch churn and worker has been developed through many years to a high state of accomplishment in the production of an excellent product. Many able minds in our dairy colleges and in the industry are ceaselessly at work in perfecting the quality of this essential food product produced by this batch churn method.

We of the equipment manufacturing branch of the industry have been conscious for a long time that with all the excellence of the modern batch churn and worker, the very nature of its operation effects limitations in its further improvement toward greater efficiency, sanitation, economy, and uniformity of product in the commercial manufacture of butter.

Butterfat is a product of natural origin which cannot be synthesized. The investigator of methods for extracting butterfat from its natural vehicle, milk, is confronted with the physical characteristics of a nearly perfect emulsion of complex components which resist separation by means permissible in the preparation of a food product. We centrifuge milk to produce cream, a product in which the fat is concentrated by removal of some of the serum, but otherwise having all of the attributes of the emulsion. The essence of buttermaking is in breaking the cream emulsion and gathering the fat therefrom.

In conventional churning, as we all know, a batch of cream is violently agitated until, by collision and adherence, the fat globules aggregate in growing clusters which finally break from the serum of floating granules. The serum is withdrawn and the fat granules are worked into butter. This sounds very simple to the layman, but the complexities of securing substantially complete separation of the fat and producing butter of uniformly fine quality are great, as we all appreciate. In fact, buttermaking is an art requiring much skill and experience.

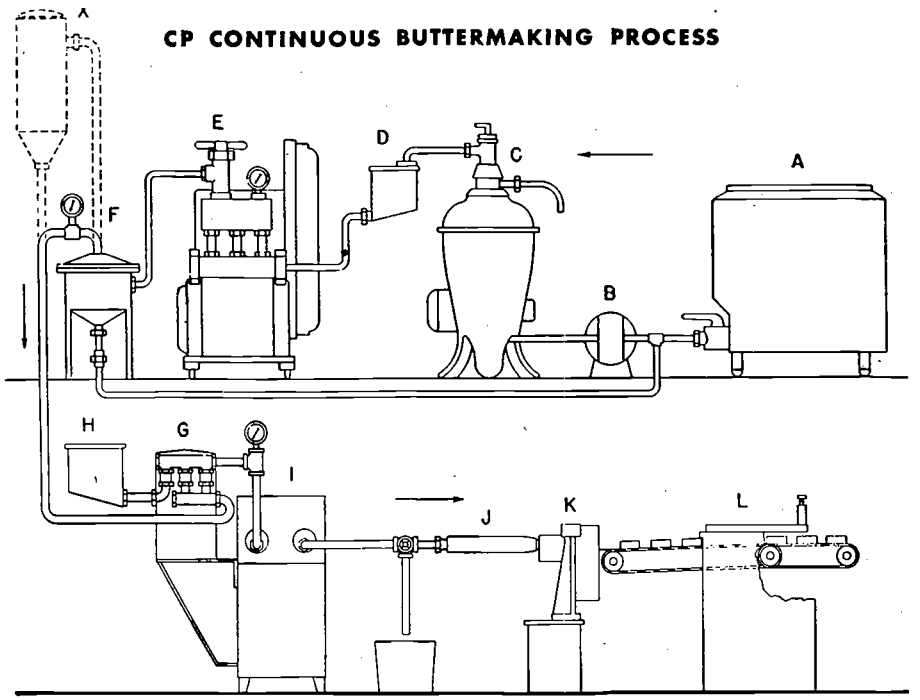
It has long been obvious to those familiar with commercial buttermaking that a continuous process for separating and working the fat into butter would be highly desirable in replacement of the cumbersome batch churn. But the difficulties in breaking the cream emulsion, separating the fat, and reproducing the butter emulsion by continuous process more successfully than is done by the proven batch churn method, have been great. Many attempts have been made without success.

In recent years, concentrated effort has been applied to the problems of the continuous process by the equipment manufacturers and producers. The Creamery Package Mfg. Company's development staff has been actively at work on the project and has developed and refined its process to the point that the Company now feels warranted in describing it to the industry.

Description of Process

A description of the CP Continuous Buttermaking Process is here presented by discussion of the functions of the several pieces of apparatus employed in the process and which are diagrammatically shown on the accompanying chart.

Preliminary preparation of the cream follows conventional practice, both with sweet cream and sour cream hav-



ing the usual fat content of churning cream. The cream is received, neutralized, pasteurized, and held in readiness for operation in the usual way.

CREAM SEPARATION

Referring to the chart, the process begins with the filling of a supply tank A with the pasteurized cream. The cream is heated to a temperature about 170° F. which liquefiies the fat and destroys enzymes causing rancidity. The hot cream is withdrawn from the tank A by a variable speed pump B through suitable piping, and delivered to a centrifugal separator C.

The separator is adjusted to deliver concentrated cream having a fat content between 75 and 80 percent. This fat concentration is within the operating capacity of the standard separators to effect clean and uniform separation at the selected percent of fat. The air-tight type of separator is suitable for sweet cream operation. For sour cream, the valve-bowl type of separator is preferable as being better able to handle the greater amount of curd precipitated during separation of the high fat concentration. The skim, without any dilution, is collected and utilized for the usual skim milk products.

EMULSION BREAKING

The hot concentrated cream flows continuously from the separator C into a receptacle D from which the cream

is fed continuously into an emulsion breaker E. The heated cream enters the emulsion breaker in a state of normal emulsion having the fat in dispersed phase and the serum in continuous phase. Although the volume of liquid fat is now three or four times greater than the volume of serum, the natural stability of the cream emulsion continues to maintain the fat globules in dispersed relation, each globule being surrounded by a tenacious film of serum. This is attributable to physical forces operating within the fat globules to retain their spherical form, and to the colloidal proteins in the serum which cover and adhere to the surfaces of the fat globules. Probably, like electric charges carried by the fat globules and having a repellent effect also tend to prevent the merging of the fat globules.

In the emulsion breaker E, these forces are overcome and the normal emulsion is broken by subjecting the flowing stream of cream to counter forces which disrupt the protective films covering the fat globules and cause them to coalesce or merge to form a free continuous liquid phase in which the lesser volume of serum is at first dispersed in small droplets. The breaking of the emulsion of fat-in-serum, and the reversing of this relation to a serum-in-fat phase, is done substantially instantly by the emulsion breaker. The resultant product is a freely separable mixture of liquid fat and serum without stability in their reversed phase relation. If quiescent, the mixture will stratify immediately, the heavier serum and its contained proteins gravitating from the fat.

Preferably, the emulsion breaker is an adaptation of an homogenizing machine of the pressure valve type characterized in operation by pumping a stream of liquid at high pressure through one or more valve orifices wherein extreme flow velocity and shear is generated. Other means for generating the disruptive force required to break and reverse the concentrated cream emulsion may be employed; as, for example, a colloidal mill of the revolving disc type may be adapted to the purpose.

The well known conventional function of an homogenizer is directly contrary to its function in the present process which we are describing. Its common use is to increase the stability of the normal fat-in-serum emulsion and prevent agglomeration of the fat globules by breaking up the normal globules into multiple smaller globules and thoroughly dispersing them in the serum, thus overcoming the natural buoyancy of the normal sized fat globules. This is illustrated in homogenizing milk to prevent the fat from rising as cream. Milk and other dairy products commonly homogenized have relatively low fat content.

In the present buttermaking process, the homogenizer, or emulsion breaker, operates upon hot cream having high fat concentration, with a result directly opposite to that of common homogenization. In a fat concentration of 75 to 80 percent, the serum is so reduced in relative volume that the continuous film of serum between and about the dispersed fat globules is so attenuated as to lessen materially its resistance to rupture and its capacity to re-form a film about broken fat globules. When subjected to the shearing forces generated in the passage of such cream through the emulsion breaker, the continuous serum film structure cannot preserve its continuity, and consequently the film breaks into dispersed droplets of serum. The released fat globules instantly merge into a continuous liquid phase carrying the dispersed serum droplets.

FAT CONCENTRATION

The broken cream, now a reversed unstable mixture of serum-in-fat, is discharged continuously from the emulsion breaker E into a serum separator F. The serum separator provides an enclosed chamber which is filled with the inflowing mixture of liquid fat and

serum. Immediately upon entry into the chamber, the fat and serum separate by stratification, the lighter fat fraction rising to the top of the chamber and the heavier serum fraction gravitating to the bottom of the chamber. During the time period allowed in practice for the passage of the mixture through the serum separator, stratification progresses to the extent that the portion of the top of the separator chamber comprises about 98 percent fat through which is dispersed about 2 percent of finely divided concentrated serum. The relatively small volume of serum gravitating to the bottom of the chamber is discharged back to the cream supply pipe ahead of the pump B for reseparation by the centrifugal separator C, thus recovering any fat entrapped in the serum and preserving the skim with that from the separator. The fat loss involved in the present process is limited to the fractional percent normal to the operation of the centrifugal separator C.

COMPOSITION CONTROL

The highly concentrated hot liquid fat fraction accumulating at the top of the serum separator F flows continuously therefrom to a composition control pump G. If it is desired to apply vacuum treatment to the hot fat fraction, a vacuum pan X_1 may be installed in the flow line between the separator F and the control pump G. The composition control pump G comprises a triplex piston pump of which two cylinders receive the fat fraction flowing from the serum separator and the third cylinder receives composition solution from a supply tank H. All three cylinders discharge into a common manifold. The third or composition solution cylinder is of reduced capacity and its piston drive is constructed for varying that capacity to supply the right amount of solution for mixture with the fat fraction. This solution is prepared from water with salt in such proportions that when mixed with the fat fraction in the control pump discharge, the mixture will have the desired composition in the finished butter.

The composition control pump G is provided with a variable speed drive so that the combined intake flow rate of the two cylinders receiving the fat fraction from the serum separator F may be adjusted to a lesser amount than the constant discharging flow rate from the emulsion breaker E. The adjusted difference in flow rates forces the return flow of the concentrated serum from the bottom of the serum separator to the cream supply line in such volume that the level of the separation of the serum from the fat is maintained constant in the serum separator.

COOLING AND WORKING

The mixture of concentrated fat and composition solution is continuously discharged under pressure from the composition control pump G into a chiller I. The chiller is essentially an adaptation of the familiar CP Continuous Ice Cream Freezer, having two cylinders for the successive passage of the composition mixture. The cylinders are refrigerated and provided with conventional temperature controls. Each cylinder is provided with a rotatable agitator with conventional drive.

The liquid mixture enters the chiller I at a temperature between 140° and 150° F. During its continuous passage through the cooling chambers, agitation promotes crystallization of the cooling fat, uniformly disperses the moisture therein, and effects uniformly progressive temperature reduction throughout its mass. As the fat progressively crystallizes into a plastic state, the emulsion phase relation of dispersed serum in continuous fat becomes stabilized. Continued temperature reduction and agitation further solidifies the fat while working the mass to attain smoothness of texture in the crystalline structure of the butter. The butter is discharged from the chiller

at a temperature between 45° and 55° F.

A considerable range of body and texture in the finished butter has been planned in the present process, also to provide for variations in fat characteristics due to season and location of production, and to the brede and feed of cows. This is accomplished by provision in the chiller for accurately controlled variation of the cooling temperature, variation in the amount of agitation, and variation in the rate of flow. Changes in these controlling conditions effect marked differences in the resulting body and texture of the butter.

PRINTING AND PACKAGING

The butter is discharged from the chiller in a plastic condition and conducted through an extruding tube J in the form of a continuously advancing bar having the cross dimensions of a standard print of butter. The bar advances into a conventional cutting machine K which severs prints of standard length and deposits them on a spacing conveyor. The latter carries the prints into a wrapping and cartoning machine L from which the packaged prints are delivered ready for distribution.

CONCLUSION

The process is the invention of A. W. Farrall, former Director of Research in the CP organization. Patents covering the process have been granted, or are pending, in the United States and foreign countries.

Extensive commercial test operation of the process has been conducted in one of the outstanding butter making plants of the mid-west, with results convincingly indicative of the complete success of the development as an improvement over the conventional churning method in economy and control of operation and in quality of product.

Due to current general acute manufacturing difficulties in securing labor and materials for a new project including quota restrictions on steel and motors, and severe shortages of various items, deliveries on the CP Continuous Buttermaker will be necessarily delayed.

From the foregoing description, you will no doubt appreciate the following obvious advantages in the CP Continuous Buttermaking Process:—

1. Reduced operating cost.
2. More sanitary as product contacts stainless metal throughout.
3. Saves time as not over 10 minutes from cream entering separator to finished butter.
4. Saves labor as one man can operate.
5. Flexibility to produce uniform composition and texture desired.

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Secretary-Treasurer, W. D. Tiedeman, New York State Department of Health, Albany, N. Y.

Oklahoma Association of Milk Sanitarians

President, Hardy Watson.....Lawton, Oklahoma

1st Vice-President, Eugene Reeves, Muskogee, Oklahoma.

2nd Vice-President, Fred Peters, Ponca City, Oklahoma.

3rd Vice-President, Jim Polson, Omulgee, Oklahoma.

Secretary-Treasurer, W. B. Lanphere, c/o Carter County Health Department, Ardmore, Oklahoma.

Wisconsin Milk Sanitarians Association

President, Elmer C. Kleffen.....Sheboygan

Vice-President, Clarence K. Luchterhand..Madison

Secretary-Treasurer, L. Wayne Brown, Bacteriologist, Dairy and Food Control Lab., Wisconsin Dept. of Agriculture, Madison.

Directors: Clarence O. Widder, August C. Hillstad.

Auditors: Ward M. Totman, Karl A. Trish.

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

California Asssociation of Dairy and Milk Inspectors

President, Albert E. Sheets, Los Angeles County Health Dept., 142 Nemaha St., Pomona, Calif.

Vice-President, Earl Hansen, San Luis Obispo County Health Dept., P. O. Box 360, San Luis Obispo, Calif.

Secretary-Treasurer, J. M. Covert, Los Angeles City Health Dept., 610¼ No. Kingsley Drive, Los Angeles 4, Calif.

Chicago Dairy Technology Society

President, Floyd Keller.....Chicago

Vice-President, C. A. Abele.....Chicago

Secretary, P. H. Tracy, University of Illinois, Urbana

Treasurer, Norman Cree.....Chicago

Sergeant-at-Arms, G. E. Dickson.....Chicago

Connecticut Association of Dairy and Milk Inspectors

President, E. O. Anderson, University of Connecticut, Storrs.

First Vice-President, Bruce C. Grant..New Britain

Second Vice-President, E. St. J. Baldwin, New London.

Third Vice-President, Alfred W. Fish....Hartford

Secretary-Treasurer, H. C. Goslee, State Office Building, Hartford, Conn.

Indianapolis Dairy Technology Club

President, James Irwin.....Indianapolis

Vice-President, Martin Koldyke.....Indianapolis

Secretary, Dr. B. E. Horrall, Purdue University, West Lafayette

Assistant Secretary, W. K. Moseley, 3862 East Washington Street, Indianapolis

Treasurer, Tom Wright.....Frankfort

Kansas Association of Milk Sanitarians

President, Mrs. Doris Van Gundy....Wellington

Vice-President, Ivan Van Nortwick.....Topeka

Secretary-Treasurer, Howard M. Weindel, Kansas State Board of Health, Topeka

Directors: J. R. Mingle, Deputy State Dairy Commissioner, Oakley; Dr. C. F. Kubin, City Milk Sanitarian, McPherson

Massachusetts Milk Inspectors' Association

President Francis M. Hogan.....Beverly

Vice-President, Robert C. Perriello.....Attleboro

Secretary-Treasurer, Robert E. Bemis...Cambridge

METROPOLITAN DAIRY TECHNOLOGY SOCIETY

President, S. H. Harrison.....New York, N. Y.
Vice-President, Richard S. Doughty, Hoboken, N. J.
Secretary-Treasurer, F. C. Button, New Brunswick, N. J.
Sergeant-at-Arms, D. X. Clarin..New York, N. Y.

MISSOURI ASSOCIATION OF MILK AND FOOD SANITARIANS

President, E. C. Loren.....Columbia
Vice-President, Dr. I. H. Baird.....St. Joseph
Secretary-Treasurer, Glenn M. Young.....
State Board of Health, Jefferson City
Acting Secretary-Treasurer, Charles E. Carl....
State Board of Health, Jefferson City

PACIFIC NORTHWEST ASSOCIATION OF DAIRY AND MILK INSPECTORS

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

PHILADELPHIA DAIRY TECHNOLOGY SOCIETY

President, Dr. H. Kenneth Wilson.....
Sylvan Seal Dairies, Phila.
First Vice-President, Thomas Waddell.....
Philadelphia Milk Exchange, Phila
Second Vice-President, William M. Taylor.....
Cherry-Burrell Corpn., Phila.
Secretary-Treasurer, Wesley S. Holmes.....
Philadelphia Dairy Council, Phila.
Assistant Secretary, Miss Jane Collins.....
Supplee-Wills-Jones Milk Co., Phila.

TEXAS ASSOCIATION OF MILK SANITARIANS

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

VIRGINIA ASSOCIATION OF MILK SANITARIANS

President, J. W. Robertson.....Lynchburg
Vice-President, C. B. Neblett.....Richmond
Secretary-Treasurer, H. P. Jolly, Health Department, Norfolk.

WEST VIRGINIA ASSOCIATION OF MILK SANITARIANS

Chairman, Donald K. Summers, Charleston 1, W. Va.
Secretary-Treasurer, J. B. Baker, Department of Health, Charleston, W. Va.

PROCEEDINGS OF THIRTY-THIRD ANNUAL MEETING OF INTERNATIONAL ASSOCIATION OF MILK SANITARIANS, INC. ATLANTIC CITY, N. J., OCTOBER 26, 1946

Russell R. Palmer, *President*, presiding.

The minutes of the Thirty-Second Annual Meeting were read and approved.

The Annual Report of the Secretary was then read by Secretary-Treasurer C. Sidney Leete (see page 361). Accepted, with applause.

The Annual Report of the Treasurer was presented by Secretary-Treasurer C. Sidney Leete, in summary, as follows:

Cash on hand, Oct. 26, 1945.....	$3,128.11
Receipts.....	3,762.75
Total.....	$6,890.86
Disburstments.....	2,433.42
Balance.....	$4,457.44

The Report was accepted, with rising vote of thanks.

Mr. H. L. DeLozier reported for the auditors that the Association records were in excellent condition.

Mr. William B. Palmer reported on the growth of the JOURNAL OF MILK TECHNOLOGY in circulation to over 3,000, going to seventeen different countries, and largely instrumental in the rapid growth of this Association in members, financial strength, and prestige. This verbal report was accepted with applause.

As presented by the Nominating Committee, the following slate of officers were duly elected by ballot:

Dr. R. G. Ross, *President*
Mr. W. D. Tiedeman, *First Vice-President*
Mr. A. W. Fuchs, *Second Vice-President*
Dr. M. R. Fisher, *Third Vice-President*
Dr. J. H. Shrader, *Secretary-Treasurer*
Auditors: Mr. DeLozier and Mr. Holford

Mr. C. A. Abele, Chairman of the

Committee on Sanitary Procedure, introduced the following resolution:

"Whereas sanitation as established by the Committee on Sanitary Procedure of this Association in collaboration with the milk and food section of the United States Public Health Service, and the sanitary sub-committee of the dairy industry committee have come to be known as 3A standards, in the attached design it has in this form, and whereas conformance to these standards has come to be designated by the use of an insignia in which the 3A is incorporated, and whereas it is desirable and essential that abuse of the employment of this insignia in advertising or stamped or engraved equipment be prevented, therefore be it resolved that the Executive Board of this Association be instructed to investigate the feasibility of copyrighting the 3A designation heretofore listed under the trusteeship of the International Association of Milk Sanitarians, and if the findings are favorable that the said board be instructed to apply for such a copyright."

This was amended to authorize the Executive Board to approve expenses incurred in executing the resolution. The resolution with amendment received affirmative vote.

Resolutions were adopted as follows:

Thanks expressed to the program participants.

Sympathy extended to the families of our recently deceased members:

George E. Bolling, a past president, Charles E. Carrigan, Riley H. Coons, L. C. Johnson, Joseph H. Shea, Dr. Frank G. Tegg, Paul O. Wood, killed in action, E. F. Roessler, Louis Voorhees, O. B. Foote, Jr., and Howard Lutz.

Life membership in this Association for Horatio N. Parker. See below.

Appreciation for services of C. Sidney Leete. See below.

Remuneration be given the Secretary-Treasurer for his work and for clerical assistance.

Mr. Leete reported that correspondence from members concerning the proposed amendments that had been distributed by mail showed that

". . . the unanimous opinion, so far as we could determine, was that the Association should open its rolls to those who are interested in food and restaurant sanitation, and that the control of the Association should remain in the hands of those officially engaged in milk sanitation or those who are interested and participate in educational and experimental institutions. I believe that is a brief summary of the situation as it stands today, other than the mechanics which we must go through if any action is taken regarding amending the constitution."

The Secretary then explained that

"Any action taken here today is only action which brings these amendments to an official vote. In other words, we cannot vote upon amendments to the constitution today; we can vote to bring any amendments we wish to a vote. In other words, if we wish to change anything we will say so now, then that change or proposed change must be sent by mail to all active members in the Association and replies must be received from them within ninety days, and the final result announced at the next Annual Meeting."

The Association voted affirmatively to adopt the proposed amendments: Article I (changing the name of the Association to include "food sanitarians") and Article II (broadening the objectives), modified by minor changes in wording. But the Association rejected the proposed Article III (which set up only one class of members), and authorized changes in Article III, Membership, of the present Constitution, so as to provide for the changes in the broader field of interest of the present two classes of members, namely, active and associate, and to include honorary members (as now provided in Article I, Section 4, of the By-Laws).

The President then appointed a committee (Wm. B. Palmer, A. W. Fuchs, and J. H. Shrader) to edit the proposed amendments so as to make them cover the inspection and supervision of general food and food-handling plants, including restaurants. These edited amendments will then be submitted by mail to the membership for final vote.

An affirmative vote amended Article IV, Officers, to provide that the retiring president shall be a member of the Executive Board for one year.

Article V, Amendments, was authorized to remain as it now stands in the Constitution.

The By-Laws were amended to make them comply with the proposals for the enlarged scope of the Association. After detailed discussion, the above Editing Committee was instructed to re-word such of the By-Laws as indicated.

The Association then voted to submit the re-worded Constitution and By-Laws to the membership for a mail vote.

The Committee on Regulations and Ordinances was then authorized:

"1. to complete regulations relating to plants and receiving stations;
"2. to submit a copy of such regulations, including the farm regulations submitted today, to each of the members of the Association and to cooperating industry groups, inviting early comments and criticism;
"3. to make such changes as it deems to be justified by the comments and criticism received;
"4. to promptly submit a copy of the completed regulations to the United States Public Health Service for submission to their advisory committee for use in possible revisions of the United States Public Health Service Ordinance and Code."

The President then presented to the Association the newly elected officers, and declared the Thirty-Third Annual Meeting adjourned.

J. H. SHRADER
Secretary-Treasurer

Resolutions

RESOLUTION—MR. C. S. LEETE

WHEREAS C. Sidney Leete has served this Association faithfully and well as its Secretary-Treasurer for ten years, and

WHEREAS during this period the membership has increased over fivefold, and

WHEREAS also during this period he greatly facilitated the founding of the *Journal of Milk Technology* as a valuable adjunct of the work of this Association, and

WHEREAS he has proven a dependable adviser and guide to the officers of the Association who have served during his incumbency, therefore, be it

RESOLVED, that in recognition of these services, the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS hereby expresses its regret at his decision to resign this position, and tenders its heartfelt thanks for his labors and accomplishments in its behalf, and be it further

RESOLVED, that he be presented with an engrossed copy of this resolution.

RESOLUTION—MR. H. N. PARKER

WHEREAS Horatio N. Parker is a member of this Association, and

WHEREAS he has increased the strength and prestige of the Association by reason of his professional ability, loyalty, and cooperation in its committees and meetings, and

WHEREAS he has admirably represented the Association and exemplified its ideals in the several sections of the country in which he was engaged in official activities, therefore, be it

RESOLVED, that in recognition of these services, the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS endeavors to express its appreciation by presenting him with a life-membership in this Association, and be it further

RESOLVED, that these sentiments and the best wishes of the Association be expressed to him in an engrossed copy of this reolution.

Annual Report of the Secretary of the International Association of Milk Sanitarians

1946

THE INTERNATIONAL ASSOCIATION OF MILK SANITARIANS has survived the war period, and, due to its nature, has made substantial gains, even though several scheduled annual conferences were not held. There is every reason to believe that in the immediate future greater progress will be made than has been possible in past years.

At the present time (October 7, 1946) the Association is composed of 2,074 members, of which 1,624 are associate and 450 active, a gain in total membership since the 1944 meeting of 379. Eleven members have died.

The *Journal of Milk Technology* has continued to be an outstanding publication, one of which the Association is proud. The Journal has been, and will continue to be a major factor in the growth of the Association. During the past two years circumstances arose which made it imperative that the Editor and Managing Editor overcome grave obstacles, if the Journal was to be published without interruption. This they did, and it is your Secretary's firm belief that their outstanding work should be recognized by all.

The various standing committees have functioned, with the result that reports of much value to the Association and to others interested in milk sanitation are available.

The Executive Board, at a meeting this year in Detroit, discussed in detail the matter of enlarging the scope of the Association to include food sanitation, and also possible future changes in the administration of the Association. These matters have been outlined by the President in a message sent to all members.

As many of you may know, this is the last report which will be made by your present Secretary. Due to personal reasons, I find it necessary to ask that my name not be considered for Secretary-Treasurer for the coming year. This was a hard decision to make—as for ten years I have had the honor and privilege of working with all the members. Such association is one which I would like to continue, but it is impossible to do so.

In view of my long tenure of office and close contact with the affairs of the Association, may I, at this time, take a few more minutes of your time to talk over with you a few constructive ideas which I believe should be considered carefully by the Association.

It was just ten years ago—here in Atlantic City—that I was elected to the office of Secretary-Treasurer. The annual proceedings of the Association were published for the last time as an annual report. The following year the *Journal of Milk Technology* came into being. The membership at that time was approximately 350. The situation now is different. We have over 2,000 members, and the Journal is established.

The Association has now reached such a position as to make it impossible for one man to carry on its affairs in a satisfactory manner without proper facilities and an amount of time which can ordinarily be given by a man who has a full-time position. The difference in the amount of time taken in keeping records and books on 2,000 members, as compared with 350, is tremendous. And, in the other duties of the Secretary-Treausurer, the same proportionate increase in time holds.

During the past few years I have been unable to do all that should be done, when it should be done regarding Association matters. Time was the limiting factor.

If the present proposition of increasing the scope of the Association to include food sanitation is carried through, more and more time of the Secretary-Treasurer will be needed. Obviously some way should be found to handle satisfactorily the administration of the Association.

It is my request that extreme care and thought be given in the election of a Secretary-Treasurer, and that the following items be considered:

1. Office space and sufficient clerical and stenographic service for the proper functioning of the office should be assured.
2. The Secretary-Treasurer should be in a position so that a considerable amount of time is available for Association work.
3. Compensation for clerical and stenographic work should be made.
4. Compensation to the Secretary-Treasurer for his time and work should be granted.
5. In the future arrangements should be made so that a full time Secretary-Treasurer can be employed. In such an eventuality, various duties pertaining to the management and editorial work of the Journal might be absorbed by such office. We are not ready to take that step for a few years. In the interim period the Secretary-Treasurer's office should be a more or less part-time position.

I am convinced that the future progress of the Association will be more or less dependent upon the amount of effort the Secretary-Treasurer can put forth in the administration of the Association. After ten years' experience and observation, I am sure that greater progress will be made in the next decade than was achieved during the one just concluded.

In conclusion, I am expressing to all of you my sincere appreciation for the wholehearted cooperation given me during the past ten years.

The officers, the committees, the staff of the Journal, and the entire membership, through their interest, their suggestions, their constructive criticisms, and their work, during my tenure of office, have made the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS an association which is an impelling factor in milk sanitation in this country and throughout the world.

For the confidence you have given me for the past years, I am deeply grateful.

Respectfully submitted,

(Signed) C. S. LEETE

Secretary-Treasurer

Associated Illinois Milk Sanitarians

The Annual Meeting of the Associated Illinois Milk Sanitarians will be held at the Hotel Morrison, Chicago, on Monday, December 16, 1946. This meeting is being held in collaboration with the annual meeting of the Illinois Dairy Products Association.

P. E. RILEY
Secretary-Treasurer

SEMINAR IN THE PUBLIC HEALTH CONTROL OF MILK SUPPLIES TO BE HELD AT SALT LAKE CITY, UTAH, DECEMBER 9–13, 1946 (10 A.M. MST)

(This seminar is to be conducted by the U. S. Public Health Service with the assistance of the Salt Lake City Health Department and the Utah State Department of Health)

These seminars are conducted for those interested in milk sanitation with special reference to local and state sanitarians, and are held as a result of a recommendation by the Committee on Milk of the Conference of State and Provincial Health Authorities.

The seminar sessions will be held at the Little Theater on the University of Utah campus at 9:00 A.M. each day, and will include the following subjects:

How milk supplies are contaminated by various disease organisms.

The history of milk-borne disease outbreaks.

The Public Health Service milk sanitation program.

Definitions used in milk control.

Methods of punishing violations—permit revocation, degrading—legal aspects of milk control.

Labeling and placarding.

Inspection procedure.

Laboratory examinations.

Grading procedure.

Detailed discussion of grade A requirements for pasteurization plants, including plant design, excreta disposal, water supply, construction, cleaning, bactericidal treatment and handling of equipment, the pasteurization process, cooling, bottling and capping, health examinations, and tests of pasteurization equipment.

Country pasteurization plants.

Detailed discussion of grade A requirements for dairy farms, including construction and operation of barn and milk house, manure disposal, excreta disposal, water supply, utensil construction, cleaning, bactericidal treatment and handling, milking procedure, cooling, bottling and capping, and health examinations.

Milk sanitation bookkeeping.

The rating of community milk sheds to determine the extent of compliance with the grade A requirements.

The cost of milk control.

Maximum attention will be devoted to a discussion of all of the farm and pasteurization plant items of sanitation.

The seminar discussions will be based on the 1939 edition of the Public Health Service Milk Ordinance and Code (Public Health Bulletin No. 220). Before the seminar each enrolee should purchase a copy from the Superintendent of Documents, Government Printing Office, Washington, D. C. (price 35 cents, stamps not accepted). Copies will not be distributed at the Salt Lake City seminar.

State or local milk sanitarians and others who wish to attend the above seminar should apply by mail immediately to: Milk Sanitation Seminar, U. S. Public Health Service, 615 Colorado Building, Denver 2, Colorado. The number of persons who can be enrolled is limited and enrollment will be made in the order in which the applications are received. State and local milk sanitarians in Colorado, Wyoming, Montana, Idaho, and Utah are invited to attend. The Public Health Service cannot defray either travel or living expenses.

Industrial Notes

Chesnut Heads New Pacific Division of Wyandotte Chemicals

C. O. CHESNUT

Charles O. Chesnut became general manager of the newly organized Pacific Division of Wyandotte Chemicals Corporation effective August 1st. Manufacturing and distributing activities in the Pacific States of the products of both the J. B. Ford and Michigan Alkali Divisions of Wyandotte Chemicals Corporation, and the Natural Soda Products Company, will now be directed from the new Pacific Division office, 502–14 Central Tower Building, San Francisco 3. The Pacific Division will also solicit business on the new Wyandotte organic specialties and fine chemicals.

Oakite Announces New Sales Manager

J. C. LEONARD

Announcement is made by Oakite Products, Inc., New York, of the appointment of J. C. Leonard as Sales Manager of its Industrial Marketing Division. Associated with the Oakite organization in the servicing of its specialized cleaning materials and equipment for over 22 years, the last 16 years of which was in the capacity of manager of the Company's Chicago Division. Mr. Leonard assumed his new duties on September 1, 1946. He will direct the marketing and servicing activities of Oakite's industrial field staff from the general offices of the company in New York.

Wyandotte Issues New Informative Material

Wyandotte Chemicals Corporation has just issued a new leaflet, "Clean Hands", describing the use of Wyandotte "Steri-Chlor" as a germicidal hand-rinse for workers in food processing plants and in other establishments where food is handled. The leaflet is complete with photographs of microscopic slides of workers' hands before and after using Wyandotte Steri-Chlor as a final, germicidal hand-rinse.

"What, Why, Where, How?", is the title of a new 8-page leaflet just prepared listing the advantages of Wyandotte Boiler Compound and directions for its use. The leaflet answers the questions asked in its title with diagrams, charts and written instructions.

A new leaflet has been prepared describing the Company's specialized line of products for maintenance cleaning . . . mopping and scrubbing floors, washing painted surfaces and cleaning porcelain enamel. Advantages of using these Wyandotte Products — Detergent, F-100, El-Bee Cleaner, 97 Paste and Steri-Chlor— as well as simple directions are included. Copies of these publications may be obtained by writing Wyandotte Chemicals Corporation, Wyandotte, Michigan.

Pennsalt Shifts Two Sales Chiefs in Midwest

Louis M. Kuilema, formerly district Sales manager at the Cincinnati office of Pennsylvania Salt Manufacturing Company, has been placed in charge of the Wisconsin territory as district sales manager. On October 1 he moved to permanent headquarters at 20 N. Wacker Drive, Chicago, from his temporary office in Minneapolis.

ROTOLACTOR SYSTEM OF MILK PRODUCTION IS OFFERED TO DAIRYMEN

The Walker-Gordon system of milk production, which centers around the famous "Rotolactor", or "milking merry-go-round", will shortly be offered to dairymen and milk dealers throughout the world. This was announced by Henry W. Jeffers, president of the Walker-Gordon Laboratory Company, and inventor of the "Rotolactor".

At present there are two such systems of milk production in operation—one at Plainsboro, the other at Charles River, Mass. The Charles River Rotolactor was the focal point of a dairy exhibit at the New York World's Fair in 1939 and 1940. Mr. Jeffers and his associates have estimated that rotolactors can be used efficiently in herds of from 300 to 2,000 cows. "Our experience has proven," he says, "that the rotolactor system is not only efficient and economical in milking herds of this size, but also that it is the most sanitary and hygienic method of handling milk from the cow to the bottle."

The rotolactor at Plainsboro is a platform 66 feet in diameter, revolving once every 13 minutes, upon which 50 cows are milked by DeLaval magnetic milkers in a single revolution. After the cows step on the slowly-moving platform, they are washed, dried, their foremilk examined, and milked.

No hands touch the milk, which is automatically weighed and then flows through sanitary pipe to the dairy where it is processed and bottled. The DeLaval magnetic milking equipment is automatically washed and sterilized after milking each cow. In this manner 1,500 cows are milked at Plainsboro three times daily. Four hundred cows are milked three times daily on the smaller rotolactor at Charles River.

The rotolactor is the keystone to the "Walker-Gordon System of Milk Production" which Jeffers has developed at the Plainsboro farm over the last half century. Control starts with the soil wherein is grown much of the forage consumed by the huge Walker-Gordon herd. It extends to the harvesting and processing of feed crops, to the delicate balance of the cows' diet; finally to the rotolactor operation, the processing of milk and its delivery.

An outstanding characteristic of the Walker-Gordon System of Milk Production is the decentralized unit operation of farms raising forage crops and of milking herd units of fifty to one hundred cows. These unit operations are under strict Walker-Gordon control and supervision. At the same time the Unit Operator maintains independent management, employs the necessary labor to operate his unit and receives compensation in proportion to the production of his unit.

The rotolactor, and the system of milk production of which it is a part, have received wide attention from the world's dairy industry. Before World War II Mr. Jeffers had inquiries from several foreign countries on the possibility of setting up rotolactors in other parts of the world. However, the outbreak of war of course put a halt to any such development. More recently, requests of a similar nature have been received from Iceland, Africa, France, South America, and several areas in this country.

New Members

ACTIVE

Anderson, Elmer O., Professor, Dept. of Dairy Industry, University of Connecticut, Storrs 21, Conn.

Bourbonnais, Georges, Sanitary Engineer, Ministry of Health, 1570 rue St. Hubert, Montreal, Canada

Bryson, Dr. Henry Lewis, Veterinarian, Division of Sanitation, Department of Public Health, Regina, Saskatchewan

Carl, Charles E., Asst. Public Health Engineer, State Board of Health, Jefferson City, Mo.

Cranford, William Henry, Sanitarian, Kay County Health Dept., Box 483, Blackwell, Okla.

Fishback, Albert Lee, Dairy Inspector, Summit County Health Department, 1023 Grant St., Cuyahoga Falls, Ohio

Johnston, Howard K., Asst. Sanitarian (R), U.S.P.H. Service, 911 "D" St., Meadville, Pa.

Kelley, Frank L., Sanitarian, Labette County Health Department, 220 Main St., Parsons, Kansas

Shipley, Angus M., Asst. Professor, Dairy Dept., University of Connecticut, West Willington, Conn.

Taylor, McCutcheon, Dairy Inspector, R. R. 3, Box 197, Tulsa 15, Okla.

ASSOCIATE

Alm, Welton, Fieldman, Farmers Co-op Dairy Assn., Nelsonville, Wis.

Blanchard, Henry, Fieldman, Alto Co-op Creamery Co., R. 1, Waupun, Wis.

Brown, Cecil G., Laboratory Technician, Blue Boy Dairy Co. Inc., 139 Bakerdale Rd., Rochester, N. Y.

Claflin, Leigh A., Salesman, Tubbs Co., Mondovi, Wis.

Culp, J. R., Sanitarian, State Department of Public Health, Atlanta, Ga.

Diehl, Melvin W., Director of Laboratories, Telling Belle Vernon Co., 3740 Carnegie Ave., Cleveland 15, Ohio

Enman, Vernon, Food and Dairy Inspector, 2292 Parker St., Vancouver, B. C., Canada

Everson, E. G., Fieldman, Bi-County Dairy Quality Co-op., 121 W. South St., Viroqua, Wis.

Finger, LeRoy, Branch Mgr., Klenzade Products, Inc., Box 495, Appleton, Wis.

Foster, Donald W., Laboratory Technician (Plant Sanitarian), Saginaw Dairy Co., 1743 E. Genesee St., Saginaw, Mich.

Freeman, Stanley, Four County Creameries, Inc., 214 Trenor Drive, New Rochelle, N. Y.

Ganshirt, Cletus S., Dairy Inspector, Wis. State Dept. of Agriculture, Fennimore, Wis.

Harlen, Alex. J., Cheesemaker, R. 2, Auburndale, Wis.

Holland, Frohman, Pres., Holland-Trieagle Past. Inc., 80 Washington Ave., Lawrence, L. I.

Holland, Irving E., Secretary, Holland-Tricagle Past. Inc., 367 Derby Ave., Woodmere, L. I.

Hughes, Miss Bertha I., Director, Educational Department, H. P. Hood & Sons, 500 Rutherford Ave., Boston 29, Mass.

Knudsen, T. E., Field Service Dept., Maple Island Farm, Inc., R. 1, Osceola, Wis.

Lange, Ernest, Fieldman, The Borden Co., 405 N. Birdsey St., Columbus, Wis.

Leppen, Elmer, Mgr., Farmers Co-op Dairy Assn., Nelsonville, Wis.

Lightfoot, J. E., Field-serviceman, Kraft Foods Co., 102 E. Fuller St., Freeport, Ill.

Martin, Marie M., Bacteriologist, Oswego Falls-Sealright Corp., Fulton, N. Y.

Monson, N. A., Salesman, Pennsylvania Salt Mfg. Co., 1325 Rutledge St., Madison 4, Wis.

Moore, Clark M., Mgr. Food Sanitation Department, Cowles Detergent Co., 7016 Euclid Ave., Cleveland, Ohio

Mundt, Earl E., Laboratory Technician, Dairy Distributers Inc., Co-op., 213 N. 10th St., Watertown, Wis.

Phillips, John D., C. J. Berst & Co. (Chicago), Route 1, Waupun, Wis.

Poole, E. L., Dist. Mgr., Klenzade Products, Inc., 748 Wisconsin Ave., Beloit, Wis.

Power, Robert G., 123 W. Cady St., Northville, Mich.

Rivard, Wilfred, Manager, Maple Island Farms, Inc., New Richmond, Wis.

Rutan, J. Joseph, Fieldman and Laboratory Technician, Box 53, Flanders, N. J.

Selke, Ed., Quality Controo, Chippewa County Co-op Dairy, Bloomer, Wis.

Seyforth, Ralph, Sales Manager, The Tubbs Co., Mondovi, Wis.

Stephan, H. P., Sales, Distribution and Sanitation, Universal Milking Machine Co., 827 Motor Ave., Waukesha, Wis.

Taylor, John J., R. 4, Osseo, Wis.

Weeks, E. R., Supervisor, Bowman Dairy

Co. (Chicago), 139 Kent St., Wausau, Wis.
Westerback, Alfred, Fieldman, Borden's Milk and Ice Cream Co., 1708 Holmes Ave., Racine, Wis.
Wulf, C. H., Manager, Lakeside Butter Co., Spring Valley, Wis.
Zierzow, Arthur W., Fieldman, Carnation Co., 740 Church St., Berlin, Wis.

CHANGES IN ADDRESS

Booth, Edward, Melmourne, Australia, to Health Dept., Town Hall, Hobart, Tasmania
Drake, P. K., Mazomanie, Wis., to Prairie du Sac., Wis.
Halldorsson, Thorhallur, Madison, Wis., to Eiriksgata 31, Reykjavik, Iceland
Hicks, Franklin B., Utica, N. Y., to 14 Pearl St., Canton, N. Y.
Kelly, Ernest, Silver Spring, Md., to 1344 W. Smith Ave., Orlando, Fla.
Matthews, William E., Ft. Lauderdale, Fla., to 743 N. Clara Ave., DeLand, Fla.
McCarthy, C. J., 373 West Ave., Rochester, N. I., to 1650 East Ave., Rochester 10, N. Y.
Roberts, Geo. M., Skaneateles, N. Y., to Mexico, N. Y.
Rogers, E. D., Brandon, Vt., to Morristown, N. Y.
Schuman, Bernard K., Phelps, N. Y., to The Diversey Corp., 7 Van Buren St., Antwerp, N. Y.
Tatz, Charles, Newark, N. J., to Charles Tatz Milk Products, 785 Chancellor Ave., Irvington 11, N. J.

NOTE: Mr. Kleffen's Address should be Milwaukee and not Sheboygan as it appears in the list of Associations in the Journal.

"Doctor Jones" Says—*

Health departments that've gotten into requiring food handlers in restaurants and so on to have physical examinations and get health certificates—a fellow out in the Salt Lake City health department says it's like having a bear by the tail. They don't want to hang on but they're afraid to let go. That was in a paper he gave at a meeting out there and it just about describes it.

A lot of places around the country required it for years and many of 'em still do. That is: everybody that handles food or dishes or whatnot in a public eating place—he has to go to a doctor and be examined and get a certificate that he isn't suffering from any communicable disease—or any that can be spread through food. Sometimes they have health department doctors make the examinations but usually they have to go to private physicians.

Well, for a good many years, the health people, pretty generally—they knew, for example, that typhoid germ carriers handling food were responsible for cases and epidemics of typhoid and they believed that was the thing to do. As a result of the "educating" they did, the general public's come to believe that the examination of food handlers is an important public health measure. If it isn't done, they think the health officer's falling down on the job.

But we live and learn. We've learned from experience that these routine examinations not only cost a lot of money but they don't accomplish what they're supposed to.

Take the typhoid carrier, again, as an example. The only way to tell that he's a carrier is by laboratory examination: finding the germs in his intestinal discharges. Sometimes they have to examine half a dozen or more specimens before they'll find the germs. These routine single examinations—if they don't find 'em he still may be a carrier. So there's the old "false sense of security". And there's other things about it, too.

So this "bear"—it's probably safer to face it and get it over with. After all, it might be a tame bear. And having one by the tail—I think I'd let go while I still had strength to beat it.

PAUL B. BROOKS, M.D.

* *Health News*, New York State Department of Health, Albany, N. Y., February 11, 1946.

SEVENTY ATTEND NADEM ATLANTIC CITY MEETING

The National Association of Dairy Equipment Manufacturers held a special meeting at the Ritz-Carlton Hotel, Atlantic City, N. J., on Thursday, Oct. 24, which was attended by representatives of 27 leading equipment manufacturers. Guests included Robert Rosenbaum, president of the Dairy Industries Supply Association; Roberts Everett, executive vice-president of DISA; and Dr. E. H. Parfitt, Director of Sanitary Standards, Evaporated Milk Association.

A highlight of the meeting was a word of greeting to the recently formed association from Mr. Rosenbaum, who was introduced by Nadem Membership Chairman Roland Smith, Waukesha Foundry Co. Mr. Rosenbaum said that within the Dairy Industries Supply Association the different groups have organized groups within their respective fields such as the Cap and Closure Institute, the Milk and Ice Cream Can Institute and others. The equipment people have now formed an organization called the National Association of Dairy Equipment Manufacturers.

Mr. H. S. Fielder, Cherry-Burrell Corp., Chairman of the Nadem Technical Committee, outlined the functions of his committee and also their work in connection with the Sanitary Standards Subcommittee of the Dairy Industry Committee in the development of "3-A Standards," and then introduced the Chairman of the latter committee, Dr. E. H. Parfitt of the Evaporated Milk Association.

Dr. Parfitt further explained the mutual interest of the Dairy Industry Committee's Subcommittee on Sanitary Standards, DISA's Technical Committee, NADEM's Technical Committee, the International Association of Milk Sanitarians, and the United States Public Health Service in developing essential Sanitary Standards for the protection of public health on a uniform national scale. He called attention to the brochure on "3-A Sanitary Standards for Dairy Equipment," approved to date, and advised that copies could be had by writing to the Sanitary Standards Subcommittee of the Dairy Industry Committee at DISA's Washington office.

Following Dr. Parfitt's remarks, Mr. Harry Sieck, Executive Secretary of Nadem, proposed the following resolution which was passed:

"WHEREAS, the National Association of Dairy Equipment Manufacturers favors constructive collaboration with the Sanitary Standards Subcommittee of the Dairy Industry Committee in developing standards of sanitary performance, on production, processing, and plant equipment, reflecting advances in sanitary science, be it therefore

"Resolved that the NADEM actively supports and brings to conclusion the work of the Sanitary Standards Subcommittee of the Dairy Industry Committee."

Forthcoming Meetings

Illinois Dairy Products Association, Inc.—Annual convention, Morrison Hotel, Chicago, December 16–17. M. G. Van Buskirk, 309 W. Jackson Blvd., Chicago, Secretary.

National Dairy Council—Annual meeting and winter conference, Hotel Traymore, Atlantic City, N. J., January 29–31, 1947. Milton Hult, 111 No. Canal St., Chicago, President.

Ohio Dairy Products Association—Annual convention, Deshler-Wallick Hotel, Columbus, January 20–22, 1947. O. E. Anderson, Secretary, 5 E. Long St., Columbus, Ohio.

Wisconsin Milk Dealers Association—Annual convention, Schroeder Hotel, Milwaukee, December 10–12, 1946. Harry Kleuter, Secretary, 1 W. Main St., Madison, Wisconsin.

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