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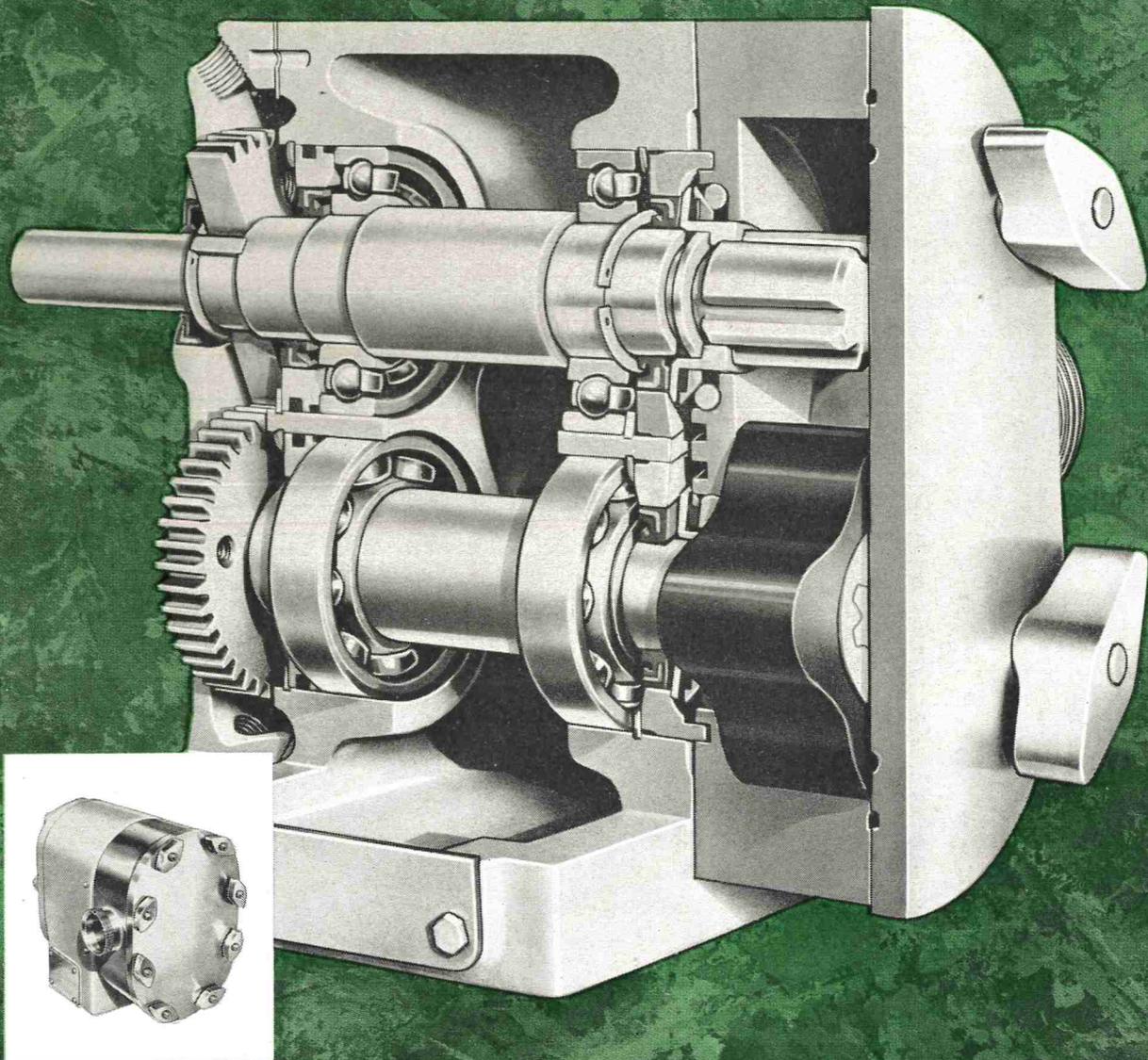
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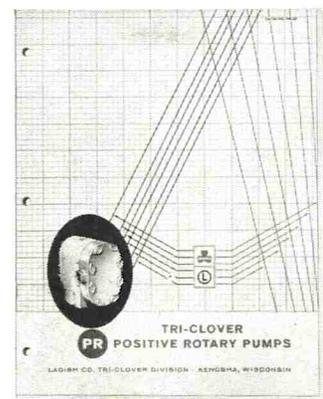
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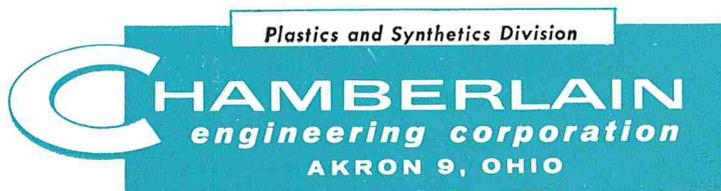
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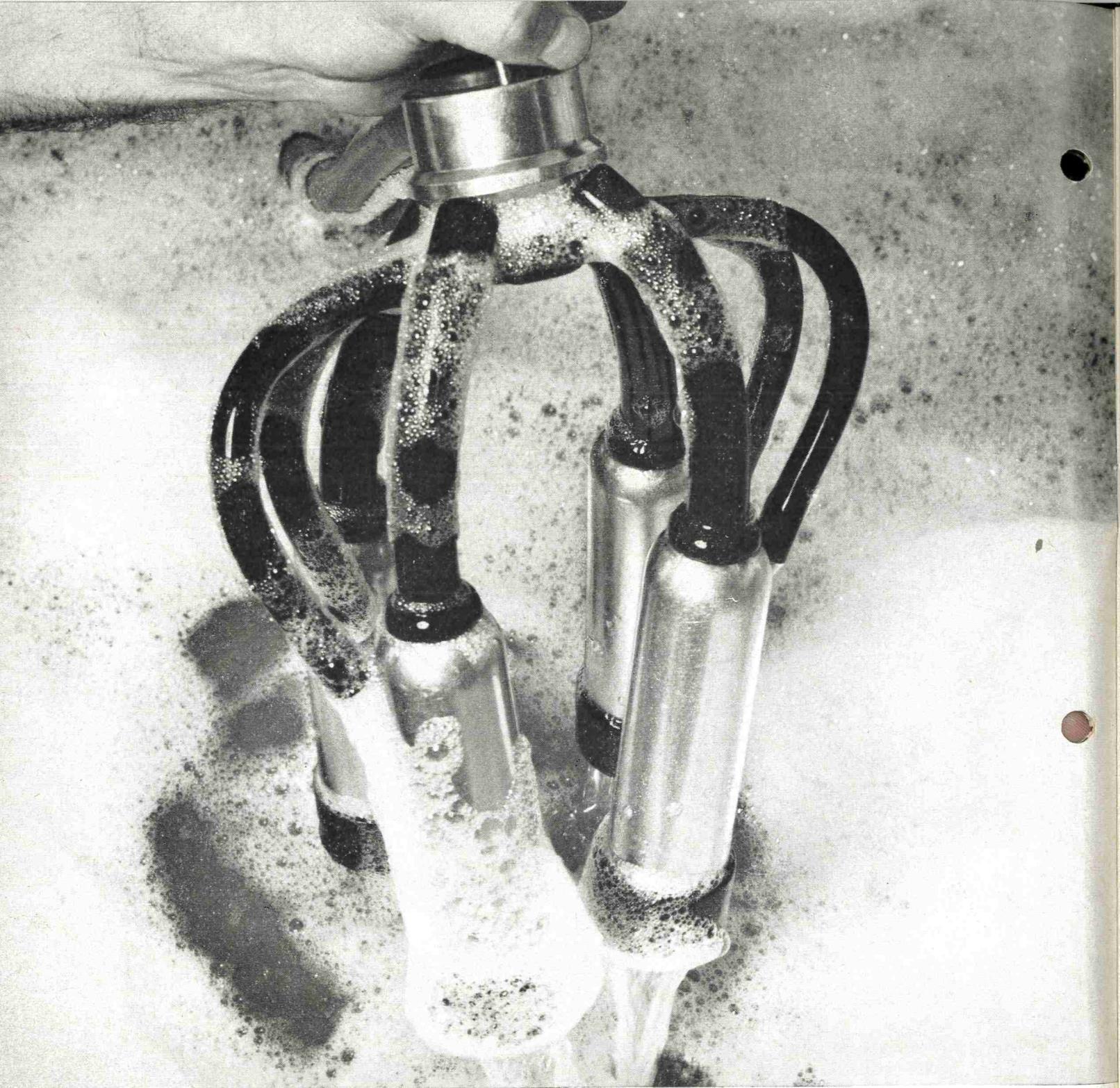
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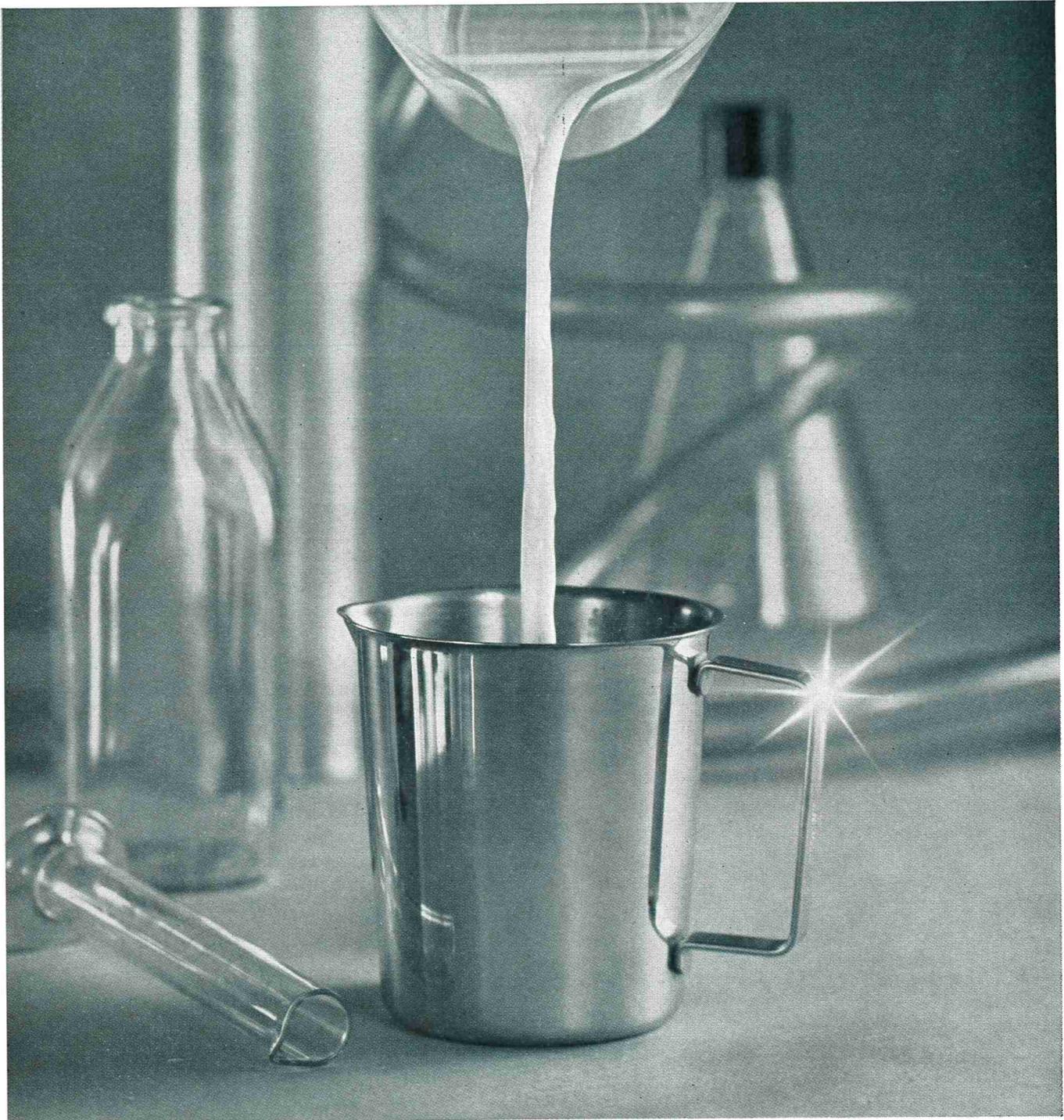
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ANOTHER STEP FORWARD

Last June, the U. S. Department of Agriculture issued "Minimum Standards for Milk for Manufacturing Purposes and Its Production and Processing Recommended for Adoption by State Regulatory Agencies." This was the culmination of several years of effort by the Dairy Division of USDA's Agricultural Marketing Service — assisted by the many technical leaders in all branches of the industry and State regulatory agencies — through meetings and numerous exchanges of correspondence.

Many problems were encountered in this effort, and there were many differences of opinion as to whether the standards were needed and where the most emphasis should be placed in evaluating the quality of milk. This was only natural because the standards were national in scope and cut across the wide variety of conditions and practices prevalent across the width and breadth of our vast country. The purpose in issuing the standards was to focus more attention on this wide variety of conditions, bring more uniformity into existing standards and into the quality of milk used for manufacturing purposes, and above all improve the quality of the dairy food products manufactured from milk. All during the preparation of the standards there was continued evidence of accomplishment toward their purpose, and as the date of issuance drew nearer the tempo of interest seemed to increase.

There are those who have said that separate standards for manufacturing milk were not needed and that we should consider only one grade of milk, whether it is used for fluid consumption or for manufactured products. Some said that by the time the standards for manufacturing milk were published, all milk would be grade A — or soon would be — and therefore, such standards were not needed. This opinion might be more valid if one overlooked the fact that the quality of fluid milk is improving also, and what was once considered acceptable quality for fluid purposes is now being surpassed as a result of better methods and improved facilities. It appears then that until we can reach closer to the ultimate in all areas of production and processing methods, there will continue to be more than one grade of milk. It was on this premise that minimum quality standards for manufacturing have been recommended by the U. S. Department of Agriculture.

Now that they have been published — *WHATNOW?*

As sanitarians, producers, technicians, plant operators and handlers of milk and dairy products, we are custodians and guardians of a human food. This guardianship begins with the responsibility that the milk be drawn from only healthy animals. All the defects that are evident in milk and dairy products from that time on are due to our ignorance, carelessness, or lack of proper facilities for their care. We do not improve milk beyond its initial quality. We can only try to protect it from contamination and apply those practices which will best retain that natural quality. Possibly, a better term for our efforts would be "quality maintenance" rather than "quality improvement."

Standards are only a part of quality maintenance. They must be adopted and uniformly applied with effective enforcement, when necessary, if they are to be meaningful. It will require the diligent effort of all of us to educate and inform those not familiar with what is to be accomplished. That may be a broad area.

Since the milk starts with the producer, we must start with him. Unless he is properly informed, the producer has every reason to believe that the milk he sends from his farm to the dairy plant is satisfactory and is the quality that the plant operator wants and needs. Unless he hears otherwise, the producer has every reason to feel that he is producing the kind of milk the consumer wants and is getting, based on the skillfully prepared advertising proclaiming its goodness.

As custodians of a product, we owe the consumer the fullest confidence that we are doing all we can and say we are doing to preserve its fine quality. When we ask the housewife to buy the product and serve it to her family or guests, we owe her the confidence that it has been produced and manufactured as carefully as she would do it herself and under sanitary conditions of which she would approve. How can we do less? Many operators complain that they cannot enforce a quality program because their competitor has no program and will accept poor quality. Uniform standards — uniformly applied — should aid the quality-minded producer and manufacturer.

Using the old adage, "we must crawl before we can walk" — perhaps in the area of quality of manufactured milk we have crawled long enough. We need to remember, however, that in walking — though we take a step forward — we do not make much progress until we pick up the other foot. Let us, therefore, begin to use these standards, as needed, to help us do the best job we can in fulfilling our responsibility as members of this great dairy industry.

FLOYD E. FENTON
U. S. Dept. of Agriculture,
Washington, D. C.

EVALUATION OF ENVIRONMENTAL HEALTH PROGRAMS¹

MORTON S. HILBERT

*School of Public Health,
University of Michigan, Ann Arbor*

"Consciously or subconsciously evaluation is an inseparable part of human life and one of the characteristics that distinguishes the behavior of the cerebrating homosapiens from the insect-guided, reflex-conditioned behavior of the lower forms of animal life. Objective, critical, self-evaluation is said to be a hallmark of the emotionally mature adult.

Evaluation is not new in public health. It predates Lemuel Shattuck's report and probably also predates Biblical references to public health. One cannot plan or administer public health programs properly without evaluating them. Although evaluation is not new, methods and tools of measurement change as do attitudes toward and emphasis on evaluation. Thus it is timely in an age when we can measure the energy released by synthetic nuclear fission to renew our efforts at measuring the accomplishments of our public health programs."

-Editorial: Am. J. Public Health, 45:1480. 1955.

Public health officials and agencies have a long history of concern with the problem of evaluation of health services and program. The American Public Health Association developed the Appraisal form for health services which was in widespread use from 1924 through 1942. In 1938 and 1939, the W. K. Kellogg Foundation in conjunction with the Environmental Sanitation Program of the seven counties in Southwestern Michigan developed extensive evaluation schedules for the major environmental health programs. These schedules were intended to provide a means of instruction for health department personnel as well as for the operators of establishments and the public in general. The American Public Health Association Evaluation Schedule was developed in 1942 and received a widespread use on a nationwide basis. As a result of this schedule, the indices of accomplishment were developed as measuring guides for program evaluation.

In 1955, the first national conference on evaluation in public health was held at the University of Michigan, School of Public Health and laid the groundwork for further development of evaluation methods, tools and techniques. The second national conference on evaluation was held at the University of Michigan in September of 1960. In August of 1963, the American Public Health Association Program Area Committee on Administration completed the preliminary draft of "Indices for Community Health Services."

The National Commission on Community Health Services, jointly sponsored by the American Public

Health Association and the National Health Council is currently developing a nationwide program involving the evaluation of pertinent information concerning health service problems, trends and resources for today's needs and future demands.

The long-continued interest of public health personnel throughout the years has indicated a concern for the development of tools with which to measure the effectiveness of public health programs and to evaluate activities of public health agencies. The Public Health Service has recognized this widespread need for evaluation and has approved a grant of approximately \$2 million for a seven-year study at the University of Michigan, School of Public Health which will concern itself with the "Evaluation of Public Health Practices."

In this discussion, we are primarily concerned with the evaluation of environmental health programs. Therefore, it becomes necessary to define environmental health. This is one of the broad areas of public health practice which involves all those phases of the environment which may in any way affect the health or well-being of man. If we are to accept the definition of public health which has been developed by the World Health Organization namely, "A program to promote the complete physical, mental and social well-being of mankind and not merely to provide for the absence of disease," then we have an extremely broad area of concern in the field of sanitation. A list of all the programs of environmental health is an extremely long one and is well known to most practitioners in the field of sanitation. Stead (4) in his presentation of a schematic approach to environmental sanitation has divided the large field of environment into four major program sectors which include water, food, air, and the space-shelter contact area. Incorporated in each of these program sectors are the many sub-program areas which have become traditional programs in some health jurisdictions and which are emerging and becoming more important in other parts of the nation. Let us assume, in developing methods of evaluation for environmental sanitation programs, that we consider the broad aspects of environmental sanitation with its many ramifications.

Now that we have defined the scope of interest in environmental sanitation, it is appropriate to carefully scrutinize the meaning of evaluation. If we are to evaluate the effectiveness of environmental

¹Presented at the Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc., October 22-25, 1963, Toronto, Canada.

sanitation programs, we need to review the programs from a number of different points of view. Involved in this study would be a consideration of four major areas of concern:

- 1) Communication problems
- 2) Motivation and perception problems
- 3) Health practice problems
- 4) Administrative problems.

The effectiveness of any program depends upon the ability of those in administrative capacity as well as those operating in the field to communicate to the public and to the operators of individual establishments the objectives of the sanitation activity. Careful attention must be given to the motivation and perception aspects of the program as they affect the members of the health department or operating agency as well as the general public. We need also to make a careful review and analysis of the procedures and practices which are followed in the routine administration of the program. And lastly, an analysis of the administration patterns of operation within the department and within the governmental structure of a community are extremely important in order to thoroughly understand the basis for evaluation.

Numerous attempts have been made by organizations, groups and individual operating agencies to evaluate programs in current operation. Some evaluation studies have been made which have been limited to a determination of the scope of coverages of the field of environmental sanitation. These studies have been aimed primarily at determining whether or not the particular agency is accomplishing the task of providing a broad environmental health program which serves all facets of the community environmental problems.

A second method of study or evaluation which is commonly used concerns the amount of activity which has been carried on by the sanitation division. This is the usual report of the number of visits made, the number of samples taken, the number of establishments in which corrections have been made, etc.

A third evaluation procedure which has been used by some departments has included special studies of efficiency of environmental health personnel. These studies are basically time studies to determine the number of services rendered by the individual staff members and are used to determine the time required for various types of sanitation services.

A fourth evaluation procedure which has not received as widespread use as the others is the measure of effectiveness of environmental health programs. We have been so interested in the number of visits made and the number of corrections accomplished that frequently we have neglected to concern ourselves with the very important and probably the most

essential aspect of evaluation which is the determination of whether or not the sanitation program has been effective in attaining the goals which have been established for the environmental sanitation activity.

One of the most essential aspects of a sanitation evaluation program is to first of all clearly define the goals which are expected to be attained if the sanitation program is effective. There is a need for clearly defining the aims and objectives of each individual environmental health program prior to the establishment of such programs. A study of a number of local health departments has indicated that in many cases goals for final accomplishment have not been clearly defined. Occasionally the goals of the administrator are not clearly understood by many of the staff people in the sanitation division.

Once the goals have been established and agreed upon by the health department and the governing body of the community, the task of measuring effectiveness of environmental programs becomes more clearly definable. We may then assess the degree of achievement toward these established objectives. Salvato (3) discussed evaluation from the standpoint of measuring the effort expended as compared to the results obtained in various sanitation programs. A very good case has been made for the measurement of inspection service including man-hours of effort required to secure the various accomplishments. Reference should be made to Figure 1 which indicates the program activities versus the improvement in facilities. It will be noted that as the program starts that there is considerable effort expended with a minimum of increase in improved facilities. Gradually as the program progresses results are obtained at a more rapid rate with less effort on the part of the sanitation personnel. There is a time, however,

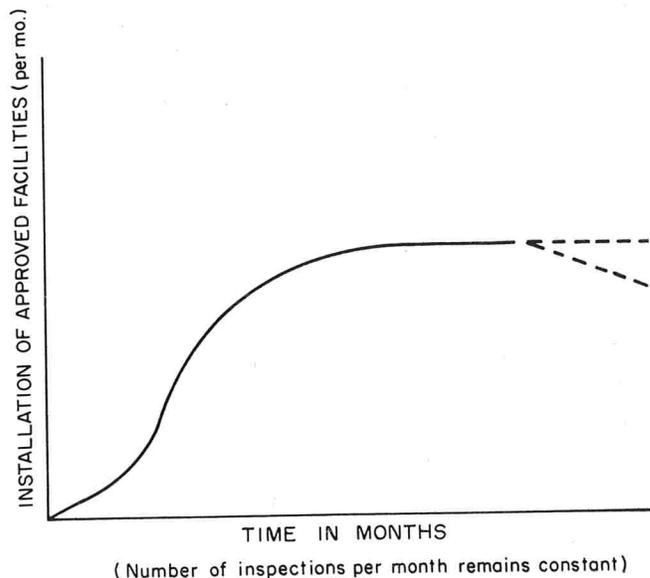


Figure 1. Sanitation activities vs. improved facilities.

at which the increase in improvement falls off as more and more of the establishments meet the recommended standard established by the inspection agency. At this point considerable effort is required to secure a minimum number of improvements. As a matter of fact, it has been observed in some areas that results may even decrease as the efforts to obtain these improvements have increased. If we have established our goals on the basis of securing the installation of various kinds of equipment or upon the objective of securing compliance with various standards based on physical requirements, then we have a measurable entity with which to deal and the evaluation of the program becomes fairly simple. However, if our goals are set at the elimination of various types of infection, or if we have a goal to provide a community in which man may thrive rather than merely survive, then the degree of accomplishment becomes extremely difficult to measure.

Many of us have selected programs for our sanitation division which are based not primarily on the established needs of a community but which are based more realistically on the traditional programs of health departments throughout the nation. On the other hand, some of us become so enamoured with the new, exotic developments of science which involve the environment that we are busy exploring the unknown areas of sanitation and tend to neglect some of the areas of well-known hazards. An example of this might be found in departments which are active in the field of radiological health but neglect to develop adequate concern for the septic tank installations which are invading their countryside by the thousands. Any discussion of evaluation of effectiveness of the total environmental health program needs to be closely related to the selection of program objectives and total program coverage.

If we are to measure the change in attitudes and change in action of the individuals with whom we deal, then we must develop a yardstick for measurement which is truly objective. We must ask ourselves, "What do we want people to do after we have worked with them in a particular environmental sanitation program?" We must develop a means of measuring whether or not the people with whom we have dealt have actually been motivated to do those things which are contained within the statement of our program objectives.

A proposal has been made and preliminary work started in one health department in which it was agreed that the program objective in the field of food sanitation would be to meet the standards established by the United States Public Health Service Food Service Sanitation Manual. It was decided that the particular health jurisdiction would be divided into a number of geographical areas and various

types of food sanitation programs conducted in each of these areas. A Public Health Service rating was made of all areas prior to development of the program and it anticipated at the end of a two-year period that a similar rating will be made to determine the effectiveness of the various kinds of programs as conducted in these four or five geographical sections of the health jurisdiction. Such a procedure is commendable from the standpoint of studying methods of administration to accomplish an improved food service rating in the various areas. There is a serious question, however, as to whether or not this is the type of goal which actually meets the needs of the community. The 1962 edition of the Public Health Service Food Service Manual places an increased stress on the operating procedures and handling methods. This is certainly an improvement in the direction of changing attitudes and action on the part of the food service employees. In previous editions, greater emphasis was placed on the physical components of the sanitation program which is only a part of the program if we are truly concerned with the protection of the health of the people of the community.

Studies made by L. M. Fisher (2) indicate that 60% of our sanitation program time is spent in activities related to food and milk. Water and liquid waste activities take approximately 15%. A total of 75% of the total effort of environmental health programs in the 42 local health departments studied was spent on these four traditional programs.

Similar evaluation studies were made in Michigan of 15 health departments for a period of 1946 to 1951 and indicated that 61% of the total time of sanitarians in these departments was spent on food and milk sanitation. There would appear to be a nationwide opinion that the most important aspect of environmental sanitation is involved in the inspection programs of food and milk activities. It is difficult to find data, however, which indicates that the tremendous amount of time and effort spent on these programs is commensurate with a resultant improvement in the general health of the country. There is certainly evidence to indicate that morbidity and mortality statistics show a decrease over a period of years from outbreaks of food and milk origin. There is no definitive data which clearly indicates that the same amount of improvement might not have occurred with less effort on the part of the field staff of the health agencies involved.

One of the most outstanding appraisal techniques which has been developed in the field of environmental health is the Housing Survey Technique developed by the Committee on Hygiene of Housing of the American Public Health Association (1). This appraisal technique is widely used throughout the

nation in studying the housing problems of various communities and determining areas in need of rehabilitation and clearance. This technique has provided an exceptional method of evaluating housing conditions but does not provide a means for evaluating the effectiveness of a housing program conducted by the sanitation division of the health department. Again we must emphasize the importance of determining first of all the objectives which the health agency wishes to accomplish before an adequate appraisal program can be applied.

The evaluation and appraisal methods for various types of establishments which were developed by the W. K. Kellogg Foundation in 1938-1940 approached the method of evaluation of environmental health status in an entirely different manner. In the documents which were prepared for the various types of establishments under the inspection service of the local health department, there was developed an inspection report form of considerable length and with rather extensive detail. Each item of sanitation was listed and a compliance standard for good, fair or poor was listed in detail. The purpose of this detailed document was to provide uniformity on the part of the inspectional staff and at the same time provide material which would be available to the operator of the establishment for purposes of comparison, education and communicative techniques. A more detailed analysis of this approach was provided through a system of weighting which assigned different values to various aspects of the environmental health program. For example, the structure, water supply, sewage disposal, and handling were given a major priority while items such as heating, ventilating, lighting, hand washing, etc. were given a somewhat lesser degree of importance. This system provided an excellent means of evaluating accomplishment toward the goal of general sanitation compliance from a physical point of view. Here again, however, no effort was made to extend the evaluation to accomplishing the long-term objective of providing an environment for the community in which the population could thrive rather than merely survive. No effort was made to compare the effectiveness of the program against the incidents of food-borne infections, nor was any attempt made to indicate the attitude of the public toward the general food sanitation activities.

In more recent years, there have been increasing attempts to approach the evaluation of environmental health programs on a broader base. There has been increased concern for the attitudes of the public toward the accomplishments of the environmental sanitation section of the health agency, and efforts have been made to provide a means by which community attitude toward the environment can be

measured. The Public Health Service has developed the "Environmental Health Planning Guide" (5) which has been receiving widespread acceptance throughout the country. This guide provides a means for local groups to study the environmental conditions of the community. Although this planning guide has not been promoted primarily as an evaluation technique, it carries with it a number of excellent appraisal and evaluation advantages. If the guide is used by local officials, citizens groups and individuals within the community, they will discover, in the process of filling in the questions in the guide, an understanding of the environmental health problems of the community. The guide is aimed primarily at problems of water supply, sewage disposal, refuse collection and disposal, radiological health, housing and air pollution. Upon completion of the data gathering aspect of the guide, plans for future development are made in conjunction with the health agency involved and recommendations for community action are included.

If a similar community appraisal technique could be used a number of years after the development of recommendations based on the preliminary use of the guide, an appraisal of the efforts of the health and planning agencies could be accomplished. Here again it must be pointed out that the preliminary use of the planning guide would involve a study of the existing problems and the determination of aims objectives and ultimate goals for the environmental health conditions of the community. The subsequent appraisal of the community conducted a number of years later would indicate the accomplishments made by the community in attaining the goals thus established.

A similar approach has been attempted in the development of the American Public Health Association proposed "Indices for Community Health Services" which is now in the preliminary draft stage. In the environmental health section, a number of the major environmental health program areas have been selected and the material indicated under a number of major categories. First, the existing facilities to implement the program are enumerated. Second, the status of the program is listed with an outline of information required in order that the status of the program may be properly assessed. A third section involves suggested levels of performance which is essentially the public health reasons for the development of the program. It is expected that such a community study would be made by citizens' groups in conjunction with local health authorities and by so doing a program of information to the citizenry would be accomplished. Joint objectives could then be developed by the governmental unit, by the health agency concerned and the public at large. Sub-

sequent use of the "Indices for Community Health Service" could be used to appraise the levels of accomplishment of the various objectives established.

In summary it might be said that, in the past, the major efforts of appraisal have been directed toward measuring the efforts made by health agencies in the implementation of environmental health programs. The need of our present-day health agencies is for a means of measuring the effectiveness of the programs in producing results. We need a measure of the degree of accomplishment of the goals established by the health agency, the community, and the governing body. Such a plan requires that clearly defined objectives for health programs be established and that these objectives be well understood by all parties concerned: the governing body, the health agency, the inspecting staff, the public at large, and the operators and personnel of establishments within the community.

Satisfactory tools for measuring the degree of accomplishment of such goals have not been well developed and there is a need for research and study in this important field of public health administration. In order that we may properly allocate the time and efforts of environmental health personnel toward the increasing demands of new environmental health problems, it is essential that we develop methods of measuring effectiveness of the more traditional programs in line with our already established techniques of measuring the effort expended in the various programs of sanitation.

The true measure of statesmanship and administrative ability comes with the ability of the health agency to re-direct its efforts away from traditional programs to less spectacular activities when it can be shown that the effort expended on the more traditional pays less public health dividends than is expected on the newer and more pressing problems that confront the communities of our rapidly growing areas. We must ask ourselves penetrating and searching questions in reference to each of the environmental health programs in which we are involved.

1. What are the objectives of the program?
2. Is the program worth the effort being expended?
3. Can we expect to accomplish our objectives with our present methods of approach to the problem?
4. Are there other areas of environmental health in which we might more profitably be spending our time and effort?

When these questions are answered, we are in a position to plan and administer the environmental health program in a more rational method. Far too many of the present-day environmental health programs are based upon tradition and what has been expected of the health agency over a period of many years. Some program emphasis can be traced to the early days of prevention of epidemics and the control of widespread pestilence. Technological and scientific advancement in the field of environmental health, the increasing demands for service and the limited availability of trained personnel demand that we approach administrative program planning, evaluation, and administration with a critical, inquisitive, scientific and coldly analytical attitude. Such a fearless approach is long overdue in environmental health and demands the efforts of all practicing sanitarians. Research is needed to develop the tools for adequate evaluation and for methods of application of these tools to existing programs. The results of such action should assure the more rapid expansion of environmental health programs into the new and developing areas of health protection and should provide an increased justification for the support of environmental sanitation activities.

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PREREQUISITES TO PROFESSIONALISM¹

SAMUEL H. HOPPER

*Department of Public Health,
Indiana University School of Medicine, Indianapolis*

There is probably no doubt in any of our minds concerning what we think we mean when we discuss the term "profession". In 1948 Dr. W. P. Shepard (1) outlined the criteria of a profession and emphasized educational qualifications as a primary consideration. He very wisely called attention to the need for each school to develop its own curriculum and warned against a freezing of thought and initiative. Macaulay, the great historian, advised that "To know the past is to predict the future". Now in order to look forward more intelligently let us consider the recent history of professionalism for the sanitarian.

In the Fall of 1950, a group of interested professional public health workers formed a Steering Committee to meet with and advise the Subcommittee on Undergraduate Training of the Engineering Section of the APHA. Our assignment was undergraduate education in Sanitary Science. Thus, a need has been recognized. We formulated a request to the W. W. Kellogg Foundation, which generously provided financial assistance for a meeting of educators, held in Battle Creek, Michigan, April, 1951 (2). And what was the purpose of the Conference? It was to outline the professional training required for sanitarians. The first thought which came to our minds, and on which we expended all of our time and energy was the content of a proposed curriculum leading to a college degree.

The first objective in the training of a sanitarian is to produce an educated individual, we said, with the hope that he will have developed a competence in the formulation of intelligent judgements. A professional person is expected to be able to do this to some degree. We went on to conclude our objective with a discussion of the general content of professional training needed in the field of environmental health and how this might be accomplished. Thus, the first prerequisite to professionalism appears to be educational preparation. Let us consider briefly a few recent examples of job opportunities in public health.

In September of 1963, the U. S. Public Health Service announced examinations for its Regular Commissioned Corps for Physicians, Sanitary Engineers, Health Educators, Veterinarians, and Sanitarians. In every case the applicant was considered as a pro-

fessional person, and a minimum of a bachelor's degree was a requirement which ran like a thread through every announcement. Obviously, some categories required more extensive graduate training than others, but the foundation stone of the basic college degree was present in all cases.

The bachelor's degree, incidentally, was originally called a "determinant" (3). It was regarded as a preliminary step towards Mastership, or Doctorate, and was awarded without a diploma. The awarding of degrees by universities (a practice dating back about 800 years) had its roots in the need for an official recognition of competency, according to one scholar. In 1849, Sir G. C. Lewis, in his definitive "Authority on Matters of Opinion" wrote sternly, "The granting of degrees by universities and other learned bodies proceeds on the supposition that the public require some assistance to their judgement in the choice of professional services, and that such an official scrutiny into the qualifications of practitioners is a useful security against the imposture and incompetency of mere pretenders to skill". Thus, professional services are different from those of a skilled tradesman.

What has been said above concerning the need of a college degree should not be misunderstood. We all know college graduates who seem unable to add two and two and we wonder how in the world they ever managed to get through. Unfortunately, it is true that it is possible to memorize course content, to deliver a warm body, regularly and on time, to lectures, to memorize facts and regurgitate them in recitation classes or on quizzes, and to so conduct oneself morally as to enable one to attain a degree after four years.

This is aimless, fruitless, worthless wandering. It is stuffing a student with facts as one would fill a sausage casing. It is the antithesis of that most essential trait of the real student, i.e., some form of intellectual curiosity. It should be understood clearly that the degree is merely a means to an end. Otherwise, as Oscar Wilde said, we might have a graduate who knows the price of everything but the value of nothing (4). We are not interested in producing a learned ignoramus (5). One might feel in agreement with the remark made in a professional journal (6), to the effect that "it is really a question of how best to do what is most likely to be right if what probably will happen happens before what is being done is no longer the best thing to do."

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The undergraduate training should give the student a command of fundamentals in the humanities and science; it should give him a method of attack on problems that are new and difficult; it should give him an intellectual self-reliance. In a similar vein, the Chief Executive Officer of the Rhodes Scholarships, Lord Elton says (7) "I regard as the great pride of Oxford its ability to present an entirely useless training in that it doesn't concentrate on technical know how . . . Science at Oxford is still taught mainly to make brains work better." The pragmatism of business cannot afford this luxury. Yet this is how we press forward in the pursuit of excellence and how some of us fondly hope that our graduates will be uncommon men.

For another view, let us briefly summarize the attributes of a profession given to me by an officer of the U. S. Public Health Service (8). They are as follows:

1. Requires a prolonged period of educational preparation, including appreciation of the *arts* as well as scientific learning.

2. A profession assembles a body of knowledge relating to its field and of necessity develops a glossary of scientific terms needed for exchange of information.

3. A profession is able to attract and hold people to it because of what it does.

4. A profession is *not* an intermediate stage or "route to" any other form of human endeavor.

5. The practice of a profession meets a basic human need.

6. The practice of a profession is not for the monetary consideration alone, but more for the satisfactions of giving service.

7. The attainment of a profession carries with it an obligation where possible to share in the teaching of those that are learning.

8. The practice of a profession is not solely a technique or scientific procedure, but in addition, requires a high order of judgement.

9. A profession shares knowledge among its members for the betterment of the profession. There are no secrets.

10. An organized profession will reject individuals from it that do not govern their actions to conform to the ideals and purposes of the profession.

11. The strength and personal satisfaction of a profession is the *service* that it gives.

12. A profession offers only its highest order of skill to those whom it serves. In other words, there is no second class service.

The above is somewhat reminiscent of the list published by Dr. Shepard in 1948 and so eloquently expanded by Chanlett in 1958 (9). I thoroughly agree with his sentiment concerning education and its re-

lationship to the moral fibre of the student. For years we have agreed that first and foremost we want men who can get along with others, men who have generally accepted desirable traits usually associated with the term "gentlemen". As an educator, I know that given such a man, we can teach him the technical portion of his work and produce a professional public health worker.

There is another aspect of professionalism which certainly has its pros and cons. This is the matter of Registration Laws for Sanitarians. If a state legislature passes a law relating to the registration of sanitarians, does this action make the sanitarian a professional man? Does it add to his stature? Is it necessary in the public interest? There are many present at this meeting who have worked very hard to get such laws passed in their home state. Without going into this matter in great detail, let me point out that surgeons and plumbers are each licensed by an appropriate governmental group to practice a particular body of knowledge and skill which they possess. The requirement of a license, or registration is a political expedient which is done in the public interest. It does not confer professional status on either the physician or the plumber. Professional status is something to be earned, by virtue of training and experience and cannot be attained because a legislative body waves a magic wand. Perhaps you feel that the end justifies the means. That sanitarians need this in order to be regarded as professional by the public or by other public health personnel. A chemist, or a mathematician, a zoologist, or a health educator is just that because of his training. He has a job specification in civil service because of his background and the sanitarian in my opinion, is not different from these professions. If the registration law is primarily aimed at a salary adjustment, then let us recognize it for what it is. The lawyer, the accountant, the metallurgist, bacteriologist, or sanitarian can be defined professionally by his training.

The chief prerequisites to professionalism, then, relate to the need for proper training at the college level. Perhaps it is time to reactivate the thinking of our group of 1951 when we formed a Council to study the means for accreditation of undergraduate schools having a degree in the general area of Environmental Health.

The profession of the Sanitarian is time honored. Such men as Sedgwick, Rosenau, and Winslow were proud to be known as Sanitarians. Perhaps you may recall a thought from Emerson who said that an institution is but the lengthened shadow of one man. To give just one example of such a shadow, we have the William T. Sedgwick Medal of the APHA. The Sanitarian has just arrived on the public health scene

as a professional person. He can assure the respect of other professional groups if he will continue to improve by showing leadership, initiative, and technical competence as new problems arise.

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AMENDMENT TO SANITARY STANDARDS FOR STAINLESS STEEL AUTOMOTIVE MILK TRANSPORTATION TANKS FOR BULK DELIVERY AND/OR FARM PICK-UP SERVICE

Serial #0505

Formulated by

*International Association of Milk, Food and Environmental Sanitarians
United States Public Health Service
The Dairy Industry Committee*

The 3-A "Sanitary Standards for Stainless Steel Automotive Milk Transportation Tanks For Bulk Delivery And/Or Farm Pick-up Service", Amended April 28, 1954, Serial #0501, are further amended by adding a new sub-paragraph D-8. Air Under Pressure and/or C-I-P, and a new section O - Air Under Pressure and/or C-I-P, and by deleting sub-paragraph E-2. and Section A of the Appendix.

D-8. AIR UNDER PRESSURE AND/OR C-I-P:

Openings for air agitation and/or C-I-P applications shall be protected against contamination by means of a removable dust cover, except where such opening is within the pump and/or hose cabinet or compartment.

O - AIR UNDER PRESSURE AND/OR C-I-P:

Means for applying air under pressure or solutions for C-I-P shall conform to the applicable provisions of the "3-A Accepted Practices For Supplying Air Under Pressure In Contact With Milk, Milk Products And Product Contact Surfaces," except that clamp type fittings shall not be used in the product zone.

Tubing and related fittings within the tank shall be readily and easily removable for cleaning outside the tank or be designed for mechanically clean-

ing in place. The C-I-P system shall be so designed that the solution is applied to all product contact surfaces of the tank, except those areas requiring manual cleaning which include such areas of the tank as vents, valves, manholes and gaskets. If designed for cleaning in place, the tubing and all related fittings shall be self-draining.

Permanently mounted air or solution tubing shall be constructed and installed so that it will not sag, buckle, vibrate or prevent complete drainage of the tank or tubing and shall be located so that the distance from the outside of the tubing and the inside lining shall be at least two inches, except at point of entrance.

This amendment shall become effective May 15, 1964.

THE CARBON DIOXIDE CONTENT OF MILK DURING HANDLING, PROCESSING AND STORAGE AND ITS EFFECT UPON THE FREEZING POINT¹

A. C. SMITH

*Department of Animal Industries,
University of Connecticut, Storrs*

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SUMMARY

Milk samples obtained from a bulk tank at the conclusion of each of four milking periods, subsequently from a plant storage tank, and after processing and storage for 0, 2, and 4 days were analyzed for CO₂ content and freezing point. Changes in CO₂ content which occurred during storage of raw or pasteurized milk, handling or pasteurization were not of sufficient magnitude to alter significantly the freezing point. Therefore, the use of the freezing point as a means of detecting adulteration of milk with water should not be complicated by normal handling, processing and storage of milk. The significant reduction of CO₂ which occurred during vacuum treatment of milk resulted in a rise in its freezing point. Allowances for this change should be made in adulteration determinations.

The use of non-steam injection vacuum treatment equipment in conjunction with high-temperature, short-time (HTST) pasteurizers has been shown (6, 10) to result in an elevation of the freezing point of milk when it is subjected to low levels of treatment. This freezing point elevation during vacuum treatment of milk has been shown to be correlated with a concomitant loss of CO₂ (11). The question arises as to whether there also may be sufficient changes in the CO₂ content of milk resulting from handling, processing and storage to alter the freezing point. Such alteration, if of sufficient magnitude, could create problems for regulatory officials attempting to detect borderline cases of adulteration of milk with water.

The CO₂ content of milk has been reported as 3.44 to 4.96 (7) and 6.58 (4) volume per cent for anaerobically drawn milk; 2.93 to 3.78 volume per cent (7) immediately after milking; and 4.45 volume per cent (12) as received at a commercial milk plant. It is apparent that there are variations in the CO₂ content of milk.

The effects of processing upon the CO₂ content of milk have been noted by several investigators. Frayer (4) and Van Slyke and Keeler (19) discovered that pasteurizing milk at 143 F for 30 min reduced the CO₂ content. Van Slyke and Baker (18) reported it was possible to remove the CO₂ completely from milk by laboratory vacuum exhaustion. This was verified by Noll and Supplee (12), who were able to

effect significant changes in the gas content of milk by subjecting it to vacuum treatment.

Processing effects upon the freezing point of milk also have been studied by several researchers with some discrepancy among the reports. English workers (3) reported that in-bottle pasteurization at 65 C for 20 min and autoclaving at 220 F for 30 min did not significantly alter the freezing point. The heating of milk to 275 F in a plate type ultra-high temperature heat exchanger was also found to cause no change in the freezing point (1). Investigators (8, 14, 15) reporting on HTST pasteurization have indicated that this method of processing, when properly carried out, does not alter the freezing point of fluid milk. However, Pinkerton and Peters (13) reported a freezing point rise on five trials of 0.0082 C when milk was pasteurized at 169 F for 16 sec. They also noted that prolonged storage of raw milk raised its freezing point. More recently, Moore and Smith (11) showed a correlation between CO₂ loss and freezing point elevation of milk with vacuum treatment of the milk during pasteurization.

These studies suggest that the CO₂ content of milk may vary or change as a result of storage, handling and processing and thus affect the freezing point of milk. The advantage of combining these factors into one study where the same milk is used from the bulk tank through processing to storage in the bottle is evident. Thus, the present study was undertaken to determine if there may be sufficient change in the CO₂ content of milk during normal handling, processing and storage to alter the freezing point.

EXPERIMENTAL

Milk, as obtained by conventional machine milking from the University dairy herd, was strained into a milk can and subsequently pulled by vacuum created by a positive pump from the can and pumped into a portable bulk milk tank where it was cooled to 36 F. The bulk tank after the addition of milk from four milkings was hauled to the dairy plant where the milk was pumped to a storage tank and processed the same day. The milk was clarified, pasteurized at 172 F for 16 sec in a HTST pasteurizer with 80% regeneration, and vacuum treated at 3-4 F tank during each of the four milkings, sampled milk

¹Scientific contribution No. 50, Agricultural Experiment Station, University of Connecticut, Storrs.

(includes 2 F of radiation loss) of flash-cooling after raw regeneration. The product was bottled in glass in a gravity-vacuum filler and stored at 40 F.

Milk samples for freezing point and CO₂ determinations were obtained, during six trials at the end of each of four consecutive milkings, from the bulk tank, subsequently from the plant storage tank, and from glass bottles after processing and storage for 0, 2, and 4 days. Since milk was added to the bulk varied in content from one milking to the next during this period, but thereafter remained the same within each trial.

During the six trials a ten quart milk can was filled with milk from the bulk tank at the end of the first milking. The can of milk was stored at 40 F for 36 hrs. Samples for freezing point and CO₂ determinations were obtained from this milk during six trials after 0, 12, 24, and 36 hours of storage. In this way, the effect of storage on the CO₂ content and freezing point value of raw milk could be studied without the error introduced by the addition of later milkings as would occur in the bulk tank.

The freezing point of milk was determined in duplicate using a model F Fiske cryoscope. The CO₂ content of the milk was determined in duplicate with a Van Slyke blood gas manometric apparatus using the method as described by Van Slyke and Peters (17), but substituting 20% lactic acid for sulfuric acid (18).

Duncan's multiple range test was used to determine independently the statistical significance of the data for the raw milk in the cans and the combined data for the bulk tank, processed and stored milk (2). Statistical significance of the data in the table is expressed by letters so that a milk sample with any letter is significantly different from any other

milk sample that does not have the same letter. A simple coefficient of correlation (16) was determined using all of the combined data to indicate the significance of the relationship between the CO₂ content and freezing point value of milk.

RESULTS AND DISCUSSION

The effect of handling, processing and storage on the CO₂ and freezing point values of milk is shown in Table 1. The data for the milk stored in cans (A) and that for the milk handled through the bulk tank to the storage tank and subsequent processing and storage (B) are combined in this Table.

The can milk data (A) indicate no significant change in the CO₂ content and freezing point of raw milk during 36 hours storage. Processed milk stored for 0, 2, and 4 days (B) showed similar results. Although the partial pressure of CO₂ is higher in milk than in the atmosphere, apparently no material shift of the CO₂ to the atmosphere occurred. CO₂ loss has been shown to result in a rise in the freezing point of milk (11), thus alteration of the freezing point in this case might not be expected since there was no significant change in the CO₂ content. These results differ from the work of Pinkerton and Peters (13) who showed a rise in the average freezing point of raw Jersey and Holstein milk of 0.0022 and 0.0014 C, respectively, after 48 hrs of storage at 0 C.

The data in section B of Table 1, show that the CO₂ content of the bulk tank milk at the end of the second, third and fourth milking periods differed significantly from that of the milk at the end of the first milking. This indicates that the CO₂ content of milk probably differs among milkings since it was shown in the can study that there was no significant CO₂ change due to storage. The CO₂ changes

TABLE 1. CARBON DIOXIDE CONTENT AND FREEZING POINT VALUES OF MILK DURING HANDLING, PROCESSING AND STORAGE

Sample identification	Carbon dioxide			Freezing point		
	Variation (Vol. %)	Mean ^a (Vol. %)	Statistical significance ^b	Variation (-°C)	Mean ^a (-°C)	Statistical significance ^b
CAN MILK						
Raw milk - 0 hr	2.78-4.07	3.40	A	0.536-0.550	0.543	A
Raw milk - 12 hr	2.87-3.89	3.39	A	0.539-0.553	0.544	A
Raw milk - 24 hr	2.80-3.58	3.20	A	0.531-0.552	0.543	A
Raw milk - 36 hr	2.82-3.61	3.23	A	0.536-0.550	0.543	A
BULK TANK MILK						
End of first milking	2.74-4.02	3.40	B	0.537-0.552	0.543	A
End of second milking	3.29-4.27	3.86	A	0.539-0.549	0.543	A
End of third milking	3.10-4.11	3.69	A	0.538-0.553	0.543	A
End of fourth milking	2.59-4.32	3.81	A	0.537-0.550	0.543	A
Storage tank	2.97-3.89	3.40	B	0.530-0.549	0.542	AB
Processed - 0 days	1.26-1.84	1.54	C	0.528-0.546	0.540	AB
Processed - 2 days	1.42-2.07	1.64	C	0.528-0.546	0.539	B
Processed - 4 days	1.31-2.02	1.63	C	0.528-0.545	0.539	B

^aEach mean represents duplicate values on six replicates

^bA sample with any letter is significantly different from any other sample that does not have the same letter.

between milkings apparently were not of sufficient magnitude to result in detectable changes in the freezing points of the milk.

The milk at the end of the fourth milking, as received at the dairy plant from the portable bulk tank (B), differed significantly in CO₂ content, but not in freezing point from the same milk after pumping it into the storage tank. This CO₂ loss may be attributed to the aeration of the milk when it hits the side of the storage tank into which it is pumped. Furthermore, the CO₂ content of the milk in the storage tank was significantly higher than the vacuum treated and pasteurized milk after 0, 2, and 4 days of storage. This loss of CO₂ because of processing was reflected in the freezing points of the same milk. There was a rise in freezing point after processing although the change was not significant unless the milk at the end of the fourth milking is compared with the processed milk. The loss of CO₂ and apparent freezing point rise during processing has been previously shown (11) to be the result of vacuum

redundant. This decision was made in spite of the unexplained different results noted by Pinkerton and Peters (13) in which freezing point rise attributed to pasteurization was even greater than that which has been reported for vacuum exhaustion of milk (11).

The simple correlation coefficient between CO₂ content and freezing point value for all of the combined data (Table 1) was 0.397 ($P < 0.01$). This substantiates previous results (11) in which a loss in the carbon dioxide content of milk was shown to correlate with a rise in the freezing point.

The results as reported in this study indicate that there are significant changes in the CO₂ content among different milks and because of vacuum treatment. Furthermore, these changes are positively correlated with changes in the freezing point value. However, variations in the freezing point may not be of practical significance since the greatest average difference in the freezing point was 0.004 C between milk at the end of the fourth milking and after processing. The major portion of this change may be attributed to vacuum treatment. Storage of raw and vacuum pasteurized milk, routine handling, and HTST pasteurization did not materially alter the freezing point.

It may be concluded that routine handling, processing and storage of milk will not alter the freezing point sufficiently to create problems for regulatory officials attempting to detect water adulteration of milk. Vacuum treatment may create problems with the detection of watering of milk in borderline cases. In such cases an adjustment for the freezing point change can be made (10, 15).

TABLE 2. INFLUENCE OF PASTEURIZATION UPON THE FREEZING POINT OF MILK

Trial	Freezing point ^a		Freezing point elevation ^c
	Raw	Pasteurized ^b	
	(-°C)	(-°C)	(-°C)
1	0.550	0.549	+0.001
2	0.532	0.532	0.000
3	0.547	0.546	+0.001
4	0.542	0.541	+0.001
5	0.537	0.537	0.000
6	0.531	0.530	+0.001
7	0.535	0.534	+0.001
8	0.545	0.545	0.000
9	0.546	0.545	+0.001
10	0.537	0.538	-0.001
11	0.542	0.542	0.000
12	0.540	0.540	0.000
Avg.	0.5403	0.5399	+0.0004

^aAverage of duplicates

^bPasteurized at 172°F. for 16 sec.

^cPasteurized milk in comparison to raw milk.

treatment. The relative insignificance of the freezing point rise after processing in this study as compared to previous research (10) may be because at the reduced vacuum used in this study there was only 1-2 F of flash-cooling of the milk if radiation losses are considered.

The use of HTST pasteurization in comparison with vacuum pasteurization in this study was not considered warranted. The results of several investigators (1, 3, 8, 14, 15) and the data in Table 2 from previously unpublished work (9), indicating no marked change in the freezing point of milk because of HTST pasteurization, prompted the decision that the above inclusion in the study would have been

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Sanitarian's Award Contest Announced

EACH OF YOU MUST KNOW A SANITARIAN WHO HAS DEMONSTRATED TO A HIGH DEGREE THE QUALITIES AND CHARACTERISTICS SPECIFIED AS CRITERIA FOR SELECTION OF THE WINNER IN THIS COMPETITION. DO HIM THE HONOR OF ENTERING HIS NAME. NO NEED TO WORRY ABOUT YOUR NOT BEING ABLE TO COMPOSE A STORY THAT MAKES FASCINATING READING. THE SELECTION IS BASED ON FACTS, NOT PRESENTATION. YOUR NOMINEE WILL BE COMPETING WITH SOME OF THE WORLD'S BEST SANITARIANS. EVEN THOUGH HE MAY NOT BE SINGLED OUT AS THE WINNER, HE WILL BE IN A SELECT COMPANY OF UNPUBLICIZED SANITARIANS WHOSE PERSONAL DEDICATION HAS HELPED SAVE MANY LIVES AND EXTENDED THE USEFUL LIFE SPAN FOR A HOST OF OTHERS.

Each year at its Annual Meeting the International Association of Milk and Food Sanitarians makes an award of \$1,000 to the sanitarian selected as outstanding in his performance and as best exemplifying the ideals of his profession. The following rules and procedures have been established governing the competition:

The Award consists of a Certificate of Citation and \$1,000 in cash, and is sponsored jointly by the Diversy Corporation, Klenszade Products, Inc., Oakite Products, Inc., Pennsalt Chemicals Corporation, and the Olin Mathieson Chemical Corporation. It is administered by the International Association of Milk and Food Sanitarians, Inc., and is presented annually. The next presentation will be at the Annual Meeting of the Association in Toronto next October.

Eligibility

The rules concerning eligibility of candidates for nomination are:

(1) Any living citizen of the United States or Canada who, at the time of nomination, is employed as a professional milk and food sanitarian, or both, by county or municipality, is eligible for the Award, except members of the Executive Board and members of the Committee on Recognition and

Awards of the International Association of Milk and Food Sanitarians, Inc. Employees of State or Federal agencies and of industry are not eligible for the Award. Membership in the International Association of Milk and Food Sanitarians, Inc., is not a prerequisite of eligibility, and there are no restrictions as to race, sex or age.

(2) A candidate shall have made a meritorious contribution in the field of milk and food sanitation to the public health and welfare of a county or municipality within the United States or Canada.

(3) The achievements and contributions on which the Award is to be based, must have been completed during the five-year period immediately preceding January 1 of the year during which the Award is to be made. Under special circumstances, consideration will be given to related work accomplished by the candidate during the seven-year period preceding January 1 of the year during which the Award is to be made.

(4) Co-workers are eligible for nomination if both have contributed equally to the work upon which the nomination is based.

(5) No person who has once received the Award shall be eligible for nomination.

Nominations

Nominations of candidates for the Sanitarians Award may be submitted by the Affiliate Associations of the IAMFS, or by any member of the Association in good standing except members of the Executive Board, members of the Committee on Recognition and Awards, and employees of the sponsoring companies. Nominations from persons who are not members of the Association cannot be accepted. No member or Affiliate may nominate more than one candidate in any given year.

Each nomination must be accompanied by factual information concerning the candidate, a resume of his work and achievements, evidence supporting his achievements and if available, reprints of publica-

be obtained upon request from H. L. Thomasson, Executive Secretary, International Association of Milk and Food Sanitarians, Inc., P. O. Box 437, Shelbyville, Indiana.

Deadline for Submission of Nominations

The deadline for submission of nominations is set annually, and all nominations and supporting evidence must be postmarked prior to midnight of that date. The deadline for this year's competition is June 1, 1964.

Selection of the Recipient

The Committee on Recognition and Awards of the International Association of Milk and Food Sanitarians, Inc., has full responsibility for selecting from among the candidates nominated the recipient of the Sanitarians Award. In judging the contributions of each candidate, the Committee will give special consideration to (a) originality of thought, mode of planning, and techniques employed, (b) the comprehensive nature of the candidate's achievements,

tions. A form for the submission of nominations may and (c) their relative value as they affect the health and welfare of the candidate's community. The Committee will give consideration also to the efforts of the candidate to establish professional recognition in the community in which he serves, as well as to his research, administrative development program operation and educational achievements. Additional information or verification of submitted information will be requested when considered necessary by the Committee. Testimonial letters in behalf of a candidate are not desired.

If, after reviewing the nominations and supporting evidence, the Committee decides that the work and achievements of none of the candidates have been significantly outstanding, the Award shall not be made. In this connection, it is fundamental that if meritorius professional achievement cannot be discerned the Award shall be omitted for a year rather than to lower the standards for selections of a recipient.

COMPARISON BETWEEN STANDARD METHODS PROCEDURE AND A SURFACE PLATE METHOD FOR ESTIMATING PSYCHROPHILIC BACTERIA IN MILK¹

J. D. PUNCH AND J. C. OLSON, JR.

Department of Dairy Industries
University of Minnesota, St. Paul

(Received for publication September 23, 1963)

SUMMARY

Psychrophilic population levels were determined by Standard Methods procedure (1) and a surface plate method. Thirty-one samples of raw milk, 47 samples of commercial pasteurized milk, and 94 samples of milk containing pure cultures of selected psychrophiles were used in the comparisons. A statistical evaluation of the results indicated counts obtained by the surface plate method after incubation of the plates for five days at 6C were equivalent to counts obtained by the standard procedure after incubation for 7-8 days at 6C. Colonies on the surface plates were larger, more uniform in size, and consequently easier to count than those on poured plates. Also, enhanced pigmentation and more characteristic colonial morphology was observed with surface plates. Approximately 80% of the pinpoint colonies appearing on the poured plates after 8 days and on the surface plates after 7 days of incubation at 6C were Gram-positive cocci indicating the emergence of colonies of organisms not considered to be psychrophilic species important to the shelf life of milk.

The rapid enumeration of psychrophilic bacteria is of concern to the dairy industry as well as other branches of the food industry. The current edition of *Standard Methods for the Examination of Dairy Products* (1) recommends the incubation of plates at 5-7 C for 7-10 days for obtaining a psychrophilic count. This is in recognition of the fact that with present knowledge, the only means of selective culture of psychrophilic bacteria from a mixed flora is through low temperature incubation. Under such conditions the time necessary for the appearance of visible colonies is increased several fold over that needed at higher temperatures. Consequently, the standard procedure for the enumeration of psychrophilic bacteria is too long to be of great practical value in commercial operations.

In an attempt to render psychrophilic enumeration more practical by reducing the time required for incubation, many investigators have proposed selective methods based on one or more characteristics of psychrophilic bacteria. The most recent efforts appear to be focused on the Gram-negative characteristic (15). For example, violet red bile agar (4),

penicillin in agar (11), Nacconal NR-SF (3), and standard plate count agar with 1 ppm crystal violet (7) have been used at elevated temperatures to measure psychrophilic activity. However, all these procedures have a common deficiency in that the activity of non-psychrophiles Gram-negative mesophiles is not differentiated from psychrophilic Gram-negative mesophiles.

In connection with certain other studies relative to the growth of pure cultures of psychrophiles, it was noted that surface colonies on agar plates always were detectable sooner and were much larger than subsurface colonies. The aerobic nature of psychrophilic bacteria has been recognized for some time. The present paper deals with the utilization of this common characteristic of aerobiosis in an attempt to obtain counts more rapidly at temperatures (5-7 C) selective for psychrophilic bacteria. This was accomplished using a plating technique which resulted only in the appearance of surface colonies. The results were compared with counts obtained by the standard pour plate procedure (1).

MATERIALS AND METHODS

Three groups of samples were used for a comparison between the counts obtained by the surface plating method and the standard procedure. One group was prepared by inoculating commercial pasteurized milk with pure cultures of psychrophilic bacteria. Twenty-six different cultures were used: 8 *Pseudomonas fluorescens*, 2 *Ps. fragi*, 1 *Ps. viscosa*, 3 *Ps. sp.*, 1 *Alcaligenes metalcaligenes*, 1 *Alc. viscolactis*, 1 *Chromobacterium sp.*, 1 *Flavobacterium sp.*, 6 coliforms, and 2 yeasts. The other two groups were composed of commercial raw and pasteurized milk samples.

The samples were plated according to the standard procedure as recommended in *Standard Methods* (1) and the surface plating method. The surface plating method was as follows. Sterile glass rods, 200 mm long and 2 mm in diameter were bent to the general shape of a hockey stick. The portion of the rod actually used to spread the inoculum over the agar was approximately 40 mm in length. These glass rods were used to spread inoculum over previously poured plates containing plate count agar

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(Difco). Approximately 12 ml of medium were used per plate. Plates were stored in an upright position for 18-30 hours at room temperature prior to inoculation. (An alternate procedure involved storage of the plates for a period of 1 to 4 days in a refrigerator maintained at $4\text{ C} \pm 0.5\text{ C}$ with a relative humidity of 50%.) This permitted excess moisture to evaporate from the surface of the medium. At the time of plating, several rods were maintained in a chlorine solution (500 ppm). Prior to spreading the inoculum, the rods were rinsed with sterile distilled water.

Ten-fold dilutions of samples were prepared using buffered distilled water (1). One-tenth ml of each dilution was placed on each of duplicate plates. Beginning with the plate containing the highest dilution of the sample, the inoculum was spread evenly over the surface of each of duplicate plates with the sterile glass rod. Temperature of incubation of plates was maintained at $6\text{ C} \pm 0.5\text{ C}$. Plates prepared from the samples containing the pure cultures were counted after 5 days, while plates prepared from the raw and pasteurized milk samples were counted after 4, 5, 6 and 7 days. Counting was done in the incubator thus avoiding any variation in incubation temperature.

Plates prepared in accordance with *Standard Methods* (1) were counted after 6, 7, 8, 9 and 10 days of incubation at 6 C. In general, plates containing approximately 30-125 colonies were selected for counting. Plates with less than 30 colonies were excluded. Plates with more than 125 colonies after 4 or 5 days of incubation were too crowded to allow the detection of new colonies appearing during the latter stages of incubation; hence, such plates also were excluded.

The logarithms of the counts obtained by both methods (and after various periods of incubation of the plates containing the pasteurized and raw milk samples) were determined. Statistical analysis was applied using the student "t" test for paired observations (13).

Smears of pinpoint colonies which appeared on the surface plates after 7 days and on the poured plates after 9 to 10 days of incubation were Gram-stained and observed for staining reaction and morphology.

RESULTS

Figure 1 is representative of the appearance of colonies on surface inoculated plates after incubation at 6 C for 4, 5 and 6 days. The colonies of all pure cultures studied were readily discernible on the 5-day plates. Actually, the plates were countable after 4 days; however, colonies of a few cultures were too small for ease of counting. Incubation periods be-

yond 6 days frequently resulted in colonies fusing together, thus materially interfering with accurate counting.

The appearance of colonies on standard poured plates after 4, 7 and 8 days of incubation at 6 C is shown in Figure 2. No colonies are visible after 4 days, and ease of counting was not experienced until after 7 or 8 days of incubation. Even then, many subsurface colonies were difficult to detect. The contrast between colonies on surface plates and poured plates can readily be observed by comparing the 5- or 6-day surface plate with the 7- or 8-day standard poured plate. The colonies on the surface inoculated plate are large, uniform in size and consequently readily countable. Surface colonies on the standard poured plate are similar. However, subsurface colonies are small and the colonial appearance is not consistent as a result of the large variation in colony size. Although the preceding plates were inoculated with a pure culture (*Pseudomonas fragi*), plates containing a mixed flora as found in raw or pasteurized milk had a similar appearance.

Often pinpoint colonies were observed on the surface inoculated plates after incubation for approximately 7 days. These were marked and selected for Gram-staining. The pinpoint colonies appearing on the poured plates during the latter stages of incubation were more difficult to select since the initial subsurface colonies were still very small. Colonies from the poured plates were selected after 9-10 days of incubation. Smears from 67 colonies appearing on the surface plates after 7 days and on the poured plates after 9 to 10 days of incubation were Gram-stained. Microscopic examination of the smears revealed that approximately 80% of them were Gram-positive cocci. Assuming that cocci are relatively unimportant in psychrophilic deterioration of milk (2, 9, 10), incubation of plates for extended periods may result in the counting of these bacteria.

Table 1 shows the results of a series of comparisons that were made. For the 94 samples containing 26 pure psychrophilic cultures, 5-day surface counts were compared with 7-day standard counts. The ratio of average counts of 1.05 indicates that the logarithmic average counts were almost identical. No significant difference was noted at the 95% confidence level using the student "t" test for paired observations. Similarly, for the series of counts on pasteurized milk, the same average 5-day surface counts and 7-day standard counts were observed, while for the raw milk counts, the 5-day surface counts were slightly, though significantly, higher than the 7-day standard counts. No significant difference was observed between the 5-day surface and 8-day standard counts of the raw milk samples. For the pasteurized milk samples, the 8-day standard



Figure 1. Surface plates containing colonies of *Pseudomonas fragi* after incubation at 6 C for 4 days (B-Su-4), 5 days (B-Su-5), and 6 days (B-Su-6).

TABLE 1. INTERRELATIONSHIPS BETWEEN PSYCHROPHILIC COUNTS BY DIFFERENT PLATING METHODS AND DIFFERENT PERIODS OF INCUBATION AT 6 C

Type	Samples Number	Ratios of average counts ^a			
		5-day S ^b 6-day S	5-day S 7-day SPC ^c	5-day S 8-day SPC	7-day SPC 8-day SPC
Pure Cultures	94	--	1.05 ^d	--	--
Past. Milk	47	.945	1.00 ^d	.936 ^e	.934
Raw Milk	31	.982	1.10 ^e	1.04 ^d	.937

^aRatios determined from antilogs of log averages

^b = Surface Plate Method with incubation time indicated

^cSPC = Standard Plate Count with incubation time indicated

^dNot significantly different at the 0.05 level

^eSignificantly different at the 0.05 level

counts were significantly higher than the 5-day surface counts.

When the 5-day surface counts were compared with the 6-day surface counts, the 6-day counts were slightly higher. Likewise, the 8-day standard counts were slightly higher than the 7-day standard counts. This difference was attributed to the appearance of small pinpoint colonies which, as pointed out previously, were largely Gram-positive cocci.

While differences are indicated in the results compared, it is felt that for all practical purposes the

differences are negligible, and that the counts obtained after 7 to 8 days on poured plates could be obtained in 5 days from surface plates. In addition to being able to count the surface plates at least 2 days and frequently 3 days before comparable poured plates could be accurately counted, the colonies on the surface plates were larger, more uniform in size, easier to count, and did not spread or swarm. Subsurface colonies on the poured plates were very small, even after incubation for 10 days. Spreading and swarming colonies were also observed on poured plates. Colonial characteristics and pigmentation were markedly enhanced on surface plates, allowing for rapid detection of certain characteristic psychrophilic species.

DISCUSSION

Any enumeration procedure designed solely for estimating the population level of psychrophilic bacteria in milk, other foods, or industrial products must conform to the limitations imposed in the definition of such psychrophilic bacteria. What may be considered psychrophilic bacteria in one perishable commodity may not be important in other food products

stored at a different temperature. Hence, the definition and enumeration procedure for psychrophilic bacteria in milk must include and measure only those bacteria which are capable of relatively rapid growth during the normal storage time at common refrigeration temperatures (0-7 C). Only those bacteria which are associated with spoilage and deterioration under such conditions should be termed psychrophilic, although some mesophilic Gram-positive and Gram-negative bacteria normally present in milk do proliferate very slowly at temperatures of 0-7 C. However, as pointed out by other investigators (2, 5, 8, 9, 10), these microorganisms are not responsible for the product deterioration under normal storage conditions.

Most industrial bacteriologists prefer to define psychrophilic bacteria on the basis of their ability to proliferate and become the primary flora under specific conditions. The actual conditions specified depend upon the product under consideration. The procedure, as given in *Standard Methods* (1), involves incubation of plates at 5-7 C for 7-10 days. That this procedure actually detects a diversified flora of rapid- and slow-growing bacteria, depend-

ing upon whether plates are incubated for 7 days or 10 days, is suggested by the data presented in this paper. It would appear desirable from the standpoint of clarity and consistency to establish a definite time-temperature standard for the enumeration of psychrophilic bacteria in dairy products. Our results indicate that a standard of 6 C for 5 days, using surface inoculated plates, gives counts equivalent to those obtained with poured plates incubated at 6 C for 7 or 8 days. Incubation of plates, either surface or poured, beyond the above periods may result in the inclusion of the relatively unimportant Gram-positive cocci.

Many surface plating methods have been previously proposed for the enumeration of specific and non-specific groups of bacteria. Burri (1) developed a simple test in which a standard loopful of milk is spread over the surface of an agar slant. Mallmann et al. (5) adapted the surface-drop technique of Tomales-Libron and Fernandos (14) for the enumeration of bacteria in raw and pasteurized milk. These methods are not readily applicable to the enumeration of psychrophiles since only 0.01 ml of the sample is examined, and consequently only high

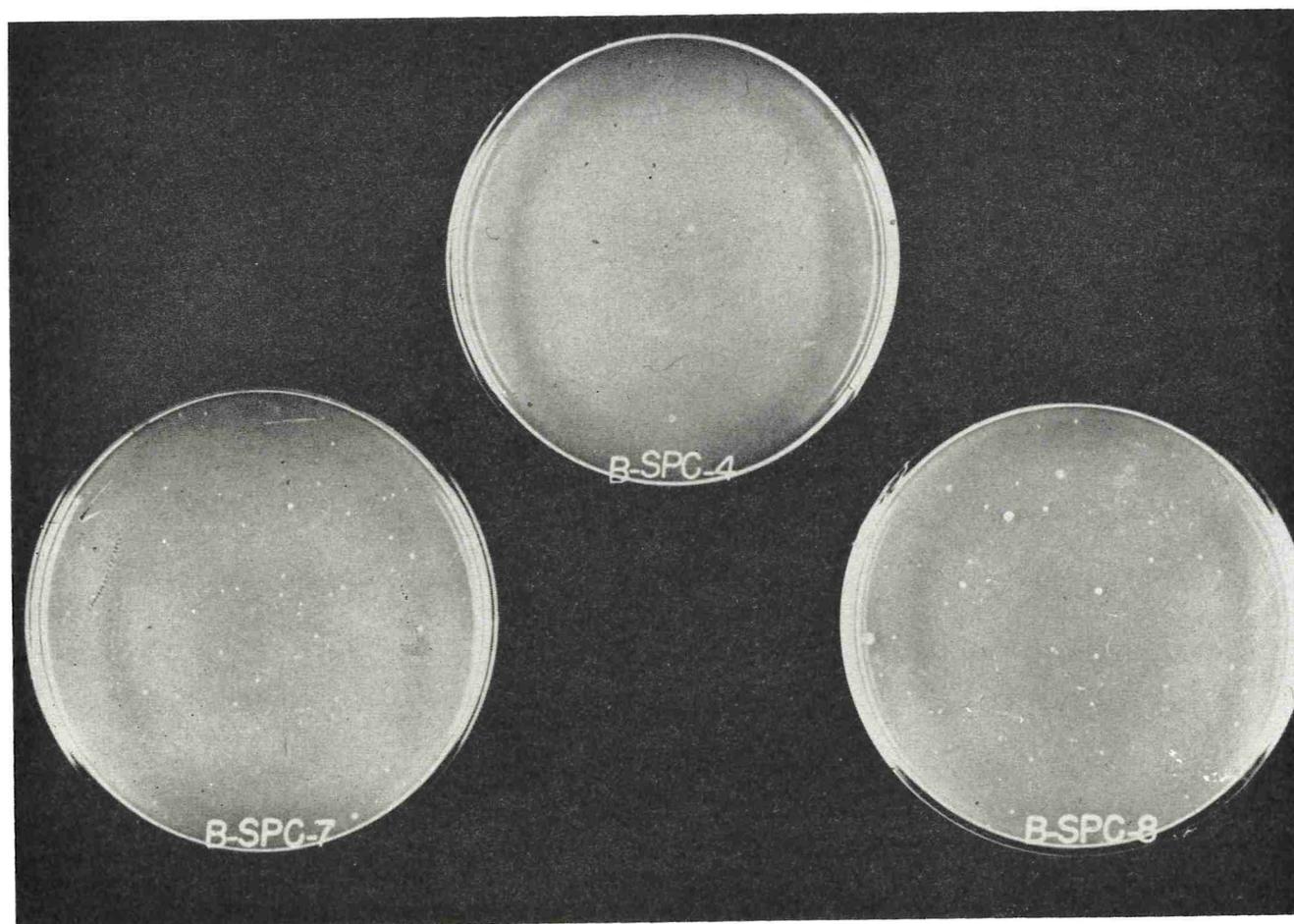


Figure 2. Standard poured plates containing colonies of *Pseudomonas fragi* after incubation at 6 C for 4 days (B-SPC-4), 7 days (B-SPC-7), and 8 days (B-SPC-8).

psychrophilic population levels could be detected.

Snyder (12) reported that the relative error and variability of a surface plating method similar to the procedure described in this paper were slightly less than those observed for the standard poured plate method. He recommended more extensive use of surface plating methods since surface plates are more conducive to replication, can be prepared on a large scale in advance, and can be more rapidly and conveniently inoculated than poured plates.

Although the surface plating method was observed to have certain advantages (including a 2-5 day reduction in incubation time) over the standard procedure for estimating psychrophilic bacteria in milk, the 5-day incubation period necessary for the appearance of countable colonies on surface inoculated plates is still too long to be of maximum value in routine quality control programs. Furthermore, the examination of 0.1 ml of milk would not be adequate in the case of freshly pasteurized milk where the presence of only a few psychrophiles can markedly affect the keeping quality. A procedure whereby psychrophilic bacteria can be accurately enumerated in 24-48 hours is needed. However, at the present time, the only common characteristic that is applicable to selective culture of psychrophilic bacteria is based on their ability to proliferate rapidly at low temperatures.

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Committees Of The International Association Of Milk, Food And Environmental Sanitarians, Inc. For 1964

COMMITTEE ON APPLIED LABORATORY METHODS

(Appointments expire in Aug. 1964)

OBJECTIVES

To study new laboratory procedures and bacteriological problems to evaluate both published and unpublished data, and to present conclusions which will be helpful to the sanitarian in the conduct of his work.

MEMBERS

- J. J. Jezeski, *Chairman*, Department of Dairy Industries, University of Minnesota, St. Paul 1, Minnesota.
- A. R. Brazis, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati, Ohio.
- P. R. Elliker, Oregon State University, Department of Bacteriology, Corvallis, Oregon.
- L. G. Harmon, Dairy Department, Michigan State University, East Lansing, Michigan.
- B. Heinemann, Producers Creamery Company, Springfield, Missouri.
- J. L. Henderson, 425 Battery Street, Foremost Dairies, San Francisco, California.
- A. C. Maack, Swift and Company, Union Stockyards, Chicago 9, Illinois.
- J. C. McCaffrey, Illinois Department of Health, 611 Lakeview Terrace, Glen Ellyn, Illinois.
- F. E. Nelson, Department of Dairy Science, University of Arizona, Tucson, Arizona.
- D. I. Thompson, Wisconsin Laboratory of Hygiene, Madison, Wisconsin.

COMMITTEE ON COMMUNICABLE DISEASES AFFECTING MAN

(Appointments expire in 1965)

OBJECTIVES

To study problems related to those diseases communicable to man through the consumption of foods, including milk and milk products, meat, poultry, and shellfish, and to recommend specific measures that can be taken by the sanitarian to control such diseases.

MEMBERS

Stanley L. Hendricks, *Chairman*, Assistant Director, Preventable Disease Division, State Department of Health, State Office Building, Des Moines 19, Iowa.

P. N. Travis, Supervisor, Milk Sanitation, Jefferson County Health Department, Post Office Box 2591, Birmingham, Alabama.

John Andrews, Chief, Sanitation Section, Sanitary Engineering Division, State Board of Health, Raleigh, North Carolina.

Calvin E. Sevy, Staff Veterinarian, Milk and Food Branch, DEEFP, USPHS, Department of Health, Education, and Welfare, Washington, D. C.

H. L. Bryson, Director, Environmental Sanitation Division, Vancouver Health Department, 456 West Broadway, Vancouver, British Columbia, Canada.

Dwight D. Lickty, Public Health Veterinarian, Post Office Box 29, West Palm Beach, Florida.

E. R. Price, Director, Bureau of Veterinary Public Health, Missouri Department of Public Health and Welfare, State Office Building, Jefferson City, Missouri.

Charles Hunter, Public Health Laboratories, National Reserve Building, Topeka, Kansas.

Robert K. Anderson, Professor of Bacteriology and Public Health, School of Veterinary Medicine, University of Minnesota, St. Paul 1, Minnesota.

COMMITTEE ON BAKING INDUSTRY EQUIPMENT

(Appointments expire in Aug. 1964)

OBJECTIVES

The objectives of this committee are to provide consultative assistance to the Baking Industry Sanitation Standards Committee in the development of Standards for items in the baking industry.

MEMBERS

Vincent T. Foley, *Chairman*, Chief of Food, City Health Department, 21st Floor, City Hall, Kansas City 6, Missouri.

A. E. Abrahamson, Chief, Wholesale Division, City Health Department, 125 Worth Street, New York 13, New York.

Lewis W. Pickles, Director, Division of Sanitation, City Health Department, Room 202 City Hall, Peoria, Illinois.

Armin A. Roth, 421 N. Rosevere, Dearborn, Michigan.

Harold Wainess, Wainess and Associates, 510 N. Dearborn, Chicago 10, Illinois.

Louis A. King, Jr., Director, Department of Bakery Sanitation, American Institute of Baking, 400 E. Ontario Street, Chicago 11, Illinois.

COMMITTEE ON DAIRY FARM METHODS

(Appointments expire in 1965)

OBJECTIVES

To study dairy farm methods and procedures, to determine the sanitary problems involved, and to make recommendations for the solution of such sanitary problems, and for the improvement of dairy farm methods which have a relationship to the sanitary quality of milk.

MEMBERS

A. K. Saunders, *Chairman*, Mgr. Farm Products Division, Monarch Chemicals, Inc., P. O. Box 666, Mundelein, Illinois.

Harry Atherton, Dairy Science Department, University of Vermont, Burlington, Vermont.

Sydney H. Beale, Michigan Milk Producers Association, 24270 W. Seven Mile, Detroit, Michigan.

George D. Coffee, Division of Milk and Veterinary, District of Columbia Department of Public Health, 300 Indiana Avenue, N. W., Washington 1, D. C.

John Dean, Dean Milk Company, Rockford, Illinois.

Farm Methods Committee, All State Affiliates.

J. C. Flake, Evaporated Milk Association, 228 N. LaSalle Street, Chicago 1, Illinois.

Milton E. Held, Regional Milk and Food Consultant, Public Health Service, Region IX, 447 Federal Office Building, San Francisco, California.

R. C. Hellensmith, Cleveland Milk Federation, Cleveland, Ohio.

Elmer Kihlstrum, Johnson & Johnson, Filter Products Division, 4949 W. 65th Street, Chicago 38, Illinois.

Lyman C. Knierem, Jr., L. K. Quality Service, 2644 McCoy Way, Louisville, Kentucky.

William McCorquodale, Ontario Milk Producers, 409 Huron Street, Toronto, Ontario, Canada.

Richard M. Martin, Sanitarian in Charge of Milk Sanitation, Ohio Department of Health, 306 Ohio Departments Building, Columbus 15, Ohio.

R. W. Metzger, Director of Quality Control, Dairyman's League Cooperative Ass'n., Inc., 402 Park Street, Syracuse, New York.

Vernon Nickel, Milk Control Section, Department of Public Health, 416 10th Street, Crystal City, Missouri.

Douglas J. Norton, Dairy Division, The DeLaval Separator Company, Poughkeepsie, New York.

Alexander A. Pais, Supervisor of Milk Sanitation, 2411 North Charles Street, Baltimore, Maryland.

A. E. Parker, Chief, Milk Section, City of Portland Health Department, Portland, Oregon.

Albert R. Pernice, Mitchell Dairy Company, Bridgeport 6, Connecticut.

Bernard Saffian, Chamberlain Laboratories, P. O. Box 624, Fishcreek Road, Stow, Ohio.

James B. Smathers, Maryland and Virginia Milk Producer's Ass'n., Inc., 1530 Wilson Boulevard, Arlington 9, Virginia.

Harry F. Stone, Milk Control Section, Department of Public Health, St. Louis 3, Missouri.

CONSULTANTS

George Babson, Jr., Babson Brothers Company of New York, 842 W. Beldon Avenue, Syracuse, New York.

Chester F. Bletch, Maryland and Virginia Milk Producer's Association, Inc., 1530 Wilson Boulevard, Arlington 9, Virginia.

James Deming, Farm Products Division, The Diversey Corporation, 212 West Monroe Street, Chicago, Illinois.

T. A. Evans, Dairy Extension, College of Agriculture, University of Nebraska, Lincoln 8, Nebraska.

Burdette Fisher, Kyanna Cooperative Milk Producer's Association, Inc., Louisville, Kentucky.

Clarence C. Gehrman, Area Supervisor, Department of Agriculture, Olympia, Washington.

M. W. Jefferson, Chief, Dairy Products, Sanitation Section, 1308 Franklin Street, Richmond 19, Virginia.

R. P. March, Associate Professor, Dairy Industry Department, Cornell University, Ithaca, New York.

William Nasson, Chief of Milk Section, San Francisco Health Department, San Francisco, California.

Mike O'Connor, Seattle King County Milk Division, 425 South Garden, Bellingham, Washington.

William Pickavance, Universal Milking Machine Division, Albert Lea, Minnesota.

Ethan Rasmussen, Iowa Nebraska Milk Producer's Association, Omaha, Nebraska.

Herman Schmidt, Hoard's Creameries, Fort Atkinson, Wisconsin.

Stephen B. Spencer, Extension Dairyman, Pennsylvania State College, University Park, Pennsylvania.

Roy Stein, Oregon State University, Corvallis, Oregon.

Norman Taylor, Rhode Island Association of Dairy and Food Sanitation, Box 22, Warwick, Rhode Island.

William Trobaugh, Milk Sanitation Section, City and County Department of Health and Hospitals, 659 Cherokee Street, Denver 4, Colorado.

COMMITTEE ON ENVIRONMENTAL HEALTH PROGRAMS

(Appointments expire in 1965)

OBJECTIVES

To study conditions and practices, to work with other groups in the development of standards, recommended practices, manuals, etc., and to develop program needs in the following areas (other than Milk and Food) which includes: Housing, Hospital and Institutional Sanitation, Water Supply, Sewerage Systems, Air Pollution, Swimming Pools, Accident Prevention, Vector Control, Radiation, Insecticides, Pesticides and Fumigants.

MEMBERS

Harold B. Robinson, *Chairman*, Department of Health, Education, and Welfare, USPHS, Washington, D. C.

Richard Bond, University of Minnesota, Minneapolis, Minnesota.

Richard Clapp, Community Services Training Section, Training Branch, Communicable Disease Center, Atlanta 22, Georgia.

Cameron Adams, Department of Agriculture, Dairy and

Food Division, Post Office Box 120, Olympia, Washington.

James Barringer, 1703 Oneida Street, Joliet, Illinois.

John B. Drake, Senior Licensing Consultant, Hospitals and Nursing Homes Section, State Department of Health, Seattle, Washington.

Maxwell Wilcomb, Professor of Sanitary Science, University of Oklahoma, Norman, Oklahoma.

Arthur E. Williamson, Director, Environmental Sanitation, State Health Department, Cheyenne, Wyoming.

John J. Sheuring, Department of Dairying, University of Georgia, Athens, Georgia.

Alfred L. Klatte, Director, Bureau of Environmental Sanitation, Division of Public Health, Health and Hospital Corporation, Marion County, Indianapolis, Indiana.

Paul Rankin, Department of County Health Administration, Mississippi State Board of Health, Jackson, Mississippi.

COMMITTEE ON FOOD EQUIPMENT

(Appointments expire in Aug. 1964)

OBJECTIVES

To participate with other health organizations and industries in the formulation of sanitary standards and educational materials and to represent the International Association specifically with (a) National Sanitation Foundation, (b) Automatic Merchandising Health-Industry Council, and (c) when directed by the Executive Board, to cooperate with other health and industry groups on food equipment sanitary guides. To present to the membership at the Annual Meeting those standards or other materials which the Committee recommends be endorsed or approved by the Association.

MEMBERS

Karl K. Jones, *Chairman*, Retail Food Section, Division of Food and Drugs, Indiana State Board of Health, 1330 West Michigan Street, Indianapolis 7, Indiana.

James W. Bell, National Cannery Association, 1133 20th Street, N. W., Washington 6, D. C.

J. Schoenberger, Supervisor of Equipment Section, City Department of Health, 125 Worth Street, New York 13, New York.

Eaton E. Smith, Chief, Food Division, Department of Consumer Protection, Food and Drug Commission, State Office Building, Hartford 15, Connecticut.

R. L. Cooper, Administrative Assistant, Calloway County Health Department, Murray, Kentucky.

Edward J. Puscus, Director of Sanitation, Oak Ridge Health Department, Municipal Building, Oak Ridge, Tennessee.

Harold Wainess, Wainess and Associates, 510 Dearborn Street, Chicago, Illinois.

COMMITTEE ON FROZEN FOOD SANITATION

(Appointments expire in Aug. 1964)

OBJECTIVES

To study conditions and practices within the frozen food industry, to determine the sanitary problems involved which might contribute to a public health hazard, and to make recommendations for the solution of such problems.

MEMBERS

Frank E. Fisher, *Chairman*, Division of Food and Drugs, Indiana State Board of Health, 1330 West Michigan Street, Indianapolis, Indiana.

Glenn C. Slocum, Director, Division of Microbiology, Bureau of Biological and Physical Sciences, Food and Drug Administration, Washington 25, D. C.

H. P. Schmitt, Research Director, National Association of Frozen Food Packers, 919 18th Street, N. W., Washington, D. C.

G. L. Hays, Bacteriological Group, American Can Company, Central Division, 11th Avenue and St. Charles Road, Maywood, Illinois.

Eaton E. Smith, Food Division, Department of Consumer Protection, Food and Drug Commission, State Office Building, Hartford, Connecticut.

A. C. Leggatt, Department of Dairy Science, Ontario Agricultural College, Guelph, Ontario, Canada.

George E. Prime, Assistant Chief, Food Sanitation Section, Milk and Food Branch, Public Health Service, Washington 25, D. C.

COMMITTEE ON ORDINANCES AND REGULATIONS PERTAINING TO MILK AND DAIRY PRODUCTS

(Appointments expire in 1965)

OBJECTIVES

To review and study the provisions of sanitary ordinances and regulations pertaining to milk, and dairy products, to evaluate data on research findings relative to the sanitary and public health significance of the specific requirements of ordinances and regulations, and to prepare for submission to the members of the Association, recommendations for changes in existing ordinances and regulations.

MEMBERS

Donald H. Race, *Chairman*, Dairymen's League Cooperative Association, Inc., Quality Control, 402 Park Street, Syracuse, New York.

C. V. Christianson, Director of Laboratories, Bowman Dairy Company, 140 West Ontario Street, Chicago, Illinois.

A. B. Freeman, Regional Program Director, Public Health Service, U. S. Department of Health, Education, and Welfare, Region I, 120 Boylston Street, Boston 16, Massachusetts.

K. A. Harvey, District Supervising Sanitarian, South Central District Health Department, 309 Second Avenue, East, Twin Falls, Idaho.

Howard K. Johnston, Principal Sanitarian, Division of Milk Sanitation, Bureau of Foods and Chemistry, Department of Agriculture, 1241 Old Boalsburg Road, State College, Pennsylvania.

Frank L. Kelley, Kansas State Board of Health, Food and Drug Division, State Office Building, Topeka, Kansas.

David Monk, Sanitarian, Wichita-Sedgwick County Health Department, 1900 East 9th Street, Wichita, Kansas.

R. M. Parry, Chief, Dairy Division, Department of Agriculture, State of Connecticut, Hartford 15, Connecticut.

A. E. Reynolds, California Department of Agriculture, 1220 N Street, Sacramento 14, California.

Louis Smith, Kentucky State Health Department 275 East Main Street, Frankfort, Kentucky.

Livingston Jennings, National Dairy Products Corporation, 260 Madison Avenue, New York 16, New York.

Ed Small, Standardization and Program Development Bureau, Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C.

John F. Speer, Jr., International Association of Ice Cream Manufacturers, 1105 Barr Building, 810 17th Street, N. W., Washington 6, D. C.

Stephen J. Wolff, Pevely Dairy Company, 1001 South Grand Boulevard, St. Louis 4, Missouri.

COMMITTEE ON SANITARY PROCEDURES

(Appointments expire in Aug. 1964)

OBJECTIVES

To participate jointly with the Sanitary Standards Subcommittee of the Dairy Industry Committee and the Milk and Food Branch, U. S. Public Health Service, in the formulation of 3-A Sanitary Standards for dairy equipment. Specifically, the functions of this committee are: (1) to receive, consider, and comment on proposed sanitation standards for dairy equipment submitted by the Dairy Standards Subcommittee; (2) to bring to the attention of the Sanitary Standards Subcommittee items of dairy industry equipment and methods for which formulation of sanitary standards appear desirable; and (3) to cooperate with the Dairy Industry Committee, the U. S. Public Health Service, and health officials in attaining universal acceptance of the sanitary standards upon which mutual agreement has been reached.

MEMBERS

D. B. Whitehead, *Chairman*, 4886 Woodmont Drive, Jackson, Mississippi.

C. A. Abele, Co-Chairman, 2617 Hartzell Street, Evanston, Illinois.

D. C. Cleveland, Director, Dairy and Food Division, Oklahoma City-County Board of Health, Room 505, Municipal Building, Oklahoma City, Oklahoma.

M. R. Fisher, Director, Milk Section, Department of Health, Room 11, Municipal Counts Building, St. Louis, Missouri.

Pat Dolan, 4009 Cayente Way, Sacramento 25, California.

Kenneth Carl, Chief, Dairy and Consumer Service Division, Oregon Department of Agriculture, Salem, Oregon.

W. K. Jordan, Associate Professor, Department of Dairy and Food Service, Cornell University, Ithaca, New York.

Harold Irvin, Omaha-Douglas Health Department, 1201 South 42nd Street, Omaha, Nebraska.

James A. Meany, 8948 South Laflin Street, Chicago 20, Illinois.

Samuel O. Noles, State Milk Consultant, State Board of Health, Post Office Box 210, Jacksonville, Florida.

Richard M. Parry, Chief, Dairy Division, State Department of Agriculture, State Office Building, Hartford 15, Connecticut.

George H. Steele, Assistant Director, Agriculture Products Inspection, Department of Agriculture, 515 State Office Building, St. Paul, Minnesota.

J. S. Karsh, Chief, Milk and Food Division, Allegheny County Health Department, Northeast District, Pittsburgh, Pennsylvania.

H. L. Thomasson, Ex-Officio, Box 437, Shelbyville, Indiana.

Members of the Committees on Education and Professional Development, Membership and Resolutions will be announced at a later date.

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dino County Health Dept., 13271
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Michigan St., Indianapolis 7, Ind.

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NEWS AND EVENTS

13th ANNUAL WORKSHOP AT OHIO STATE UNIVERSITY

The 13th annual work shop in fluid milk practices and sanitation will be held March 23-27 on the Ohio State University Campus, sponsored cooperatively by the Department of Dairy Technology of the Ohio State University, the Ohio Cooperative Extension Service, and the Ohio Department of Health.

This year's program is completely re-designed as a concentrated short course for milk plant employees, industry fieldmen, and health and regulatory personnel. Its basic aim is to satisfy the educational needs of persons varying widely in background and experience and will serve both as a training and a refresher course. It will involve farm, dairy plant, and laboratory practices, fundamentals of cleaning and sanitizing compounds and their use, equipment design and utilization, product quality control, and health regulations and their interpretation and enforcement.

Each day of the five-day event is complete in itself for a given subject, with the related information covering the complete span from elementary to advanced knowledge as related to production, processing, sanitation and control of fluid milk.

The program consists of the following main topics and schedule: First day — the fundamental aspects of milk microbiology, including the interpretation and utilization of microbiological results; Second day — dairy farm practices — with discussions on the present status of raw milk quality, installation and operation of milking equipment, and new changes in the Milk Ordinance and Code as regards the water supply, bacteriological methods and standards, assignment of responsibility, and animal health; Third day — cleaning and sanitizing compounds and their uses on the farm and in the dairy plant; Fourth day — plant equipment layout and process flow — with major emphasis on pasteurization results in terms of legal aspects, bacteriacidal efficiency; requirements for instrumentation, controls, and integration of pasteurizer with other processing equipment; Fifth day — plant practices — which involve automated systems for cleaning and sanitizing, engineering cleaning methods, layout and blueprint interpretation, and inspection and testing of installations and equipment, — and new concepts in milk packaging.

Pre-registration will be necessary and may be obtained on either a one-day or the one-week program. The registration fees will be \$5 for one day or \$20 for the entire course. The deadline for registration will be March 2, 1964. Inquiries should be sent to the Department of Dairy Technology, 2121 Fyffe Road, Ohio State University, Columbus, Ohio 43210.

TRANSPORT TANK DEVICE TO GET 3-A AMENDMENT IN MAY OF 1964

The final validating signature was added to a new amendment to the 3-A Sanitary Standard for Stainless Steel Automotive Milk Transportation Tanks for Bulk Delivery and/or Farm Pick-up Service on January 15, 1964.

This amendment, which was formulated at the October meeting of the 3-A Sanitary Standards Committees in Cincinnati, provides for the optional installation in transportation tanks of a permanently mounted device serving the dual purpose of air agitation and in-place or mechanical cleaning.

The new amendment will become effective four months after the signing, or May 15, 1964. It will be published in the earliest possible issue of the Journal of Milk and Food Technology.

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

The 3-A program, which is supported by every national dairy trade association, is an entirely voluntary undertaking which has resulted in standards' being issued for 23 items of dairy industrial supplies or equipment.

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

MONARCH CHEMICAL DEVELOPS NEW HEAVY DUTY CHLORINATED CLEANER

A chlorinated, heavy duty alkaline cleaner for removing protein film from food processing equipment has been formulated by Monarch Chemicals, Inc., of Minneapolis.

The cleaner, named Crevat, was specifically developed to remove baked on protein "varnish" film on cottage cheese vats, and has proved itself equally effective on all dairy and food processing equipment.

In use, Crevat may be used as a slurry or in solution for brushing and spray applications. Crevat is completely free rinsing in cold water. A free flowing powder available in 100 lb. and 350 lb. drums.

For complete details, write Monarch Chemicals, Inc., 3801 N.E. 5th Street, Minneapolis, Minnesota.

NEW PROFESSORIAL CHAIR ESTABLISHED AT UNIVERSITY OF MASSACHUSETTS

Establishment of a professorial chair "to further research and graduate work in the field of food preservation" was announced here today by the University of Massachusetts and the Glass Container Manufacturers Institute, Inc. (GCMI).

The joint announcement was made by University President John W. Lederle and Finley B. Hess, chairman of the GCMI special committee that arranged for the Chair.

Major support of the professorship, to be named the Nicolas Appert Chair of Food Science and Technology after the inventor of the technique for preserving perishable foods in glass containers by heat processing, will be provided by GCMI, the trade association of the glass container industry. It will be established within the U. Mass College of Agriculture's Food Science and Technology Department, the oldest department of its type in the country. The Nicolas Appert Chair is the first endowed chair in the 100-year history of the University.

The Chair, according to the joint announcement, will make it possible for "a highly qualified professor to devote his efforts to increasing the fundamental knowledge of color, appearance, acceptability, nutritional value and microbiology of food products, particularly those foods packaged in glass containers."

Mr. Hess, President of the Brockway Glass Company, said that "the endowed professor will be an authority in the field of food science and technology who can lend his knowledge and experience to research and teaching projects at the University."

The Nicolas Appert professor will be appointed shortly, according to Pres. Lederle. Several candidates are being considered, and the one selected will have regular staff status in the University and the Department of Food Science and Technology.

He said, "To the best of our knowledge, this will be one of the first endowed professorial chairs in food science and technology in the United States."

Pres. Lederle pointed out that establishment of the professorship marks the 25th anniversary of the formation of a sustaining research fellowship by GCMI in the University's Department of Food Science and Technology.

"Research conducted under this Fellowship, which is probably one of the oldest of its kind in the country, has resulted in many basic advances in the food processing sciences," he explained. "Furthermore, in this quarter century, some 70 graduate students have been aided financially and assisted in their ad-

vanced work as research fellows under the GCMI Fellowship.

"Support of the University by GCMI can well be pointed to as a splendid example of cooperation between industry and an academic institution."

Nicolas Appert is regarded as the "patron saint" of the food processing industry. Spurred on by a 12,000-franc reward offered by Napoleon to anyone inventing a useful method of preserving food, Appert discovered and demonstrated the principle of the application of heat for the preservation of food in sealed containers. He won the prize in 1810 by successfully preserving for the first time a variety of perishable food products in glass jars and bottles.

COLOR FILM IS AVAILABLE FOR FIGHT AGAINST MASTITIS

Fight mastitis with a better informed dairyman!

That's the mission of a film, "Mastitis is *Your* Problem," now available to the cow-milking public and others interested in the dairy industry.

This film, in vivid color, is aimed at striking a blow at mastitis, which is estimated by various authorities to have stolen anywhere from \$225,000,000 to \$500,000,000 out of the pockets of American dairymen last year.

This disease cost the average dairyman \$500 or more in 1963. It forced the shipping of thousands of good milk cows to the slaughter house. It further damaged valuable udders on other cows, cost hard-earned dollars in drugs, took hours of time in treatment, and rendered millions of gallons of milk unfit for human consumption.

"Mastitis is *Your* Problem" forcefully, yet simply, presents the best ways to go about getting control of this scourge of the dairy farm.

This is a 35 mm. strip film in color. Showing time is 25 minutes. A manual record provides the sound.

To obtain this film on a free-loan basis, a 2-weeks' notice before the showing date is necessary. Simply contact Film Department, Babson Bros. Dairy Research Service, 2843 West 19th Street, Chicago, Illinois 60623.

1964 CATALOG OF DISPOSABLES AND PLASTICS

A comprehensive catalog of plastic and disposable labware, featuring many money-saving, time-saving values for the laboratory. Illustrated throughout, Catalog includes helpful information in selecting the proper material for specific applications. Some of the items described — animal cages, beakers, petri dishes, carboys, test tubes, syringes, needles, staining

dishes, pipettes.

Distributed by Scientific Products, 1210 Leon Place, Evanston, Illinois.

45TH ANNUAL MEETING FOR DAIRY AND FOOD INDUSTRY SUPPLIERS SET FOR APRIL

Dairy and Food Industries Supply Association will hold its 45th Annual Meeting April 2-3, 1964, at the Executive House Arizonian in Scottsdale, Arizona. Several hundred representatives of the association's more than 400 member firms are expected to attend.

Comprised of firms which sell equipment, supplies or services to the dairy and food processing industries, the association is the sponsor of the Dairy and Food Industrial Exposition, to be held October 4-9 in Chicago. Accordingly, major items of business at the annual meeting in April will be concerned with details of staging the Exposition which, until this year, was called the Dairy Industries Exposition. The new name — Dairy and Food Industrial Exposition — reflects the wider range of displays which will be presented.

Display locations at the Dairy and Food Industrial Exposition are determined by an impartial lottery, which will be held on the closing day of the meeting, April 3. Member companies which have indicated to the association their intention to display will draw for available space locations in McCormick Place, the Chicago lake-front building which will house the Exposition for the first time. (Earlier Expositions in Chicago occurred on Navy Pier and at the International Amphitheatre.)

Also on the agenda of the Arizona meeting is the election of six directors to three-year terms on the association's 18-man Board of Directors. This year will also see the election of a seventh director to fill the vacancy caused by the unexpected retirement of Western Area Director Sherman C. Little, Weber Showcase & Fixture Co., Inc., whose term normally would have expired in 1966.

An intensive business session, set for Thursday, April 2, will include a talk by an outstanding marketing man, reports from committees concerned with Exposition and internal association affairs, and the annual Presidential Report of Paul K. Girton, Girton Manufacturing Company, who this year completes two years as the chief executive officer of the association.

Lighter moments of the two-day meeting will include a sightseeing tour and visits, as time allows, to golf courses, tennis courts, riding centers and swimming pools in the area.

George L. Huffman, Ex-Cell-O Corporation, Packaging Equipment Division, is chairman of the An-

nual Meeting Committee, which met January 7 in New York City to set program details. Serving with him are: G. B. Armstrong, Olin Mathieson Chemical Corporation; John H. Bullen, Burry Biscuit Division of The Quaker Oats Company; C. E. Brooker, Pennsalt Chemicals Corporation; T. E. Hoyer, Jr., Mohawk Cabinet Company, Inc.; Edward K. Walsh, American Can Company; and Thomas E. Wiley, United States Steel Corporation.

MARKET MILK AND ICE CREAM CONFERENCES TO BE HELD AT PURDUE

J. L. Krider, Head of the Animal Sciences Department at Purdue University, and F. J. Babel, professor-in-charge of the Dairy Manufacturing Section, have announced two, one-day meetings to be held in March 1964. The Market Milk Conference will be held on March 18 and the Ice Cream Conference on March 19, Morris Bryant Motel, West Lafayette, Indiana. The conferences are an annual affair sponsored in cooperation with the Indiana Dairy Products Association.

The Market Milk Conference will include discussions on the Consumer Attitudes Concerning Milk, Prof. R. L. Kohls, Agricultural Economics Department, Purdue University; Milk Quality Improvement, Prof. W. L. Slatter, Department of Dairy Technology, Ohio State University; Detecting Off-Flavors in Milk, Prof. C. M. Stine, Department of Food Science, Michigan State University; New Methods of Culture Propagation, Don Eakle, Chr. Hansen's Laboratories, Inc., Milwaukee, Wisconsin; and Instrumentation and Mechanization, Ronald B. Douglas, Assistant Manager, Equipment Department, Klenzade Company, Beloit, Wisconsin. The luncheon topic will be, Speaking, Feeling and Doing, Walter Bryant, Markel Service, Inc., Indianapolis, Indiana. The program will be concluded with a milk and buttermilk clinic.

The Ice Cream Conference is to feature discussions on, Chocolate and Vanilla Flavorings, Prof. W. L. Slatter, Department of Dairy Technology, Ohio State University; Sweeteners for Ice Cream, Prof. D. R. Frazeur, Animal Sciences Department, Purdue University; Stabilizers and Emulsifiers for Ice Cream, Dr. W. F. Collins, Swift & Company, Kearney, New Jersey; Use of Foam Spray Dried Cottage Cheese Whey for Sherbets, Prof. C. M. Stine, Department of Food Science, Michigan State University. The luncheon will feature a discussion of Trends in Ice Cream Production, Howard Grant, Publisher of Ice Cream Field, New York, New York. The program will be concluded with an ice cream clinic. Both vanilla and strawberry ice cream are to be examined at the clinic. All ice cream manufacturers in the area

are encouraged to submit samples for examination at the clinic.

Further information may be obtained from Mr. H. F. Ford, Smith Hall, Purdue University, Lafayette, Indiana.

INSTITUTE OF OCCUPATIONAL DISEASES ACQUIRED FROM ANIMALS

The great pestilences of mankind still lurk in the streams and forests to pose a growing risk to public health as people find more leisure time for outdoor recreation.

This is the picture that emerges from reports given Jan. 8 at the second day of the "Institute of Occupational Diseases Acquired from Animals" being held by The University of Michigan School of Public Health.

Bubonic plague, anthrax and tularemia were among 15 major bacterial and protozoal diseases under discussion as scientists from throughout the nation reviewed the current status of animal-borne diseases. Pockets of infection pose a greater potential threat during recreational activities than during occupational pursuits, the speakers said, because they are usually located in the wilds.

Dr. Fred R. McCrumb, Jr., director of the Institute of International Medicine at the University of Maryland, said, "There is a disquieting thought that man's efforts (to control bubonic plague), and the disappearance of plague, are not at all cause and effect."

He said the "Black Death" that slaughtered 25 million Europeans in the 14th century, strikes with explosive speed, produces delirium and death in three to five days, and kills up to 90 per cent of those afflicted.

He said the disease still exists in parts of the world and "can assume catastrophic proportions among human populations." He cautioned doctors that "delay in diagnosis and specific treatment is a grave error in clinical judgment which may also have dire public health consequences."

Doctors Henry T. Eigelsbach and Richard B. Hornick of the U. S. Army Biological Laboratories and the University of Maryland presented a report on tularemia, a highly infectious disease widely found in nature.

About 100 types of wildlife carry the diseases, they said, and half of these can transmit it to man. The most common transmitters are wild rabbits, ticks, squirrels and sheep, so the disease becomes an occupational hazard for hunters, butchers, cooks, trappers, and sheep shearers.

Tularemia can have up to 30 per cent fatality rate in the United States. The disease is viciously in-

fective, and can be transmitted to man by direct contact, through the skin, by tick bites, eating improperly cooked infected meat or even inhaling air-borne organisms, they reported.

Less fatal, but probably far more prevalent, are the salmonella diseases caused by any of a large group of microorganisms. This area of infection was outlined by Dr. Gail M. Dack, director of the Food Research Institute at the University of Chicago.

Dr. Dack said a wide variety of foods have been involved in past outbreaks of salmonella infections.

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They range from dried egg powder and cake mixes to coconut, watermelon, and corned beef.

"Small numbers of salmonella enter the food supply of every home in certain foods," he said. "Since there have been great changes in our food habits, and more convenience foods are now reaching the market, there is a constant opportunity for new sources of infection."

The 4-day Institute which runs through January 10, is headed by Dr. Harold J. Magnuson, chairman of The University of Michigan department of industrial health, and is co-sponsored by the National Academy of Sciences and the National Research Council. More than 170 military and civilian physicians, veterinarians and researchers are attending. Support for the meetings has been provided by the U. S. Public Health Service.

PUBLIC HEALTH SERVICE ISSUES LEAFLET ON MASTITIS

The Public Health Service has issued a leaflet containing information about recommended screening tests used in detecting abnormal milk. The folder, entitled "Mastitis Screening Procedures," is available in limited quantities, from the Public Health Service, Division of Environmental Engineering and Food Protection, Washington, D. C., 20201.

The brief publication lists recommendations of the National Mastitis Council, Inc., on the regulatory use of such procedures, but points out that information now available on bovine mastitis is not sufficient to justify establishment of regulatory action based solely upon screening test results. It does indicate that the Public Health Service concurs in the Council's recommendations, and that such tests may well serve as a significant part of a milk regulatory program designed to combat the incidence of the disease. In addition to listing approved screening tests, it lists those who should conduct such tests and outlines correct procedures for testing.

30th ANNUAL UTAH DAIRY SHORT COURSE

The 30th Annual Utah Dairy Short Course will be held on March the 23rd, 24th and 25th, 1964, at Utah State University in Logan, Utah.

The subjects of quality milk production, cheddar cheese, swiss cheese, cottage cheese, ice cream, concentrated milks, starters, sanitation and marketing trends will be emphasized. *Problems of the fieldmen will be emphasized.* "Prepare Today For Tomorrow" is the keynote.

The Short Course faculty will consist of state and national authorities including Walter V. Price of the

University of Wisconsin, C. K. Johns of Ottawa, Ontario, and other national dairy leaders.

An educational scoring and analysis of dairy products will be conducted prior to the course to give background information for quality improvement throughout the year of 1964.

Contests among dairy leaders and plant employees in judging and grading will give experience and evaluation in scoring dairy products.

Professor A. J. Morris is General Chairman of the course and John J. Barnard is Co-Chairman. Professor Paul B. Larsen will be in charge of the scoring and analysis of the entries of dairy products.

The conference is sponsored by the Utah State University Extension Services.

GAUHN AWARD TO METZGER

Dr. Robert W. Metzger, Director of Quality Control, Dairymen's League Cooperative Association, Syracuse, N. Y., was the honored recipient of the coveted Emmet R. Gauhn Memorial Award at the NYSAMS Annual Meeting.

The award, which is given to those who have distinguished themselves through their outstanding service and contributions to the Association, was presented to Dr. Metzger by a former associate and past president of the Association, Dr. Joseph J. Regan, General Dairy Service, Utica, N. Y.

In making the presentation Dr. Regan cited the foresight, diligence, and devotion to the cause of progressive sanitation which marked the man in whose memory the Award is given, Emmet R. Gauhn, the Association's first president (1923-28), and likened this to Dr. Metzger's career.

Dr. Metzger, a member of long standing in the Association, was one of the organizers and first Chairman of the Farm Practices Committee which has functioned so effectively over the years. He is a past president of the Association (1958-59) and he has been instrumental in the development of many of the Association's projects.

Reprinted from New York Association Newsletter.

BROOKS AWARD TO MARCH

Prof. Richard P. March, Cornell University, Ithaca, N. Y. was the honored recipient of the Dr. Paul B. Brooks Memorial Award at the NYSAMS Annual Meeting in Syracuse.

In presenting the high honor to Prof. March, Henry W. Lehmkuhl, Milk Plant Specialties, Inc. Rochester, N. Y. said, "It is customary to introduce the recipient of an award by reciting his background and accomplishment, sometimes much to his own discomfort and embarrassment. This I shall dispense with.

"Where he was born, educated and where he spent his later life, his habits, and avocations are really not so important as to know the kind of man he is.

"The attributes of a man lies in his character—his inner nature revealed to those who know him best—his kindness, his lack of pretense, his concern for his fellow man, especially the somewhat less fortunate—the fieldman, his capability to do a job unstintingly and willingly, his ability to teach and his eagerness to learn, and above these, his intellectual honesty. These are the hallmarks of the man chosen to receive this year's Award in honor and memory of Dr. Paul Brooks, whose work in behalf of this Association will always be remembered.

"It is not necessary to review this man's accomplishments—these are best stated in the present issue of the Newsletter—it is my responsibility to state his worth as a man, as a friend, as a teacher and as diligent a worker and organizer as can be found. To this we all subscribe.

"It is a personal honor to be chosen to present this Award in behalf of the New York State Association of Milk Sanitarians to a man who has served his country in war and now serves this State in time of peace and whose friendship is felt by all who know or have the good fortune of having known him.

"It is a coincidence that two secretaries are being honored in this city tonight, one the United States Secretary of Agriculture at the War Memorial within a stone's throw who even at this moment must wonder who and where friends of his policies are, the other a secretary who has no such doubt—all in this ballroom are his friends and friends of his policies.

"He is none other than our secretary, both of this Association and of the Council of Affiliates—Dick March."

Reprinted from New York Association Newsletter.

MARKET MILK AND MILK SUPERVISION SHORT COURSE MARCH 16 to 28, 1964

The Pennsylvania State University will offer its annual Market Milk and Milk Supervision Short Course on March 16 to 28, 1964. The course is designed primarily to aid the dairy industry in obtaining and up-dating personnel regarding problems in the production, processing, distribution, and supervision of fluid milk and related products. Subjects to be covered in the course include: composition and properties of milk, milk bacteriology, quality tests and methods, dairy farm inspection, milk and public health, standardization, pasteurization, separating, clarification, homogenization, cream, chocolate milk, buttermilk, cottage cheese, problems of distribution, product accounting, plant layout and design, re-

frigeration, milk economics, milk legislation, and milk control commissions.

A Babcock and/or Gerber tester license and a weighers and samplers examination is scheduled at the conclusion of the course for those desiring to qualify as testers. Special discussions will also be held for those interested in the work of Approved Inspectors in Pennsylvania.

The registration fee is \$25.00; for non-Pennsylvanians the fee is \$35.00.

To enroll or for additional information contact the Director of Short Courses, Room 211 Armsby Building, College of Agriculture, The Pennsylvania State University, University Park, Pennsylvania.

INSTITUTE OF ENVIRONMENTAL SCIENCES

On April 13, 14, 15, 1964 the Institute of Environmental Sciences will hold their annual Technical Meeting and Equipment Exposition at the Sheraton Hotel in Philadelphia, Pennsylvania.

The theme of the meeting will be "Reliability versus Reality".

For registration information please contact the Registration Chairman, Mr. John Breen, R.C.A., Bldg. 10-1-2, Camden 2, New Jersey.

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WORLD'S LARGEST CHEESE

The World's largest cheese, destined to be displayed at the New York World's Fair for two years, has been completed at Denmark, Wisconsin, the Wisconsin Cheese Foundation announced today.

The cheese, which weighs 34,561 pounds, is the largest mammoth ever made, according to Roland C. Behle, managing director of the Wisconsin Cheese Foundation, which is spearheading the New York World's Fair project. It was made under the supervision of Steve Sudzinski, nationally famous mammoth cheese expert of Denmark who has produced many huge cheese for Wisconsin promotions in the past, and surpasses the former "biggest" cheese which weighed 31,232 pounds. Sudzinski's biggest previous mammoth was a 15,085 pounder made about four years ago and used in a California supermarket promotion for the Wisconsin State Department of Agriculture.

When completed, the huge cheddar, made in a block shape, was approximately 14½ feet long, 6½ feet wide and five feet 8 inches in height.

Teams of cheese makers who started midnight, Monday, Jan. 20, worked around the clock to complete the cheese. A total of 26 workers was involved in the manufacture of the giant cheddar.

Behle said plans were for the cheese to leave Wisconsin early in April on its way to the World's Fair opening on April 22. The cheese, which will be on display at the Fair through September 15th, then would make "personal appearances" around the country in the fall of 1964 and spring of 1965, prior to its return to the Fair for a second year. Behle said that the Ford Motor Company was donating a diesel tractor to haul the "Cheese-Mobile" to New York and around the country with Highway Trailer of Edgerton donating the trailer to be used. The refrigeration unit is being donated by Thermo King of Minneapolis.

In New York, Behle said, the cheese would be exhibited alongside of the Wisconsin Pavillion which will have a Frank Lloyd Wright type of building managed by Wisconsin Pavillions, Inc., under a contract with the official Wisconsin World's Fair Authority.

The "Cheese-Mobile" unit will be strategically placed near the New York City building on the Grand Central Parkway, just at the foot of a pedestrian overpass, and contiguous to the Unisphere, prime attraction at the Fair. Thus, the Cheese-Mobile is expected to be seen by many thousands of people who may not enter the Pavillion Building.

Behle said the Borden Co. had agreed to purchase the cheese following its two year "run" at the Fair. He also pointed out that a special \$35,000 appropriation had been approved by the Wisconsin State

Legislature, to be administered through the Wisconsin Department of Agriculture and the Wisconsin Conservation Department, to help finance the promotional project.

The Wisconsin Cheese Foundation official said the appearance of the cheese in New York, and its subsequent travels throughout the nation "will do more than ever has been done to call attention to Wisconsin's cheese making prowess."

He added that the national publicity and promotion that the cheese will engender should make millions more people in the nation aware of the quality and goodness of Wisconsin cheese products.

GRAZING COWS ARE A HIGHLY ORGANIZED SOCIAL GROUP, RESEARCHER REPORTS

University of Wisconsin Dairy Scientist H. J. Larsen says that a herd of grazing cows is a highly organized social event. Larsen has been studying social behavior of cows and reports it is remarkably orderly.

Cow society, he says, is very undemocratic. Like most animals that run in herds, they seem to set up a rigid social hierarchy in which every cow has her place. She is a queen to all the cows below her, and the loyal subject of all the stronger cows in the herd.

There's always one cow that bows to none—the boss of the herd. She has free and uncontested access to the best feeding spots, the best shade, the choicest spot in the milking line-up, or any other privilege she may choose to establish as her own.

Likewise, there's always the cow at the bottom of the ladder. She owns no privileges, defends nothing, and simply takes what the others leave behind, or are willing to share with her. Sometimes she'll wait for half an hour for a turn at the feed bunker, rather than start a squabble with a social "better."

A cow establishes her rank soon after she joins the herd, and once it's set it isn't likely to be challenged until another newcomer tries to find her place in the social order. Status, Larsen finds, seems to depend mostly on ability to push and shove. Audacity and daring are much more important than a talent for making milk. In fact, the high producers are found as often at the bottom as at the top of the social ladder.

In most good-sized herds there is often a "public servant." Any cow, regardless of her place in the social order, can come to this cow for a "refreshing" face washing. In answer to a gentle, pleading nudge, the servant will turn and lick the head, face, or neck of her herd mate. Another aspect of "organization" Larsen has noted among grazing cows was a rest period after about an hour and a half of feeding. Often they will bunch together, combining their fly-

swatting strength for about 10 or 15 minutes while their food settles a bit.

"Cow sociology," says Larsen, is interesting and fun, but it also has some practical utility. For instance, knowing how far a cow walks to get her feed may be useful in devising better feeding schemes. And an understanding of the "bovine pecking order" and how it works may prove useful in handling and training cows and in planning facilities for them. One thing this kind of observations does is emphasize the importance of providing plenty of feed and lots of manger space, to minimize the competition, and make life easier for the cows.

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International Association Of Milk, Food And Environmental Sanitarians, Inc.

EMPLOYMENT OPPORTUNITY

ANNOUNCEMENT

The Executive Board of the International Association of Milk, Food and Environmental Sanitarians, Inc., is seeking qualified persons to apply for a position as Assistant Executive Secretary. The Association publishes a monthly journal — The Journal of Milk and Food Technology — and other technical papers and bulletins in this general field. The primary responsibilities of the Assistant Executive Secretary would be that of managing and editing the Journal of Milk and Food Technology.

The Association has a membership of about 4000, has thirty affiliated associations throughout the United States and Canada, and is the largest association of its kind in the country.

The Association has its headquarters in Shelbyville, Indiana.

SALARY

The beginning salary is between \$5500.00 - \$6500.00 per year. There is provision of annual vacation and sick leave after six months of service.

QUALIFICATIONS

1. A Sanitarian holding a Bachelor's degree from an accredited college or university or a person holding a Bachelor's degree in Journalism.
2. Preferably one year of successful professional experience in the journalistic field in technical, trade or scientific writing, or in the field of Milk, Food, or Environmental Sanitation. Person should have had experience in technical writing and in public relations.

DUTIES OF THE POSITION

1. To be the editor of a professional publication in the field of milk and food control, environmental sanitation, and public health.
2. Compose and organize the News and Events Section of the Journal of Milk and Food Technology and stimulate communication and contact with affiliates and with other organizations having parallel interests.
3. Edit auxiliary publications of the Association including Committee Reports, special reports and develop promotional materials.
4. Do literature research in terms of articles dealing with newer technical developments within the areas of interests; keep abreast of legislative and regulatory matters of interest to the Association. Contribute articles, abstracts and summaries.
5. Write editorials in the field of environmental sanitation or in areas of related interests; enlist the services of others as guests editorial contributors, or both.
6. Attend meetings, conferences, affiliate meetings and the annual meeting of the Association to gather news and to represent the Journal and the Association.
7. Become acquainted with the managerial and other duties of the office of the Executive Secretary, assist him, and, in his absence, assume his duties.
8. Continue the improvement of the format, contents, appearance of the Journal and suggest such improvements as may enhance the publication and its acceptance among members and subscribers.

OTHER CONDITIONS

The successful candidate should not be more than 50 years of age. He must be personable, with ability to make presentations before the public. He must be of good moral character and physically able to carry out his duties.

The successful candidate will be expected to establish residence in Shelbyville, Indiana, or within reasonable commuting distance of Shelbyville.

Closing date for applications: April 15, 1964.

Persons interested in this position should request an application from Mr. Karl K. Jones, Secretary-Treasurer, International Association of Milk, Food, and Environmental Sanitarians, 1330 West Michigan Street, Indianapolis, Indiana 46207.

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Here's something you can do to help Dairymen fight MASTITIS

Authorities are pretty generally agreed that a good job of cow milking is an important factor in Mastitis control. And . . . a good job of milking is dependent on both the mechanical condition of the milking machine . . . and the men who operate that equipment.

Babson Bros. Co. and Your local SURGE Dealers are now equipped to help you DO something about both conditions.

Two precision instruments are available. The Babson Flow-Meter for determining vacuum system capacity . . . and, the Babson Levograph Vacuum System Analyzer that records operating vacuum levels as well as pulsator action. With them, the adequacy and efficiency of the milking machine's vacuum system can be analyzed so that corrective steps can be taken.

Proper operation can best be accomplished by education of the men who run the milkers. Here too, Babson Bros. Co. and SURGE Dealers have available special training sound-slide films to help you get the story of good cow milking explained . . . and aid you in YOUR Mastitis Control problems.

Write or contact your nearest Authorized SURGE Dealer or Babson Bros. Co. to arrange for use of the films, "The Story of Vacuum" or "Mastitis Is Your Problem", as well as availability of actual vacuum system tests.

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2843 WEST 19TH STREET—CHICAGO, ILLINOIS 60623

