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Journal of

MILK and FOOD TECHNOLOGY

Official Publication

International Association of Milk, Food and
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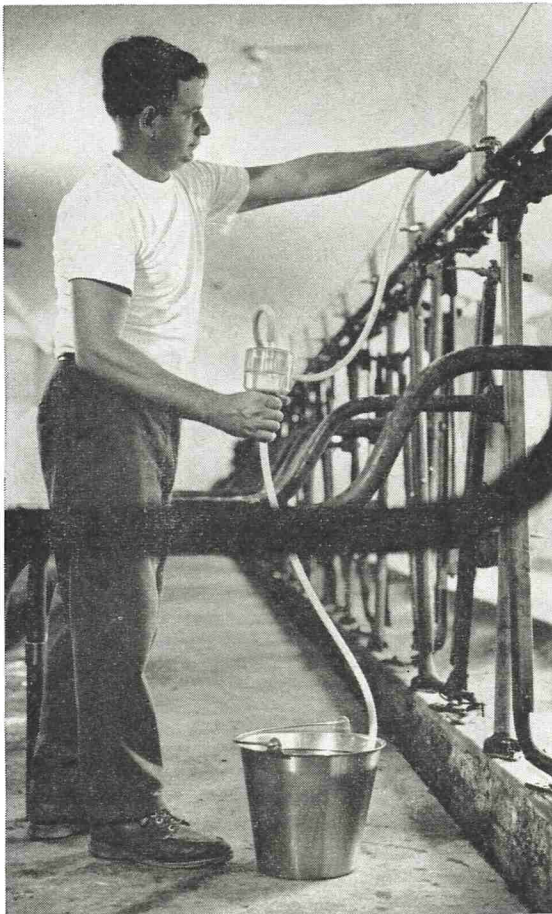




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INCLUDING MILK AND FOOD SANITATION

Official Publication

International Association of Milk, Food and
Environmental Sanitarians, Inc.

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Volume 27

October, 1964

Number 10

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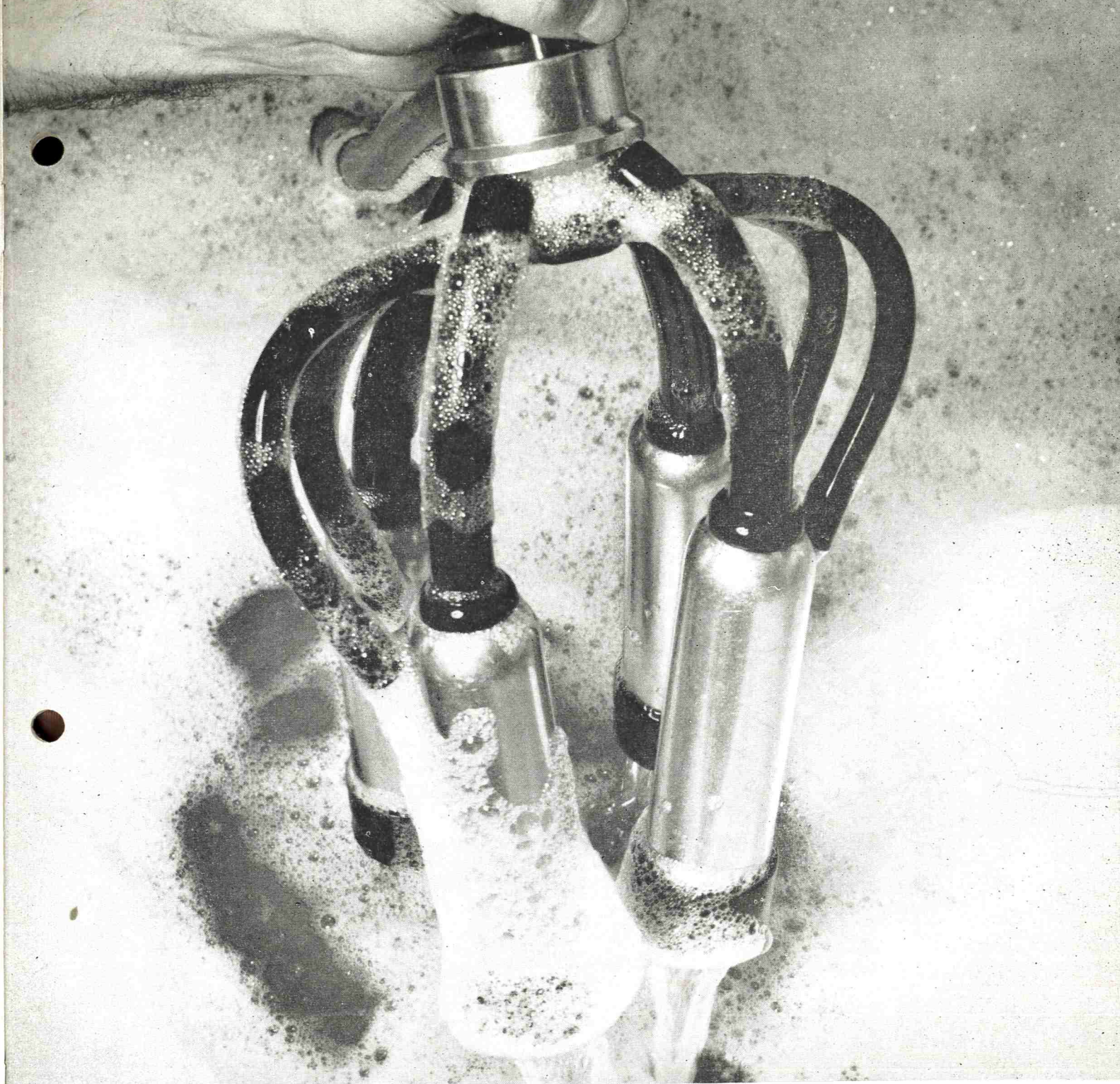
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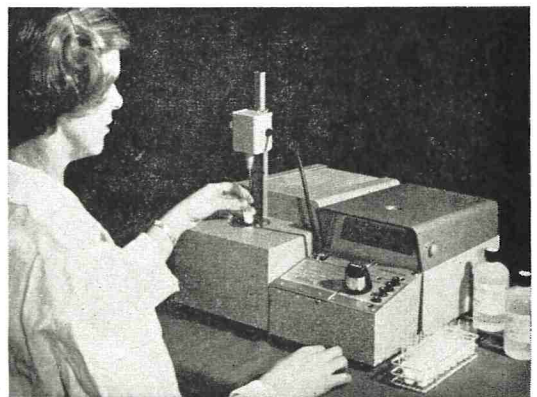
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PRESIDENTIAL ADDRESS

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*International Association of Milk,
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John H. Fritz

It is indeed a pleasure, on behalf of the Officers and Executive Board, to extend a warm welcome to you at the opening of this, the 51st Annual Meeting of the International Association of Milk, Food, and Environmental Sanitarians. Those of us who are not fortunate enough to reside in the great Pacific Northwest find it exhilarating to have the opportunity to enjoy the beauty and friendly hospitality of this part of our wonderful country.

During the next three days we will have an opportunity to gain new knowledge, renew acquaintances with many old friends, and work with other members of our Association whom we have not previously had the opportunity to know personally. This is truly one of the most important benefits we derive from being members of this Association. It is unfortunate that we attract such a small percentage of our members to our annual meetings.

As in past years, your officers and Executive Board have been working hard to meet the responsibilities placed upon our shoulders when we were asked to serve the Association. As has been the case, I am sure, with our predecessors, we have made progress, but not the amount we had hoped for when we concluded our meeting in Toronto last October. Nevertheless, we have marked a few milestones which are worthy of note.

During the year the Board signed an agreement with the National Labeling Committee (NLC) to

furnish that organization executive secretarial services through our Shelbyville office. While we had looked forward to an indefinite arrangement with the National Labeling Committee, we were notified recently that the consolidation of the business offices of the Milk Industry Foundation and the International Association of Ice Cream Manufacturers made it economically attractive to NLC to cancel its contract for executive secretarial services with IAMFES and move this activity to the new MIF-IAICM offices. Accordingly, effective January 1, 1965, our contract with NLC will be terminated. While we regret this loss, both IAMFES and the NLC have benefited from our contractual agreement.

Also of interest is the action of your Executive Board in lending support to the Sanitarian's Joint Council in the establishment of an American Inter-society Board for Certification of Sanitarians (AIBCS). Viewing this as another step forward in our continuing efforts to work collectively with other sanitarian organizations to encourage our members to achieve higher and higher goals of professional accomplishment, the Executive Board voted to endorse the plan presented to it and to provide financial support in the form of a \$1,000 non-interest loan as the IAMFES's share to implement it. The National Association of Sanitarians took similar action at its recent meeting in Philadelphia. As yet we have not been advised officially as to the action the American Public Health Association may take, although it is my understanding they are expected to approve a loan to the AIBCS.

There has been some apprehension on the part of a few sanitarians that implementation of the certification plan might adversely affect current efforts directed toward registration of sanitarians, or that it is intended to establish a "super" sanitarian category. Let me assure you that such fears are not well founded. As set forth in the Preface of the Plan, "certification" is a clearly delineated process undertaken and executed by the profession itself through its constituent societies and affiliations. It is the recognition of professional achievement resulting from educational preparation and competent practice of the profession with marked distinction. It is my personal conviction that historically we will one day recognize certification as a major step forward in our constant march toward professional recognition for sanitarians.

Another matter of importance to most of you is the invitation by the National Restaurant Association to send a representative to a meeting hosted by that organization to explore, with sanitarian and other health related organizations and the Public Health Service, ways to open lines of communication between industry and public health agencies across the nation to achieve uniformity of laws and regulations and their interpretation and application. Subsequent to the exploratory meeting held in Chicago, April 13 and 14, at which your Executive Secretary, Red Thomasson, served as IAMFES representative, we received an invitation from NRA to participate in a series of meetings to achieve the objectives set forth above. Earlier this week, during Executive Board meetings, the Board voted to accept the NRA proposal. Following this Annual Meeting your incoming President, Dr. W. C. Lawton, will formally accept the NRA invitation and will appoint an IAMFES representative whose name will be reported in the Journal. This new undertaking, we hope, will provide for the increased understanding and cooperation between public health and industry which is so vitally important to improving the health protection in this country.

We have made a major step forward this year by reorganizing our Membership Committee, which is chaired by Mr. William V. Hickey. He has asked the Chairman of each affiliate Membership Committee to serve with him on this Committee. Through an appeal to these individuals, and with the cooperation of the affiliate Executive Secretaries, it was possible to send out almost 800 letters to sanitarians not currently listed among our membership. While returns from this mailing are just beginning to arrive in the Shelbyville office, the effectiveness of this concerted effort is yet to be determined. Here, however, is a place where we need your personal touch. While a membership committee can be quite effective, there is no substitute for the personal appeal by an enthusiastic membership. We need your help to reach the several thousand unaffiliated sanitarians who could benefit materially from membership in this great Association. We will be counting on you to do your part.

Speaking of active participation by the members of this Association, we have over the years made every effort to provide you with a technical Journal that meets the needs and expectations of the membership. This, with four thousand members, is no small task as all of you recognize. For some time, however, there have been complaints from some quarters that the Journal does not have enough "grass roots" articles and is too technical, being too research oriented. While there is much to be said on either side of this question, depending upon which side you

are on, what concerns me most is the fact that very little is being done by the "grass roots" members to assist our editors in their constant search for suitable material. We need more of, not one or the other, but both technical and "grass roots" articles. Here again each of us has the opportunity, and if you will, the responsibility, to encourage the authors of speeches we hear delivered, and studies we know have been undertaken, to submit their manuscripts to our editors for consideration as material for the Journal. No one or two, or a dozen persons for that matter, can do the job in this regard that four thousand of us can do. It is our Journal and we can derive benefits many fold greater than the effort we expend in helping to improve our official publication. In this regard, however, let me stress we are not only after quantity but also quality. We have a Journal with a reputation as a scientific publication of which we can be justly proud. We have untold and untapped resources at our fingertips if we will but reach out to help the sanitarians who are "doing things" to put their ideas and accomplishments on paper and see that they are submitted to the editorial board. The associate editors will provide every possible assistance to such authors in reviewing and redrafting material for publication. Again I appeal to you to actively participate in an on-going activity which is of vital importance to our growth and progress. There just is no substitute for active participation on the part of the entire membership.

For several years now we have been faced with urging on the part of some members to change the name of the Journal in recognition of those members whose interest lies in the broad area of environmental health rather than a specialty of food or milk. While no one would argue that this is not a worthy objective, we must of necessity be concerned with a number of effects which such a change would produce. I would like to bring just two of these to your attention. First, the name "Journal of Milk and Food Technology" is widely recognized as an important scientific publication which has resulted in its being included as a reference in libraries throughout the world. A change in the name of such a Journal requires changes in library referencing systems and could even result in its being dropped if the new name does not appropriately identify it as a scientific publication. Secondly, we have already experienced difficulties in the unwieldy length of the name of the Association as changed at the annual business meeting in Philadelphia. For these and other reasons a committee appointed following the Toronto meeting to study this matter for possible action at this meeting, has recommended holding this matter in abeyance until tangential matters have been resolved.

During the business meeting tomorrow morning we will be faced with a decision on whether to increase the dues of this Association to \$8.00 for affiliate members and \$10.00 for direct memberships from the present \$5.00 and \$7.00 respectively. This change in our By-Laws has been recommended by the Board to cope with rising operating costs and to make it possible to increase services to the membership.

One of the major benefits you may expect to accrue from this increase will be the expansion of the Journal by the addition of a section containing "grass roots" articles and an expansion of the present section on news and events and association affairs. In addition, the Board has approved the hiring of additional office staff to make it possible for our Executive Secretary to spend more time in the field making personal visits to our affiliate meetings with a view to rendering increased services and assistance to the affiliates and strengthening the bond between the affiliates and the IAMFES.

Speaking for the Board may I urge you to approve the proposed increase. While we are currently operating on a sound financial basis for the foreseeable future, we cannot render the additional services being requested by the membership and which the Executive Board feels are essential to the growth and health of the Association without additional revenue. While we are aware many of you are opposed to the proposed increase, we are confident you will take these factors into account when you vote on this matter.

I regret very much to inform you that this year, for the first time since the establishment of the Sanitarian's Award, it has been decided no award would be given. Only two nominations were received, whereas, it was felt at least five are needed to provide adequate selectivity. Further, the change in the Association's name to include environmental sanitarians has made it important to re-evaluate the rules established for issuing this award since at the present time only persons engaged in milk and/or food sanitation are eligible.

The Recognitions and Awards Committee to be appointed by Dr. W. C. Lawton, our incoming President, will study this matter and will confer with the Award sponsors. The two nominations received this year will be carried over and reconsidered with others submitted during the coming year, for the 1965 Award. I wish to stress, however, that this decision does not in any way reflect on the two individuals nominated this year.

Last year, in his presidential address, Mr. Ray Belknap discussed a question which has concerned sanitarians for the past 10 to 15 years. Specifically I am referring to the question, "Why do we need more than one sanitarian organization?" Many have reasoned that sanitarians would achieve greater rec-

ognition if they spoke with one voice through a single organization. In fact, this theory has received so much attention that many of its proponents have come to believe this is the only means whereby we can reach the goal of unified action on the part of all sanitarians.

There can be little doubt in any sanitarian's mind that we will progress farther and faster if we unify our approach to common problems. This is not to say, however, that these objectives can only be reached through one route and one route alone. Unfortunately, few things in life lend themselves to such a simple solution. Though the sanitarian is recognized outwardly as a single category of public health worker, internally this category is composed of several distinct entities in terms of specialized areas of interest: namely, milk, food and environmental sanitation.

Many sanitarians have work responsibilities encompassing the entire field of environmental health, thereby necessitating that they become reasonably well informed in all facets of environmental health. To such persons there appears little justification for more than one sanitarian organization. Further, they expect, and perhaps rightly so, to have their professional association furnish them services and technical information and stimulation sufficiently broad to keep them knowledgeable and effective in the total environmental health field.

On the other hand, the membership of this Association is composed of sanitarians, including those employed in the industry, who have a major concern with only one of these three areas. With such a composite group, this Association has somewhat different needs to satisfy in terms of technical know-how and services.

These differences are perhaps the fundamental reason for the existence of more than one professional sanitarian association in this country today. It is important to recognize, however, that these differences are not inherently wrong, but rather are a natural product resulting from evolution in the field of public health. The complexity of the technical developments in the fields of milk and food sanitation have more or less dictated that these specialty areas be retained in order that we will preserve, and in fact, expand our competency to cope with emerging health problems resulting from technological changes. In this regard, an increasing number of sanitarians are looking to the day when there will be a greater degree of cooperation between sanitarian organizations through which the common goals of improved public health and professional development and recognition can be achieved.

As directed by a vote of the membership present at the Toronto business meeting, a committee of three, Mr. H. S. Adams (Chairman), Mr. William C.

Miller, Jr., and Mr. William V. Hickey, has been appointed and an invitation extended to the National Association of Sanitarians, and the National Society of Professional Sanitarians to work with this Association in establishing a unified approach to attaining professional objectives which all three groups hold in common. Both NAS and NSPS have indicated an interest in this activity and are awaiting the establishment of a date and time when this Intersociety Committee can hold its first meeting to explore in depth specific activities which these Associations can undertake cooperatively to further their individual and collective objectives. It is expected that the first meeting will be held early this fall.

For far too long now, the "one organization" theory has impeded our progress. As I have previously stated, there is seldom only one way to resolve a problem. Our future growth individually and collectively is to a great extent dependent upon our ability to demonstrate that we can work together as a category, yet through our separate organizations bound together with common objectives and a fervent desire to prove the validity of our claim to professionalism. I feel we can open new vistas for our

future growth and development if we will but recognize that this can be accomplished through the cooperative efforts of all sanitarians through their respective organization. As was expressed to me recently, the loyalty, dedication, and professional approach to public health of the members of this Association have made it the most outstanding sanitarian organization in the world. We have a proud heritage which we all wish to preserve, yet we are willing and ready to work with other sanitarian groups for the betterment of sanitarians as a whole.

Let me conclude my remarks on this topic with the thought that the climate for cooperative action appears to be extremely favorable. Through such action we can do much to improve the image of the sanitarian in the eyes of all segments of our society. As we move on to what may eventually be a more formal type of cooperation, we owe it to ourselves and our profession to do all we can individually and collectively, to further the cause of improved environmental health for the public we serve.

It has been a great honor and privilege to serve as President of this Association. For this I am deeply grateful.

3-A SANITARY STANDARDS FOR SILO-TYPE STORAGE TANKS FOR MILK AND MILK PRODUCTS

Serial #2200

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

It is the purpose of the IAMFES, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Silo-type tank specifications heretofore and hereafter developed which so differ in design, material, fabrication, or otherwise as not to conform with the following standards, but which, in the fabricator's opinion are equivalent or better, may be submitted for the joint consideration of the IAMFES, USPHS, and DIC, at any time.

A. SCOPE

These standards cover the sanitary aspects of silo-type storage tanks for milk and milk products. In order to conform with these 3-A Sanitary Standards, silo-type storage tanks shall comply with the following design, material, fabrication, cleaning, and refrigeration criteria.

B. DEFINITIONS

- (1) **SILO-TYPE TANK**—Any vertical tank in excess of 10 feet inside height for the storage or storage and cooling of milk or milk products.
- (2) **CONTROL AREA**—The control area is that part of the processing area or acceptable tank truck receiving area in which all appurtenances for the operation of the silo tank are located and vent lines terminate, except as provided in section D.(19).
- (3) **ALCOVE**—Is an extension of the processing or acceptable tank truck receiving area in which all appurtenances and vent line openings are located.
- (4) **SURFACES:**
 - (a) *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, or be drawn into the product.
 - (b) *Non-Product Contact Surfaces:* Shall mean all other exposed surfaces.

C. MATERIAL

- (1) All product contact surfaces shall be of 18-8 stainless steel with a carbon content of not more than 0.12 percent, or equally corrosion resistant metal that is non-toxic and non-absorbent, except that:
 - (a) Rubber and rubber-like materials may be

used for gaskets, seals and parts used in similar applications. These materials shall comply with the applicable provisions of the "3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Serial #1800".

- (b) Plastic materials may be used for bearings, gaskets, seals, and parts used in similar applications. These materials shall comply with the applicable provisions of the "3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Serial #2000".
- (c) Where functional properties are required for specific applications, such as bearing surfaces and rotary seals, where dissimilar materials are necessary, carbon, and/or ceramics may be used. Ceramic materials shall be inert, non-porous, non-toxic, non-absorbent, insoluble, resistant to scratching, scoring, and distortion by the temperature, chemicals, and methods to which they are normally subjected in operation, or cleaning and bactericidal treatment.
- (2) All non-product contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion-resistant. If painted, the paint used shall adhere. All non-product contact surfaces shall be relatively non-absorbent, durable and cleanable. Parts removable for cleaning having both product contact and non-product contact surfaces shall not be painted.

D. FABRICATION

- (1) All product contact surfaces shall be at least as smooth as a No. 4 mill finish on stainless

- steel sheets or 120 grit finish properly applied.
- (2) All permanent joints shall be welded. All welded areas of product contact surfaces shall be at least as smooth as the adjoining surfaces.
 - (3) All product contact surfaces shall be easily accessible for cleaning, either when in an assembled position or when removed. Removable parts shall be readily demountable. Sight or light openings, when provided, shall be relatively flush and shall be located in the control area.
 - (4) All product contact surfaces shall be self-draining except for normal clingage. The bottom lining shall have a minimum slope of 3/4" per foot toward the outlet.
 - (5) The inside radii of all welded or permanent attachments shall be not less than 1/4 inch. Where the top head and the bottom join the vertical lining of the tank the radius shall not be less than 3/4 inch. The top head shall be dished or otherwise shaped so that it readily facilitates mechanical cleaning.
 - (6) There shall be no threads on product contact surfaces.
 - (7) Sanitary pipe and fittings shall conform with 3-A "Sanitary Standards For Fittings Used On Milk And Milk Products Equipment And Used On Sanitary Lines Conducting Milk And Milk Products", Serial #0800, and supplements thereto, except that sanitary fittings made of nickel alloys shall not be used.
 - (8) The outer shell shall be smooth and effectively sealed. Outside welds need not be ground. A vent hole shall be provided in the outer shell of the tank and shall be located to provide drainage from the outer shell and shall be vermin proof.
 - (9) Non-product contact surfaces to be painted shall be effectively prepared for painting.
 - (10) Equipment for producing and introducing air under pressure into the product and which is supplied as an integral part of the tank shall comply with the "3-A Accepted Practices For Supplying Air Under Pressure In Contact With Milk, Milk Products And Product Contact Surfaces."
 - (11) The tank shall be insulated with insulating material of a nature and amount sufficient to prevent freezing, or in 18 hours, an average temperature change of greater than 3°F. in the tank full of water when the average differential between the temperature of the atmosphere surrounding the tank is 30°F. above or below that of the water in the tank, provided that the insulating material shall be the equivalent of not less than 2 inches of cork in insulating value. Tanks installed partially or wholly outside of a building shall be insulated with insulating material having the equivalent of not less than 3 inches cork in insulating value over non-refrigerated areas. Insulation material shall be installed in such a manner as to prevent shifting or settling.
 - (12) Tank Supports (When the tank is installed in a processing or acceptable tank truck receiving area)
 - (a) Adjustable legs of round stock with sealed bases shall be provided of sufficient size and spacing to carry the tank when full and to raise the milk outlet sufficiently high to allow for adequate cleaning. The tank or bracing, whichever is lower, shall have a minimum clearance of 8 inches from the floor. Leg socket exterior shall be readily cleanable.
 - (b) When tanks are mounted on a slab or island, that portion of the base within the processing area shall be effectively sealed.
 - (13) A sanitary connection(s) of sufficient diameter to prevent back pressure during normal filling and to prevent vacuum during emptying shall be provided in or near the top of the tank as a vent connection. The vent line(s) from this connection(s) shall terminate in the control area and shall be provided with a perforated cover(s) having openings not greater than 1/16 inch diameter, or slots not more than 1/32 inch wide. This cover(s) shall be so designed that parts are readily accessible and easily removable for cleaning. Woven wire mesh shall not be used for this purpose (See Section B - Appendix).
 - (14) Fittings to accommodate indicating and recording temperature sensing devices shall be provided and shall conform to one of the following types:
 - (a) Fittings conforming to Supplement No. 1 to 3-A "Sanitary Standards for Thermometer Fittings and Connections Used on Milk and Milk Products Equipment" Serial #0901.
 - (b) Fittings for temperature sensing devices which do not pierce the tank lining, but which have temperature sensing element receptacles securely attached to exterior of the lining.

The temperature sensing elements of (a) and (b) above shall be located not more than 24 inches above the bottom of the lining and the

indicating or recording device shall be located so that it is easily readable.

- (15) The outlet and inlet shall be located where they are readily accessible. The outlet shall be in a position that will provide complete drainage of the tank. The top of the terminal end of the outlet passage shall be lower than the low point of the bottom of the lining at the outlet. When tanks are located in the processing area or acceptable tank truck receiving area milk inlets and outlets may be in the side or bottom of the tank. Means shall be provided for easy access to the valve(s) for cleaning and inspection purposes.
- (16) A manhole(s) shall be provided and shall be located near the bottom of the tank. The inside dimensions of the manhole opening shall be not less than 15" x 20" oval, or 18" diameter. A hand grip shall be mounted externally on the tank near the manhole in order to facilitate easy access to the tank interior.
- (17) The manhole cover shall be the inside or outside swing type. If the cover swings inside, it shall also swing outside away from the opening for disassembly and cleaning. No threads or ball joints shall be employed within the milk zone to attach the manhole cover and its appendages. The manhole cover and its appendages shall be removable without tools.
- (18) Gaskets shall be removable. Any gasket groove or gasket retaining groove shall not exceed 1/4-inch in depth or be less than 1/4-inch wide. The minimum radius of any internal angle in a gasket groove or gasket retaining groove shall be not less than 1/8-inch.
- (19) All openings in the tank lining shall be within the control area, except openings for mechanical agitators and openings for cleaning and/or vent line(s). Cleaning and/or vent line(s) shall terminate in the control area.
- (20) Unless otherwise specified, means for mechanical and/or air agitation of product shall be provided that when operated intermittently or continuously shall be sufficient to maintain the butterfat content of whole milk throughout the tank within a variation of plus or minus 0.1 percent as determined by the Official Babcock Test. The agitator, if not designed for mechanical cleaning, shall be located in such a manner that it shall be readily accessible and removable for manual cleaning.

E. CLEANING

Means shall be provided for mechanically cleaning the product contact surfaces of the tank, piping and all non-removable appurtenances thereto.

F. REFRIGERATION

Refrigerated tanks shall be capable of maintaining milk temperatures at 40°F. or lower when the tank is full.

APPENDIX

A - SUGGESTED CLEANING PROCEDURES

One cleaning method found to be satisfactory is to pump the cleaning solution to the dome of the tank through stainless steel welded lines and distribute it in such a manner as to provide flooding over the entire inner dome, side walls and bottom. Means should be provided for manual cleaning of all surfaces not cleaned satisfactorily by mechanical cleaning procedures.

B - AIR VENTING

To insure adequate venting of the tank which will protect it from internal pressure or vacuum damage during normal operation, the critical relationship between minimum vent size and maximum filling or emptying rates should be observed. The size of the free vent opening of a tank should be at least as large as those shown in the table below:

<i>Minimum Free Vent Opening Size (inches, I. D.)</i>	<i>Maximum Filling or Emptying Rate (gallons per minute)</i>
1 3/4	175
2 1/4	300
2 3/4	400

The above sizes are based on normal operation and are sized to accommodate air only and not liquid.

The diameter of the connecting vent pipe line between the vent opening in the tank and the control area should be no smaller than the inside diameter of the vent opening in the tank. The perforated vent cover should have a free opening area equal to at least 1½ times the area of the vent opening in the tank. Means should be provided to prevent siphonage, such as a re-vent line, or anti-siphon device (see illustrative sketches in Appendix). The vent piping of a tank outside of a building should be protected against freezing.

The venting system covered in the preceding paragraphs is intended to provide for venting during filling and emptying; however, it is not adequate during cleaning. During the cleaning cycle, tanks when cleaned mechanically should be vented adequately by opening the manhole door to prevent vacuum or

pressure build up due to sudden changes in temperature of very large volumes of air*. Means should be provided to prevent excess loss of cleaning solution through the manhole opening.

The use of tempered water of about 95°F. for both pre-rinsing and post-rinsing is recommended to reduce the effect of flash heating and cooling. Provisions should be made to prevent overfilling with resultant vacuum or pressure damage to the tank.

*For example, when a 12,000 gallon tank (with 1600 cu. ft. of 135°F. hot air after cleaning) is suddenly flash cooled by 50°F. water sprayed at 100 gpm the following takes place:

Within one second, the 1600 cubic feet of hot air shrinks approximately 102 cubic feet in volume. This is the equivalent in occupied space of approximately 765 gallons of product. This shrinkage creates a vacuum sufficient to collapse the tank unless the vent, manhole, or other openings allow the air to enter the tank at approximately the same rate as it shrinks. It is obvious, therefore, that a very large air vent such as the manhole opening is required to accommodate this air flow.

C - TEMPERATURE RECORDER

A temperature recorder should be provided on all tanks to record temperatures during the filling, storage, emptying and cleaning periods. This temperature recorder should be accurate to plus or minus 1°F. within the temperature range for milk storage. The recorded elapsed time, as indicated by the chart, should be the true elapsed time over at least a seven-day period.

D - PLACEMENT

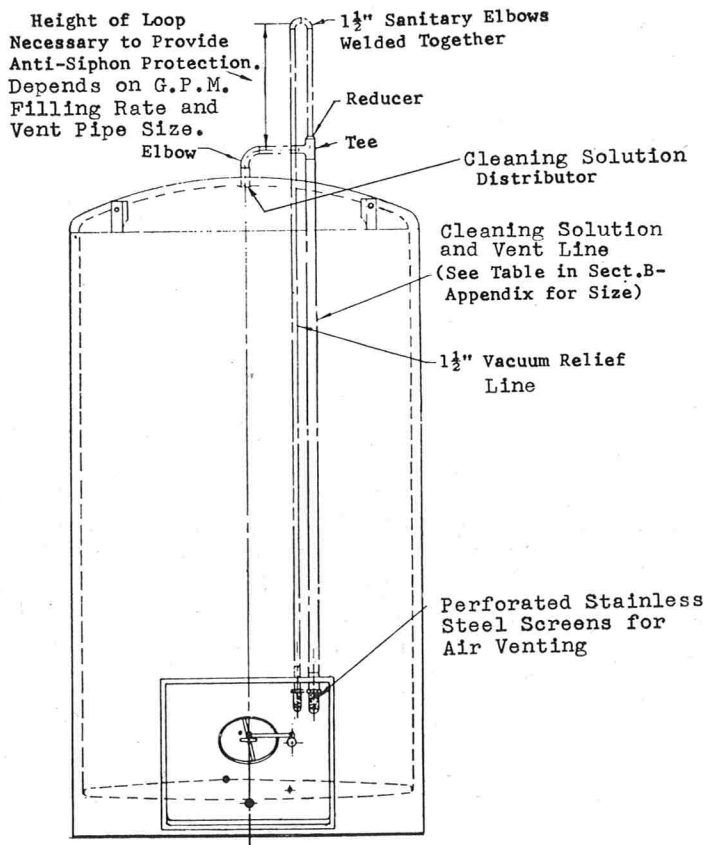
If the tank is not in a processing area or acceptable tank truck receiving area or adjacent to the outside wall of one of these areas, a hallway should be constructed at least 7 feet high and 5 feet wide to provide easy access to the control area. Extension through the roof is permissible.

These standards shall become effective Feb. 10, 1965.

APPENDIX (Con'd)

PIPING FOR AIR VENTING

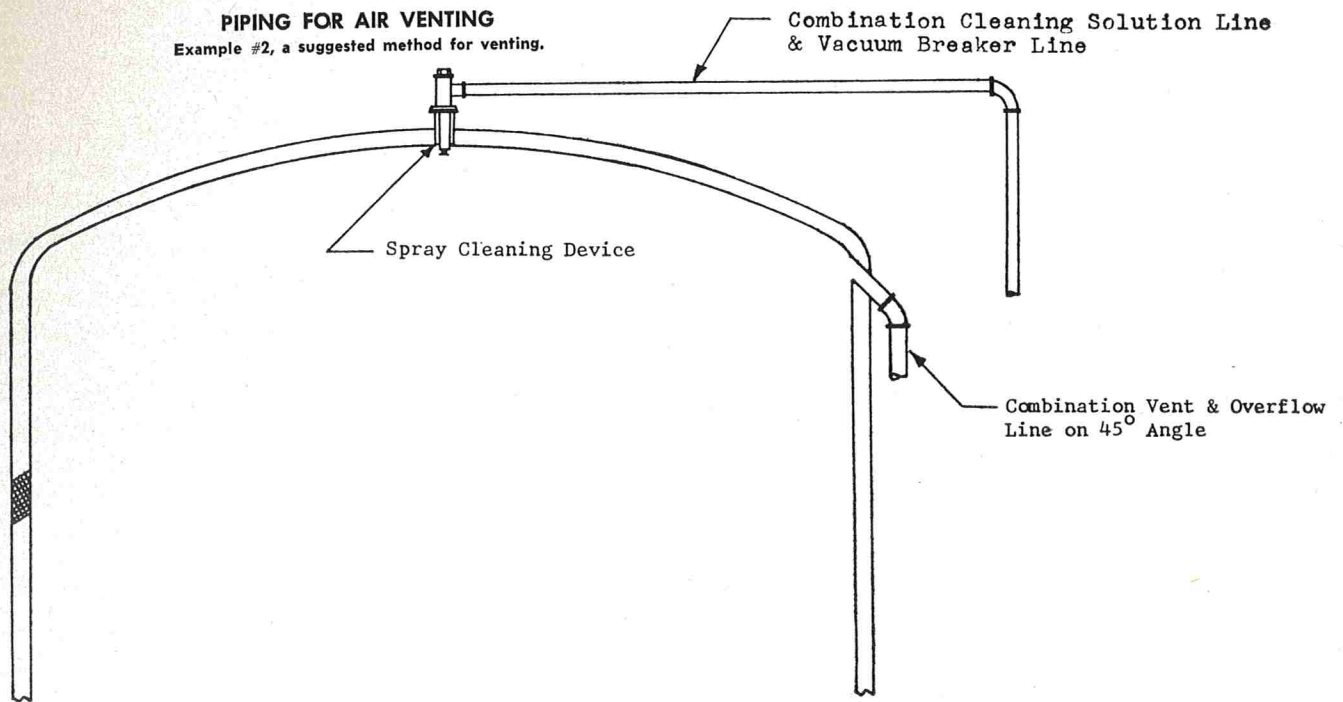
Example #1, a suggested method for venting



This design shows a loop-type syphon breaker. The loop is made so that its height above the vent line is sufficient to prevent milk rising in the vacuum relief line to the top of the loop when the tank is being filled at the maximum rate recommended by the manufacturer.

Legend: In event of overfilling, milk enters the vent line through the opening in the top of the tank. The area of this opening is such that when the tank is being filled at the maximum rate recommended by the manufacturer, pressure in the tank will not exceed that for which the tank is designed. The vacuum relief line will prevent any siphoning action in the overflow line.

APPENDIX (Con'd)



Legend: The purpose of the opening at the juncture of the head and shell is to act as a vent during normal operation, and an overflow in case the tank is overfilled. In this event, the cleaning solution line acts as an auxiliary vent to break any siphoning action in the overflow line.

IMITATION CREAM FILLING AS A VEHICLE OF STAPHYLOCOCCAL FOOD POISONING

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SUMMARY

After two cases of staphylococcal food poisoning were attributed to doughnuts containing imitation cream filling, dispensed from an unrefrigerated vending machine, a batch of this filling was inoculated with food poisoning staphylococci to determine its ability to support growth. Three staphylococcus cultures were employed: culture K which came from the doughnut filling that prompted this study; culture D which was recovered from chocolate eclairs incriminated in an outbreak in 1961; and culture T which was isolated from turkey responsible for an outbreak in 1962. All cultures grew at both 25 C and 32 C in 20 hr and 40 hr. However, cultures K and D developed larger populations than T, the turkey strain. This emphasizes the need for refrigeration of imitation cream fillings from the time of manufacture to the time of sale.

On Sunday morning, December 17, 1962, two employees in the flight control section of a large commercial air line each consumed what appeared to be a cream filled doughnut from an unrefrigerated vending machine in the office. Less than three hours later both men became acutely ill with nausea, vomiting, and diarrhea and were forced to leave work. Staphylococcal food poisoning was clearly indicated.

A third doughnut taken from this vending machine that afternoon yielded 215 million *Staphylococcus aureus* per g of filling. This organism has since been shown by Casman (1) to produce enterotoxin type A.

The vending machine had been serviced on Friday morning, December 15, 1962. The internal temperature, although not measured, was sufficient to melt the chocolate coating on candy bars in adjacent compartments, causing chocolate to adhere to the wrapper.

That a modern, reputable vending firm was handling cream filled pastries in such a hazardous fashion seemed almost incomprehensible. When confronted, the vendor stated that the doughnut filling was not a true cream but rather a commercial "filling mix" preparation containing starches, sugars, salt, cellulose gum, gelatin, certified color, artificial flavor, and sodium propionate in powder form. Water, cane sugar, vegetable fat, and flavoring were added according to the manufacturer's directions. Since highly perishable milk and eggs were omitted from the formulation, the product was believed incapable of supporting the growth of food poisoning organisms and was being recommended by the manufacturer for use in all seasons without refrigeration.

Approximately 1700 doughnuts, an undeterminable number of which contained imitation cream filling, had been prepared by the vendor Thursday and distributed Friday morning. Undoubtedly, other cases of staphylococcal food poisoning occurred from eating these pastries but went unreported. As a consequence of this epidemiological information, a laboratory study was made to establish just how well food poisoning staphylococci could grow in the incriminated filling.

METHOD

An unopened 23 pound tin of the powdered filling mix was secured from a local distributor. Using aseptic technique approximately 1250g ($\frac{1}{4}$ of the recipe on the container) of imitation cream filling was prepared according to directions on the label.

The requisite amount of cane sugar (227g) was dissolved in 661g of sterile boiling water. Next, 113.5g of the commercial filling mix were dissolved in 227g of sterile water and the concentrate was poured into the boiling sugar water and cooked briefly. Neither cooking time nor temperature was recorded but the process most certainly effected pasteurization.

Once prepared, the filling was distributed into 16 presterilized beakers. Beakers were then divided into 4 lots as follows:

Incubation temp.	Inoculated with 3000 organisms/g			Uninoculated
	LOT I (Culture K)	LOT II (Culture D)	LOT III (Culture T)	
25 C	50g	50g	50g	50g
32 C	50g	50g	50g	50g

Three cultures of coagulase-positive staphylococci previously isolated from outbreaks by this laboratory were used to inoculate three lots at the level of 3000 organisms per g. Lot I received culture K, a staphylococcus isolated from the doughnut filling which prompted this study. Lot II received culture D, a staphylococcus recovered from chocolate eclairs incriminated in an outbreak during October, 1961. Lot III received culture T, a staphylococcus isolated from turkey incriminated in a high school lunchroom outbreak in January, 1962. Lot IV served as uninoculated controls.

All beakers were covered with sterile aluminum foil. One half of the samples from each of the 4 lots was incubated at 25 C and the other half at 32 C. It was thought that continuous holding at 32 C would represent temperatures likely to be encountered during hot summer months; whereas, 25 C would more nearly approximate room temperatures during winter months.

Samples inoculated with staphylococci were examined at 20 and 40 hr. Filling was removed from the beaker, weighed to the nearest 0.1g, and mixed in a sterile Waring blender with sufficient sterile phosphate buffered diluent to make a 1:10 dilution. Operation of the blender motor on low speed for one minute gave a homogenous mixture without inducing excessive foaming.

One-tenth (0.1) ml portions from serial dilutions of inoculated samples were streaked onto the surface of duplicate, pre-poured mannitol salt agar (Difco) plates. After 48 hr incubation at 37 C, dilutions having between 30 and 300 mannitol positive colonies were counted and the results recorded.

Standard plate counts were obtained on powdered filling mix, prepared filling, and uninoculated control samples from serial dilution pour plates using standard methods agar (BBL). Results were read after 48 hr incubation at 32 C. Coliform counts on these samples were determined from violet red bile agar (Difco) pour plates incubated at 32 C for 24 hr. The absence of staphylococci in both powdered mix and prepared filling was ascertained by the method described for inoculated samples.

TABLE 1. BACTERIOLOGICAL QUALITY OF POWDERED PRODUCT BEFORE AND AFTER MIXING

Sample	Plate count/g	Coliform/g	Coagulase positive Staph/g
Before Mixing	<300	NG ^a	NG
After Mixing	<300	NG	NG

^aNG = No growth obtained.

TABLE 2. BACTERIAL GROWTH IN CONTROL SAMPLES

Method	25 C incubation		32 C incubation	
	20 hr	40 hr	20 hr	40 hr
Plate Count	<300/gm	NG ^a	<300/g	900/g
Coliform Count	NG	NG	NG	NG

^aNG = No growth obtained.

TABLE 3. INOCULATED SAMPLES — INITIAL INOCULUM IN ALL CASES WAS 3000 PER GRAM

Staphylococcus culture	25 C incubation		32 C incubation	
	20 hr	40 hr	20 hr	40 hr
K	110,000	5,200,000	32,000,000	67,000,000
D	80,000	9,800,000	11,000,000	59,000,000
T	25,000	770,000	2,900,000	30,000,000

RESULTS

From Table 1 it will be seen that the raw powdered mix was an excellent product bacteriologically. It contained no coliform organisms, no staphylococci, and less than 300 viable bacteria per g. Few organisms seem to have been introduced during preparation through the addition of sugar and vegetable oil since counts in the mixed filling were essentially the same as for the powdered mix. The initial pH of the filling was 6.89.

A slight increase in numbers of organisms was observed in control samples only after 40 hr incubation at 32 C (Table 2). Coliform counts were consistently negative on all samples.

Contrary to the manufacturer's belief, food poisoning staphylococci grew very well in this imitation cream product (Table 3). No appreciable difference was noted in the abilities of cultures K and D to multiply at both 25 C and 32 C; culture T did not appear to grow as well as did the other two. It was far from being inhibited completely, however, increasing from the initial level of 3000 per g to 30,000,000 per g after 40 hr incubation at 32 C.

DISCUSSION

The necessity for adequate and continuous refrigeration of cream filled bakery products is not disputed. Modern food technology has endeavored to overcome the hazards associated with this type pastry through the development of imitation cream fillings which will not support the growth of food poisoning organisms. Evidence is presented here to indicate that at least one such formulation has not been successful in this regard.

Crisley, Angelotti and Foter (2) inoculated seven "synthetic" cream fillings with *Staphylococcus aureus* 196E. Of these, five failed to support growth and two allowed only a slight increase in 72 hr at room temperature. However, when placed in pastry shells, all fillings supported luxuriant growth at the interface of shell and filling. The addition of milk and/or eggs to these fillings also enhanced their ability to actively sustain staphylococcus.

At present, manufacturers' recommendations often state or give the impression that their imitation product is safe for use without refrigeration regardless of temperature. As a result of these recommendations, vendors, bakers, and food service operators in general are becoming extremely careless with these products. Leaving doughnuts containing imitation cream filling in an unrefrigerated vending machine from Friday morning until Monday morning is a noteworthy example. Similarly, such pastries are now found with increasing frequency among unrefrigerated bakery items offered to the consumer at a reduced price as "slightly stale" or "day-old". Sanitarians

have noted that restaurateurs supplied with imitation custard pies are also following the trend toward non-refrigeration.

Unless present formulations are improved or unless manufacturers' recommendations are altered to impress upon the user the necessity for refrigeration, an increase in the incidence of food poisoning attributable to imitation cream filled products can reasonably be expected. Cream filling whether imitation or

real still requires refrigeration at 45 F or below from the time of preparation to the time of sale.

REFERENCES

1. Casman, E. P., Division of Microbiology, Food and Drug Administration, U. S. Department of Health, Education, and Welfare, Washington, D. C. Personal communication.
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FASTER ENUMERATION OF PSYCHROPHILIC BACTERIA IN PASTEURIZED MILK - A PRELIMINARY REPORT¹

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SUMMARY

Of the 58 chemicals tested, the following were considered effective as selective inhibitors for gram-positive organisms in milk: sodium desoxycholate, alkylmethyl benzyl ammonium chloride, methyl dodecyl trimethyl ammonium chloride, alpha-bromolauric acid, alpha-bromomyristic acid.

The quality control laboratory of the up-to-date milk plant has need for a faster method of making psychrophilic counts. The Standard Methods procedure (10) requires a plate incubation period of 7-10 days. Moseley (6) suggests making the Standard Plate Count before and after incubating the milk sample for 5 days at 45 F. With either method, a minimum of 7 days must elapse after plating before results are available. Other workers (3, 5, 11) have used plate incubation periods as long as 14 and 20 days. Even a delay of as much as 7 days complicates the task of correlating plant operations with milk quality.

Selective inhibition of certain types and strains of bacteria is a principle or procedure familiar to all microbiologists. The authors have been interested in the possibility of using this principle as the basis for modifying the Moseley (6) test to obtain a more rapid method of enumerating psychrophilic microorganisms in pasteurized milk. It was thought that if, in the Moseley procedure, a selective gram-positive inhibitor could be added to the milk sample prior to incubation, the incubation temperature could be

raised, thereby shortening the incubation time. Obviously, the application of this principle is dependent upon the discovery of a chemical or chemicals with good selective inhibitory characteristics.

The grouping of bacteria into two categories - psychrophilic and non-psychrophilic - based on their gram staining characteristics may not, in all instances, produce two mutually exclusive groups, as indicated by Witter (12). It has been pointed out, however, that most of the psychrophiles of practical importance to the dairy industry are gram-negative organisms (1, 2, 4, 8, 9, 9a). This broad assumption, rather strongly supported by the report of Schultze and Olson (9a), was the fundamental justification for the experiments outlined in this paper.

A search of the literature disclosed the fact that many dyes and other chemicals have been tried as inhibitors of one or more species of gram-positive bacteria (7). These references served as the basis for selecting most of the chemicals used in this study.

EXPERIMENTAL

General Procedure

Sterile reconstituted skim milk (ca. 8.95% solids) dispensed in screw-capped test tubes was the substrate employed. Experimental tubes received the inhibiting agent immediately prior to inoculation. Control and experimental tubes, following inoculation with the organism being tested, were incubated for 24 hrs at 23 C. Standard Plate Counts (10) were made on the contents of all tubes at the end of the incubation period. The plates were incubated at 32 C. Estimates of the bacterial populations in the inoculated tubes prior to incubation were obtained by making direct microscopic or standard plate counts of the inoculum.

¹The investigation reported in this paper is in connection with a project (No. 408) of the Kentucky Agricultural Experiment Station and is published with approval of the Director. Data presented constitute a portion of a thesis offered by N. V. Nanavati in partial fulfillment of the M. S. degree at the University of Kentucky.

²Deceased.

The cultures employed which were identified as to species were obtained either from American Type Culture Collection or from the private collections of other bacteriologists. They include the following: gram-positive species: *Micrococcus freudenreichii*, *Micrococcus conglomeratus*, *Micrococcus varians*, *Streptococcus durans*, *Staphylococcus epidermidis*, *Microbacterium lacticum*, *Microbacterium thermosphactum*, *Lactobacillus bulgaricus*, *Micrococcus flavus*, *Streptococcus lactis*. Gram-negative species: *Alcaligenes viscolcaligenes*, *Pseudomonas fragi*, *Alcaligenes metalcaligenes*, *Pseudomonas putrefaciens*, *Aerobacter aerogenes*, *Pseudomonas mucidolens*, *Escherichia coli*. Cultures which were uncharacterized beyond their gram staining characteristics were isolates obtained from bottled milk commercially processed in Lexington plants.

Screening Methods

1. *Dyes*. Five gram-positive organisms were used in the preliminary screening. Each of the 32 dyes was used at 0.001% concentration in the experimental tubes which, after inoculation, were incubated at 23 C for 72 hrs, then observed. Tubes with contents showing visual change were discarded. The cultures in the remaining tubes were analyzed by the standard plate count procedure.

2. *Other chemicals*. Five gram-positive and five gram-negative organisms were used. Twenty-six chemicals other than dyes were included in the screening tests. Initial concentration of inhibitor was selected on the basis of information in published literature. If the selected concentration did not appear suitable after the first trial, the concentration was varied in subsequent trials until an optimum was found. This was the concentration which gave maximum inhibition of growth of the gram-positive organisms with a minimum inhibition of growth of the gram-negative organisms.

Verification Methods

The procedure was essentially the same as Screening Method 2 except that 18-20 gram-positive organisms were used. Concentrations of inhibiting agents selected were based on the results of the screening tests.

RESULTS AND DISCUSSION

Dyes

Of the 32 dyes (7) subjected to the preliminary screening test, only five produced results indicating their possible usefulness as selective inhibitors of gram-positive organisms in pasteurized market milk. The results of the final screening tests on these five dyes, using gram-negative as well as gram-positive organisms, are shown in Table 1. It will be noted

TABLE 1. EFFECT OF 0.001% CONCENTRATION OF CERTAIN DYES ON GROWTH OF GRAM-POSITIVE AND GRAM-NEGATIVE ORGANISMS IN MILK^a

Dye	Gram-positive cultures					Gram-negative cultures				
	a	b	c	d	e	A	B	C	D	E
Malachite green	+	-	+	-	-	+	+	+	-	+
Basic fuchsin	+	+	+	+	+	+	+	+	+	+
Brilliant green	+	-	+	-	-	+	+	+	-	+
Crystal violet	+	-	+	-	-	+	+	+	+	+
Gentian violet	+	-	+	-	-	+	+	+	+	+

^a(+) = Growth; (-) = inhibition

that at 0.001% concentration none of the dyes was effective in inhibiting all of the gram-positive test organisms. These dyes were then tested at 0.01% concentration. Although there was almost complete inhibition of the gram-positive bacteria at the higher dye concentration, there was also some inhibition of the gram-negative cultures. On the basis of these results it was decided that the dyes were not sufficiently promising to warrant further study at this time. Consequently, verification tests were not made.

Other dyes eliminated as a result of screening were: congo red, methylene blue chloride, methylene blue thiocyanate, brom phenol blue, cresol red, eosin Y, thionin, safranin, Nile blue sulfate, thymol blue, neutral red, nigrosin, tartrazine, alizarine red, alpha-zurin 2G, dichlorofluorescein, brom thymol blue, dahlia, 2-7 alphanine red, xylene cyanole, methyl green, methyl violet, brom cresol green, victoria blue, methyl red, rosaniline hydrochloride, janus green, and 5-nitro-2-naphthol-4-sulfonic acid sodium salt.

Other chemicals

In the interest of conserving space, only the results obtained with the chemicals subjected to "verification" testing are given in this report. Other chemicals which showed some promise based on the screening test, but which were not verified be-

TABLE 2. EFFECT OF 0.5% SODIUM DESOXYCHOLATE ON THE GROWTH OF GRAM-POSITIVE AND GRAM-NEGATIVE ORGANISMS IN MILK

Type of culture	No. of cultures tested	Average initial count per ml	Average control count per ml	Average experimental count per ml
<i>Trial 1</i>				
Gram-positive	19	4,200	300,000,000	330
Gram-negative	10	790	110,000,000	210,000,000
<i>Trial 2</i>				
Gram-positive	17	210	31,000,000	0
Gram-negative	10	250	74,000,000	99,000,000

cause of lack of time, were sodium selenite, bile salts, 2-3-5-triphenyl tetrazolium chloride (TTC), neotetrazolium chloride, and sodium salt of ricinoleic acid.

1. *Sodium desoxycholate*. Results of verification trials are presented in Table 2. Values shown are the arithmetic averages resulting from individual trials with the 10 to 19 cultures employed. The data indicate that sodium desoxycholate at 0.5% concentration effectively inhibited the growth of the gram-positive organisms, with no apparent effect on the gram-negative organisms. In Trial 1, nine of the gram-positive cultures exhibited no growth in the "experimental" tubes, while the count in the other ten tubes was lower, in each instance, than the initial count.

2. *Alkyldimethyl benzyl ammonium chloride*. Results of the experiments with this chemical are shown in Table 3. Although there appeared to be very slight growth of the gram-positive organisms and slight inhibition of the gram-negative cultures, this quaternary ammonium compound seems to have definite selective inhibitory properties. Only one of the 14 gram-positive organisms produced bacterial colonies (80/ml), and the count in this tube was lower than the initial count (before incubation). One gram-negative culture was completely inhibited, and four others showed some inhibition. Further study of alkyldimethyl benzyl ammonium chloride would seem justified.

3. *Methyl dodecyl trimethyl ammonium chloride*. According to the data presented in Table 4, this quaternary is somewhat more effective as a selective inhibitor than the preceding one. Fourteen of the

TABLE 3. EFFECT OF 0.025% ALKYLDIMETHYL BENZYL AMMONIUM CHLORIDE ON THE GROWTH OF GRAM-POSITIVE AND GRAM-NEGATIVE ORGANISMS IN MILK

Type of culture	No. of cultures tested	Average initial count per ml	Average control count per ml	Average experimental count per ml
Gram-positive	14	1,300	200,000,000	6
Gram-negative	10	860	110,000,000	85,000,000

gram-positive organisms in Trial 1 exhibited no growth during incubation, whereas there was no inhibition of the gram-negative cultures. In Trial 2 the gram-positive bacteria were completely inhibited, with no evident effect on the gram-negative organisms.

4. *Alpha-bromolauric acid*. This compound, as indicated by the data in Table 5, showed some promise as a selective inhibitor of gram-positive bacteria,

TABLE 4. EFFECT OF 0.025% METHYL DODECYL TRIMETHYL AMMONIUM CHLORIDE ON THE GROWTH OF GRAM-POSITIVE AND GRAM-NEGATIVE ORGANISMS IN MILK

Type of culture	No. of cultures tested	Average initial count per ml	Average control count per ml	Average experimental count per ml
<i>Trial 1</i>				
Gram-positive	19	4,200	290,000,000	4
Gram-negative	10	810	110,000,000	470,000,000
<i>Trial 2</i>				
Gram-positive	17	210	13,000,000	0
Gram-negative	10	250	74,000,000	83,000,000

although there was slight growth in the gram-positive cultures and some inhibition of the gram-negatives. All but three of the gram-positive organisms were completely inhibited, whereas only three gram-negative cultures were considered to have been seriously inhibited. It seems that alpha-bromolauric acid should be subjected to further trials, possibly using concentrations of greater refinement than were used in these experiments.

TABLE 5. EFFECT OF 0.01 N CONCENTRATION OF ALPHA-BROMOLAURIC ACID ON THE GROWTH OF GRAM-POSITIVE AND GRAM-NEGATIVE ORGANISMS IN MILK

Type of culture	No. of cultures tested	Average initial count per ml	Average control count per ml	Average experimental count per ml
Gram-positive	16	2,600	160,000,000	33
Gram-negative	10	3,800	210,000,000	130,000,000

5. *Alpha-bromomyristic acid*. Results of the trials with this chemical, shown in Table 6, indicate that it was slightly more effective as a selective inhibitor than alpha-bromolauric acid. This compound completely inhibited growth of the 16 gram-positive organisms in milk. Although the average results shown in Table 6 show a slight suppression of growth in the

TABLE 6. EFFECT OF 0.01 N CONCENTRATION OF ALPHA-BROMOMYRISTIC ACID ON THE GROWTH OF GRAM-POSITIVE AND GRAM-NEGATIVE ORGANISMS IN MILK

Type of culture	No. of cultures tested	Average initial count per ml	Average control count per ml	Average experimental count per ml
Gram-positive	16	1,300	200,000,000	0
Gram-negative	10	860	110,000,000	92,000,000

tubes containing the gram-negative cultures, appreciable inhibition was limited to one or two cultures.

Other chemicals eliminated as a result of screening were: phenol, methyl hydroxy benzoic acid, para bromo phenol, Naccanol, propyl-parahydroxy benzoic acid, 2, 4 dihydroxy benzoic acid, sodium oleate, caproic acid, capric acid, caprylic acid, and the detergents Gemex, Monidet, Tergitol, Non-501, Tergitol 7, and Manoxol.

SUMMARY AND CONCLUSIONS

Of the 32 dyes and 26 other chemicals subjected to screening and verification trials, five of the latter ("other chemicals") were considered effective as selective inhibitors for gram-positive organisms in milk. These were: sodium desoxycholate, alkyl-dimethyl benzyl ammonium chloride, methyl dodecyl trimethyl ammonium chloride, alpha-bromolauric acid, and alpha-bromomyristic acid.

By the use of these inhibitors, gram-negative counts of milk samples were obtained in 72 hrs. This procedure should be subjected to further study, using a larger number of species and strains of both gram-positive and gram-negative organisms. Experiments should be conducted using a mixed culture of two or more species and/or strains of bacteria, inasmuch as the trials reported herein involved the use of single-species cultures only.

Preliminary trials are now in progress using each of the above five chemicals as additive ingredients in standard methods agar. If this approach proves to be feasible, it would seem to offer the possibility of shortening the time required for obtaining psychrophilic counts by an additional 24 hrs.

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STAINING OF BACTERIA IN MILK FOR DIRECT MICROSCOPIC EXAMINATION—A REVIEW

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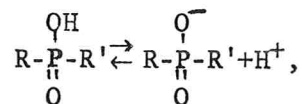
In the direct microscopic method for examining milk for bacteria, it is important that an adequate staining method be used. The method should stain clearly all bacteria present so that they can be identified readily and counted under the microscope. The problem of adequate staining has become more acute with the introduction of the direct microscopic count into Federal Standards for nonfat dry milk, (33) since the processing kills most of the bacteria and decreases their ability to take up stains. The direct microscopic count, despite its shortcomings (12), gives a general picture of the quality of raw milk used and the hygiene of manufacture of nonfat dry milk (7, 12), and is probably the best method for this purpose.

Staining of biological materials is essentially the binding of dyes to various chemical constituents of the object under study. In the case of milk, the objective is, of course, to stain the bacteria as heavily as possible without staining the milk film unduly. Biological staining methods are necessarily somewhat empirical because of the complex stereochemistry of both the dyes and the biological compounds to which they are bound. It is nevertheless, possible in many cases to apply sound physical and chemical principles to the development of staining methods. Until quite recently, the approach to the staining of bacteria in milk has been entirely empirical, and has consisted mostly of formulating a single dye, methylene blue, in various solvents. Results were never entirely satisfactory, although over the years procedures have improved considerably.

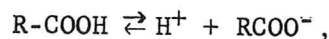
In the development of suitably selective staining procedures for bacteria in milk, it is helpful to consider the chemical composition of the bacteria and the milk. Both contain protein; bacteria, in addition, contain considerable amounts of nucleic acids and perhaps some other polyphosphate materials; gram-positive bacteria, at least, contain a great deal of polysaccharide material in the cell wall (30). By using stains specific for nucleic acids or polysaccharides, then, it should be possible to selectively stain bacteria with little staining of the milk background.

Selective staining of nucleic acids with basic dyes is based on the fact that phosphoric acid is a stronger acid than the carboxylic acids commonly found in

biological materials such as proteins (28, 32). Nucleic acids are polyphosphates in the structure,



where R and R' represent the remainder of the nucleic acid molecule. Proteins contain free carboxylic acid groups in the form,



where R represents the remainder of the protein molecule. In slightly acid solution, basic dyes pick up a hydrogen ion and carry a positive charge. The positively charged dye is then bound to the negatively charged groups on the proteins or nucleic acids by the attraction of the oppositely charged ions. The above equations show that, as the hydrogen ion concentration of the medium is increased, the equilibrium will shift toward the unionized forms of the acids and they will lose their ability to take up basic dyes. The phosphates remain dissociated into ions at a lower pH than the carboxyls, therefore, nucleic acids can be selectively stained by suitably adjusting the pH of the dye solution. In practice, dissociation of carboxyls is almost completely suppressed at pH 4 while phosphates of the nucleic acids remain in ionic form to about pH 2 (28, 32). Another means of suppressing the dissociation of molecules into ions is to lower the dielectric constant of the medium (11) by using organic solvents instead of water. Dissociation of the weaker carboxylic acids is affected more than is dissociation of the phosphates. Lowering the dielectric constant will also, however, tend to reduce the percentage of dye which is in ionic form, whereas lowering the pH will not.

The standard methylene blue stains used for staining bacteria in milk are, in fact, nucleic acid stains which use one or a combination of the above methods to selectively stain bacterial nucleic acids. The stains were developed empirically. The original Breed stain (4) used a water-ethanol solvent and tended to overstain the milk proteins. Levine (15, 16, 17) found that 95% ethanol was more a satisfactory

solvent and attempted to explain his results solely on the basis of changes in surface tension, without considering the reduced dielectric constant of the medium. The carbolated aqueous methylene blue stain (6) used phenol to acidify the medium which also tended to overstain the background (17, 18). Phenol is a very weak acid and evidently did not lower the pH sufficiently to suppress staining of proteins. Levine and Black (17) observed that strong mineral acids or even too much acetic acid in the medium gave very light staining, as would be expected in too acid a medium. North (24) used an aniline-HCl buffer in ethanol-water and Levowitz and Weber (19) used organic solvents slightly acidified with acetic acid in their modification of the Newman-Lampert formula No. 2 (23).

Some staining formulations developed include fat solvent in the staining solution, thereby staining and defatting simultaneously (2, 5, 19, 23), thus making staining a "one-dip" procedure. This is certainly convenient if it can be done without sacrificing quality of the resulting stained smear. This method has, perhaps, been over emphasized, because even with the more involved procedures, the actual staining time is relatively brief compared with the time spent preparing smears and in microscopic examination of the stained smear. This is particularly true if a number of smears are stained at one time. Some authors (5, 10) have included in the formulations basic fuchsin, which stained bacteria blue against a pink background. The advantage of this method appears to be questionable (17) and such procedures have not been widely accepted. Comparative studies (1, 20, 26, 34) have shown that of the methylene blue stains, the aniline oil, the Levowitz-Weber, and the acid- and water-free procedures are most satisfactory and are recommended in the 11th Edition of Standard Methods (31).

Methylene blue, unfortunately, is a rather poor stain for nucleic acids and is not now generally used for this purpose in histology and cytology (8, 28). The first break from methylene blue is the procedure of Anderson, Gunderson, and Moehring (3), in which the methylene blue is polychromed. Polychroming is an oxidation process which converts the methylene blue to a mixture of related thiazine dyes such as the azures and thionin (8). These are generally considered to be more satisfactory nucleic acid stains than pure methylene blue (8, 28, 32). Polychroming is, however, the difficult way to obtain these dyes, considering that they are available commercially. Anderson (2) also recognized this and recently described a single-solution nuclear staining procedure using azure A in which defatting and fixing agents are incorporated into the dye solution. Olsen and Jezeski (25) treated milk smears with strong alkali

before staining with crystal violet. Alkali treatment is supposed to increase dye uptake by proteins. Since both bacteria and milk contain protein, it is not clear why increasing dye uptake by proteins should be advantageous in staining bacteria in milk. The approach may ultimately prove satisfactory for reasons other than those given. Neither the Anderson nor the Olsen-Jezeski stain has been evaluated in published independent comparisons.

The author studied the use of a polysaccharide stain, the periodic acid-Schiff reaction, for selectively staining bacteria in milk (21, 22). This type of staining was recently reviewed by Kasten (14). In this procedure, the smear is treated with periodic

acid which oxidizes structures of the type $\begin{matrix} \text{OH} & \text{OH} \\ | & | \\ -\text{C} & -\text{C}- \end{matrix}$, such as are found in polysaccharides, to $-\text{CHO} \text{OHC}-$, splitting the carbon-carbon bond and forming two aldehyde groupings. The polyaldehydes thus formed are then reacted with Schiff's reagent, a colorless complex of bisulfite and basic fuchsin, to give a magenta stain. The Schiff reagent prepared from basic fuchsin, however, gave too light a stain to be practical. Many other dyes also form complexes with bisulfite which react with aldehydes in a similar manner (9, 13, 27), although, unlike the classic Schiff reagent, the complexes are not colorless. Of a number of other dyes tested in the periodic acid-Schiff procedure, toluidine blue and azure A were the most satisfactory. Toluidine blue was selected for use since it is cheaper and more stable in solution. This stain, at its best, was very good, but the dye-bisulfite solution was not stable more than a few days.

An alternative method of polysaccharide staining was developed which overcame the problem of instability of the Schiff-type reagents. In the revised procedure, the polyaldehyde is reacted with bisulfite and then the aldehyde-bisulfite complex is reacted with the dye. This gives results identical with those obtained by reacting the aldehyde with the bisulfite-dye complex and has the advantage that the reagents are stable for a long time. The toluidine blue dye solution is buffered to pH 4 and, therefore, stains both nucleic acids and polysaccharides (21, 22).

The periodic acid procedure for polysaccharides is most advantageous for staining dead bacteria in nonfat dry milk. The author (22) found that, when bacteria are heated in milk, a large part of their nucleic acid content is extracted from the bacterial cells. Therefore, staining by the usual techniques, based on nucleic acid staining, is rather poor. Furthermore, the bacteria appear shrunken and are difficult to distinguish from particles of debris. When the periodic acid stain was used, no decrease in direct microscopic counts was observed after heating, and staining of the heat-treated bacteria was as

good as before heating, except in the case of gram-negative rods which were stained sufficiently by the periodic acid procedure to be counted, while they could not be seen at all when a standard methylene blue stain was used.

The direct microscopic count has not been used as a means of distinguishing between grades of nonfat dry milk because of the high interlaboratory variation in counts on duplicate smears observed in collaborative studies (29). With the periodic acid procedure, stained bacteria appear much larger and are much easier to identify positively. Contrast between bacteria and background is also much better. These features should make it easier for technicians to obtain reproducible results.

For bacteria in raw milk, use of the longer periodic acid procedure may not be justified. A good nuclear staining procedure such as that of Anderson (2) should be satisfactory. Another satisfactory procedure is to defat in xylene, fix a few minutes in 3:1 absolute ethanol-acetic acid until the smear appears clear, stain for 30 seconds in pH 4 toluidine blue (22), rinse lightly, and dry.

An effective method for staining gram-negative rods in heat-processed milk is still needed. Research on the development of new and improved stains for bacteria in milk should be encouraged.

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INTERFERENCE OF SANITIZERS WITH ANTIBIOTIC DISC ASSAY TESTING OF MILK

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SUMMARY

Five commercial sanitizers were added to milk containing added antibiotics at a concentration range likely to be found in milk; to determine if the presence of the sanitizer would interfere with the estimation of antibiotics by the disc assay method. The sanitizers used were acid, halogen and quaternary types, representing a range of commercial currently used products. The results obtained indicated no interference with the antibiotic disc assay test when the residual sanitizers were present even at much higher concentrations than would be expected under good operational practices.

The subject of antibiotic testing of milk and the factors affecting the estimation (4, 5, 6) has occupied a considerable portion of the literature during the last decade. It is well known that certain residual sanitizers gaining access to milk may interfere with acid production by starter organisms (7) and yet go undetected by the standard disc assay test method for antibiotics. The quaternary ammonium compounds for instance can interfere with starter activity at as low a level as 2-3 ppm (7) and are only detected by the disc assay test method when present at a level of 100-200 ppm. Halogenated compounds used as sanitizers might well interact with antibiotics in solution in milk to cause partial inactivation especially with the more easily oxidizable antibiotics such as chlorotetracycline (aureomycin) or oxytetracycline (terramycin). The possible synergistic or antagonistic effects of sanitizers on residual antibiotics in milk and the consequential interference with the antibiotic disc assay test (1) was therefore thought to be worthy of investigation.

EXPERIMENTAL PROCEDURE

Penicillin, terramycin, aureomycin and streptomycin were selected for the present test studies as these antibiotics are commonly used for mastitis treatment and, furthermore, *Bacillus subtilis* spores can be used as test organism for all of these antibiotics. The antibiotics were commercial samples and the concentrations used covered a range likely to be found in milk. Each antibiotic was weighed on an analytical balance, dissolved in homogenized milk and diluted further with milk containing added sanitizers to give the final desired antibiotic and sanitizer concentration. The disc assay method (1) was used for antibiotic estimation. *Bacillus subtilis* spores (6633 ATCC) and penicillin assay agar were obtained from

Difco Laboratories. Half-inch paper discs were obtained from Schleicher and Schuell Paper Company. The following germicidal products were used:

Product A—An acid liquid based on free alkyl aryl sulfonic acid as the active germicide.

Product B—A neutral liquid quaternary with n-alkyl ($C_{14}C_{12}C_{16}$) dimethyl benzyl ammonium chloride as the active agent.

Product C—An acidic liquid iodoform based on iodine dissolved in a nonionic surfactant.

Product D—An active chlorine powder of weakly acid reaction based on 1,3-dichloro-5,5-dimethyl hydantoin as the germicidal agent.

Product E—An active chlorine powder of neutral pH based on dichloroisocyanuric acid as the germicidal agent.

Product F—An active chlorine powder of weakly alkaline pH based on chloramine T as the germicidal agent.

All sanitizers were weighed on an analytical balance, dissolved in homogenized milk and diluted immediately in homogenized milk containing added antibiotics to give desirable concentrations of active agent. The halogenated materials were tested for available chlorine by the thiosulfate method prior to use.

RESULTS

The sulfonic acid sanitizer, A, at all concentrations tested did not interfere with the estimation of penicillin in milk (Table 1), but had a pronounced effect on the amount of streptomycin detectable especially when present at 400 ppm. Sanitizer A had no effect on terramycin at a concentration of 200 ppm, but had an additive effect at 400 ppm. When no antibiotic was present in the milk, A did not show any zone of inhibition when present up to the extent of 200 ppm.

Quaternary Sanitizer B showed little effect on the estimation of antibiotics in milk when present at a concentration of 100 and 200 ppm, but produced zones of inhibition when added to milk free from antibiotics (Table 1).

The iodoform sanitizer, Sanitizer C, when added to milk at concentrations of 100 and 200 ppm had no adverse effects on antibiotic assay. This sanitizer did not produce zones of inhibition when present in milk free from antibiotics at the concentrations used (Table 1).

Sanitizers D, E and F had no effect on the estima-

TABLE 1. EFFECTS OF ADDED SANITIZERS ON MILK CONTAINING ANTIBIOTICS^a

Antibiotic concentration in milk	Sanitizer ^c	Zone of inhibition in cm ^b			
		Sanitizer conc. ppm active agent in milk			
		0	100	200	400
Penicillin					
(I.U./ml)					
1.0	A	2.45	2.45	2.45	2.40
0.1		1.85	1.85	1.85	1.80
1.0	B	2.30	2.40	2.50	—
0.1		1.75	1.60	1.60	—
1.0	C	2.30	2.30	2.30	—
0.1		1.75	1.75	1.70	—
Streptomycin					
(μ g/ml)					
10.0	A	1.80	1.80	1.80	1.45
5.0		1.60	1.60	1.60	Trace
10.0	B	1.85	1.90	1.90	—
5.0		1.65	1.55	1.55	—
10.0	C	1.85	1.85	1.85	—
5.0		1.65	1.55	1.55	—
Oxytetracycline (Terramycin)					
(μ g/ml)					
3.0	A	1.70	1.80	1.85	2.00
0.3		Trace	Trace	Trace	1.50
3.0	B	1.80	1.80	1.90	—
0.3		Trace	1.40	1.50	—
3.0	C	1.80	1.80	1.80	—
0.3		Trace	Trace	Trace	—

^aAll samples heated to 80 C for three minutes before disc assay.

^bZone of inhibition = diameter of disc (1.27 cm) + zone diameter.

^cSanitizers without addition of antibiotics gave no zone of inhibition except for A which gave a zone of 1.45 cm at 400 ppm and B which gave a trace at 100 ppm and 1.45 cm at 200 ppm.

tion of penicillin or streptomycin when added to milk at a rate of 250 and 500 ppm. However, these sanitizers had a marked effect on the amount of terramycin and aureomycin detectable when added to milk at the above concentrations (Tables 2 and 3). Both E and F formulations seem to be much more destructive agents for these antibiotics than D or sodium hypochlorite.

None of the halogenated compounds listed in this table gave zones of inhibition when present at a concentration of 500 ppm in absence of antibiotics.

The action of chlorinated sanitizers on oxytetracycline (terramycin) was studied in phosphate buffer at pH 7. It was found that D, E and F formulations when present in the buffer at as low a level as 3.9 ppm available chlorine completely inactivated oxytetracycline (terramycin) present at a concentration of 3 μ g/ml of buffer. No organic matter from milk was present in this test and the active chlorine was fully available to react with the antibiotic.

DISCUSSION

The action of Sanitizer A on the antibiotic streptomycin may be a hydrolytic effect as this compound on hydrolysis yields streptomine in acid conditions. Sanitizer A when added to milk at a concentration of 400 ppm gives a pH of less than five so that it could bring about the hydrolysis of streptomycin in this pH range.

Sanitizer B gave zones of inhibition when added to milk at 100 and 200 ppm, but did not interfere to any extent with the estimation of added antibiotics in milk.

The iodoform, Sanitizer C, did not interfere with antibiotic testing of milk at the concentrations used. Since about 50 ppm is the usual use concentration, it was considered unnecessary to test at higher levels than 200 ppm.

The action of the chlorinated sanitizers on terramycin and aureomycin is probably an oxidation effect as low levels of hydrogen peroxide will also inactivate these antibiotics. No explanation other than the effect of the cyanuric acid and para sulfonamide residues left after the available chlorine is removed is offered for the fact that Sanitizers E and F seemed to be much stronger inactivators of these antibiotics than the other chlorinated compounds used.

The extent to which the use of Sanitizer E can contribute cyanuric acid salt residue to food products has been estimated by means of experiments employing carbon-14-tagged dichloroisocyanuric acid (2, 3). The estimation revealed that the magnitude of the residue on stainless steel resulting from solutions containing 100 ppm available chlorine is in the range of 0.71 to 0.90 μ g per square inch. By calculation using the value of 0.90 μ g per square inch the contribution of residue to food products such as milk in sanitized tanks is 0.0071 and 0.0026 ppm dichloroisocyanuric for a 250 and a 5000 gallon tank, respectively (3). These amounts are considered insignificant both in view of the relatively non-toxic nature of cyanuric acid and the fact that the amount of active chlorine in association with this cyanuric acid residue would be even still less.

The action of the chlorinated sanitizers on oxytetracycline (terramycin) in buffer clearly demonstrates the greater activity of chlorine on this type of antibiotic structure in absence of organic matter.

CONCLUSION

It appears that any of the sanitizers tested when used according to the manufacturer's directions could not result in contamination of milk to a degree that any effect would result on tests for presence of antibiotics in the milk. With adequate draining, and with or without rinsing of processing equipment, the po-

TABLE 2. COMPARATIVE ACTION OF ACTIVE CHLORINE SANITIZERS ON ANTIBIOTIC OXYTETRACYCLINE (TERRAMYCIN) IN MILK^a

Sanitizer in milk		Zone of inhibition in cm ^b						
		ppm available chlorine in milk						
		0	31.25	62.5	125	250	500	500 ^c
Sodium hypochlorite (NaOCl)	UH ^c	1.75	1.75	1.70	1.60	1.40	None	None
	H ^d	1.75	1.70	1.70	1.50	Trace	None	None
Sanitizer D	UH	1.75	1.75	1.75	1.75	16.0	None	None
	H	1.75	1.75	1.75	1.70	1.50	None	None
Sanitizer E	UH	1.75	1.65	1.45	None	None	None	None
	H	1.75	1.65	1.45	None	None	None	None
Sanitizer F	UH	1.80	1.75	1.70	1.45	None	None	None

^aTerramycin was added to milk at a level of 3 μ g oxytetracycline/ml.

^bZone of inhibition = diameter of disc (1.27 cm) + zone diameter.

^cUH denotes sample was unheated prior to disc assay.

^dH denotes sample was heated to 80 C for two minutes prior to disc assay.

^eIn absence of antibiotic.

TABLE 3. COMPARATIVE ACTION OF ACTIVE CHLORINE SANITIZERS ON ANTIBIOTIC CHLOROTETRACYCLINE (AUREOMYCIN) IN MILK

(MILK CONTAINED 3 μ g/ml CHLOROTETRACYCLINE EXCEPT WHERE NOTED)

Sanitizer in milk	Zone of inhibition in cm ^a						
	ppm available chlorine in milk						
	0	31.25	62.5	125	250	500	500 ^b
Sanitizer D	2.05	2.10	2.10	2.05	1.90	None	None
Sanitizer E	2.05	1.95	1.70	None	None	None	None
Sanitizer F	2.05	1.95	1.90	1.60	None	None	None

^aZone of inhibition = diameter of disc (1.27 cm) + zone diameter.

^bIn Absence of antibiotic.

tential levels of sanitizer residues added to milk are far below the levels tested in this work. Amounts of the sanitizers below 31.25 ppm show no evidence of giving false positive or false negative results for the antibiotics tested in normal homogenized whole milk.

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NEWS AND EVENTS

WISCONSIN "SANITARIAN OF YEAR" FOR 1964 September 10, 1964

This year's recipient is a past-president of the Wisconsin Association of Milk and Food Sanitarians and also a past-president of the Wisconsin Association of Sanitarians.

He grew up on a Wisconsin dairy farm and also spent six years working in a dairy plant before officially becoming a sanitarian.

The "sanitation profession" almost lost him to the medical profession, and would, no doubt, have lost him if the "great depression" had not interrupted his medical school training which was well under way. He left medical school to take a job in a dairy plant. While so engaged, he found that there were many things to learn about the technical side of sanitation and the dairy industry, and came back to the University. At this time, he enrolled at the Department of Dairy Industry. Following this training, he took a position as a state dairy inspector under the late L. G. Kuenning, who was at that time, chief of the Dairy and Food Division of the Wisconsin State Department of Agriculture.

Your recipient continued as a state dairy inspector until 1944 when he became the milk sanitarian for the State Board of Health, and shortly thereafter Chief of Milk Certification for Wisconsin. This is the position which he now holds. In this position, he has demonstrated the courage, forthrightness, and integrity for which he is well known in the milk sanitation circles throughout the nation.

He is a family man and justifiably proud of his fine family—his wife, two daughters, a granddaughter and a grandson. In spite of an extremely busy schedule in his professional work, he has found time to be very active in the affairs of his church, and has taught Sunday school for many years.

His accomplishments are many and difficult to outline without too many important omissions.

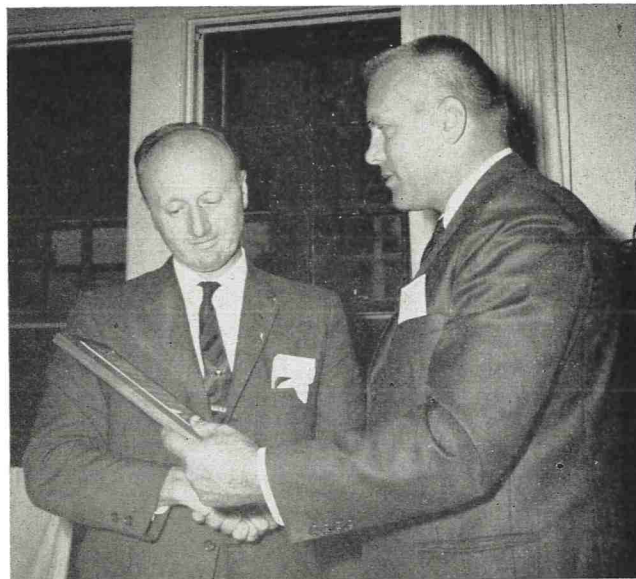
1. *Activities of State-wide Scope*

State-wide Grade A Milk Program

He took the leadership in the development of a state-wide grade A milk program—starting from "scratch" and culminating, within a fifteen year period, in a program which requires grade A compliance for all regular commercial sales of milk to consumers in Wisconsin.

2. *Development of State and Local Cooperation*

He has furnished the leadership for the development of the finest kind of mutually agreeable state and local relationships. This is a cooperative health program where each has a definite part to fulfill



Wisconsin Sanitarian of the Year Award presented by President Dan G. Jindra (right) to Clarence K. Luchterhand, Chief of the Milk Certification Division of the Wisconsin Board of Health.

without stepping out of bounds in each others sphere of influence. It is indeed one of his finest accomplishments for which all Wisconsin sanitarians can be justifiably proud.

3. *Development of Wholehearted Teamwork Between Industry and Official Agencies*

He has continuously worked hard and unselfishly on the development of wholehearted teamwork between industry and the state and local agencies concerned.

4. *Reciprocal Milk Control*

He was one of the pioneers in working out a system of reciprocal milk control which is acceptable to both receiving and shipping area authorities. This was first developed through a large committee representative of all interests concerned and officially promulgated through a joint regulation by the State Department of Agriculture and the State Board of Health. This was later implemented to a finer degree through the Wisconsin Conference on Intra-state Milk Shipments of which our recipient was also a founder.

5. *Development of Uniformity in Interpretation and Application of the Standard Milk Ordinance and Code.*

For more than fifteen years our "Sanitarian of the Year" has worked inexhaustibly on a program of seminars for official sanitarians, plant fieldmen, plant employees, and producers. These were designed to bring about the greatest possible uniformity in under-

standing of the meaning and applications of the Standard Ordinance and Code.

1. *Activities of National or Regional Scope National Conference on Interstate Milk Shipments*

Our recipient is one of the founders of the National Conference on Interstate Milk Shipments which has become a clearing house for interstate reciprocity in sanitary milk control. He has been a member of the Executive Board, Chairman of a number of committees, and in general, a dynamic leader in many activities of that organization.

2. *3-A Sanitary Standards Committees*

Our "Sanitarian of the Year" was a member of the 3-A Sanitary Standards Committees for many years and a leader in the development of universally acceptable standards for dairy equipment nationally as well as in his own state.

3. *State Survey Officers Seminars*

Those who have participated in regional survey officers seminars know that our choice for this award has shown outstanding leadership in all of the survey officers seminars in which he has participated.

In summary, the integrity and honesty of his milk certification is nationally recognized by state milk regulatory agencies and leading local health departments throughout the nation. They know that they can rely on its accuracy. This has been and continues to be a tremendous asset to the industry as well as the milk sanitation profession.

Our award recipient has never sought any credit for himself, but has consistently given to others, the credit which he so richly deserves. Probably, the most salient characteristics of this ceaselessly exuberant, enthusiastic, and dynamic sanitarian, are his courageous and intelligent good will towards his fellowmen and his constant willingness to go more than "the second mile."

It is a great pleasure and a very real honor to present Clarence K. Luchterhand for the honor so richly deserved and so long over-due.

**PURDOM HEADS ENVIRONMENTAL
ENGINEERING PROGRAM AT
DREXEL INSTITUTE**

P. Walton Purdom has been appointed to full professorship in Environmental Engineering and Science and director of the Environmental Engineering and Science Program at Drexel Institute of Technology, it was announced today by Vice President - Provost, Dr. Allen Bonnell.

Dr. Purdom received his Ph.D. and master of governmental administration degree from the University of Pennsylvania, a master's degree in sanitary

engineering from the University of Michigan and his bachelor's degree in civil engineering from Georgia Tech.

Professor Purdom, a nationally-known specialist in public health, joined the Drexel staff in 1963 as associate professor of civil engineering with the responsibility of assisting in the development of a graduate curriculum in Environmental Engineering and Science. He subsequently was appointed to the post of associate director of the program which was formally initiated as a graduate curriculum leading to the master of science degree in the fall of 1963.

Environmental Engineering and Science at Drexel is concerned with the problems confronting all urban communities. The curriculum includes engineering, plus the physical, biological and social sciences whose application will produce an environment conducive to the healthful development of man and society.

Dr. Purdom is Chairman of the American Sanitary Engineering Intersociety Board and a Diplomate of the American Academy of Sanitary Engineers. He is a past president of the Pennsylvania Public Health Association and has been active in the American Public Health Association, the National Commission on Community Health Services, the American Society of Civil Engineers, the Air Pollution Control Association, the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, the National Association of Sanitarians, the International Association of Milk, Food, and Environmental Sanitarians, the Water Pollution Control Federation and the American Water Work Association.

Prior to joining the Drexel staff in September of 1963, Dr. Purdom was director of environmental health, Department of Public Health, for the City of Philadelphia. During Dr. Purdom's directorship, Philadelphia adopted a code and regulations governing all food handling operations, swimming pools, disposal of refuse and health conditions for places of work. A program was also initiated for controlling the use of x-ray machines and radio-active materials. A new air pollution code, plus a body of regulations were adopted and a complete reorganization of the environmental health services was accomplished which resulted in Philadelphia receiving the Crumline Award in 1961 for the outstanding environmental health program in the nation.

Since coming to Drexel, Dr. Purdom has served as consultant to the U. S. Public Health Service and the National Academy of Sciences-National Research Council. Dr. Purdom also is a member of the editorial staff of the Journal of Milk and Food Technology.

Dr. Purdom resides at 319 E. Durham Street in Philadelphia.

MYHR ELECTED SECOND VICE-PRESIDENT OF IAMFES

After a lapse of many years there now is international representation among the officers of IAMFES. This has occurred due to the election of Dr. Allan N. Myhr as Second Vice-President of the International. Dr. Myhr is an Associate Professor of Dairy Science at the University of Guelph, Guelph, Ontario. His principal responsibilities at the University are research and dairy products extension.



Dr. A. N. Myhr

Dr. Myhr was born at Preeceville, Saskatchewan. He graduated with distinction from the University of Saskatchewan and in 1952 received the M.S. degree (major-Dairy Bacteriology, minor-Biochemistry) from the University of Minnesota. He returned to the University of Saskatchewan as a member of the staff of the Department of Dairy Science and subsequently went back to Minnesota to continue his graduate studies. In 1958, he received the Ph. D. degree and again returned to the University of Saskatchewan as an Associate Professor of Dairy Bacteriology.

In 1963 Dr. Myhr left Saskatchewan to accept his present position at the University of Guelph.

Dr. Myhr's research interests are broad, including the heat resistance of microorganisms and factors affecting thermal tolerance, ultra high temperature processing of dairy products, antibiotic resistance of staphylococci associated with mastitis, and a variety of applied research problems concerning raw milk procurement and processing.

For many years Dr. Myhr has been a member of International and also is active in many other professional societies, including the American Society

for Microbiology, Agricultural Institute of Canada, and the American Dairy Science Association. He also is a Director of the Central Ontario Milk Sanitarian's Association, an affiliate of IAMFES and sponsor of the Association's annual meeting of 1963 which was held in Toronto.

Golf, curling, fishing, and music are active hobbies of Dr. Myhr. The latter has brought him considerable renown for he is an accomplished pianist, and his vocal talents led to his having served as a past president of the Saskatchewan Chapter of the Society for the Preservation and encouragement of Barber-shop Quartet Singing in America.

Dr. Myhr brings to the governing body of IAMFES a real enthusiasm for progressive activity and a perspective that encompasses all of the area of dairy, food, and environmental sanitation.

LETTER TO EDITOR

September 15, 1964

International Association of Milk, Food
and Environmental Sanitarians, Inc.

Attention: Mr. H. L. Thomasson
Box 437

Shelbyville, Indiana

Dear Friends,

It was with great pleasure and pride that I received the beautiful plaque and tribute which you so generously have paid me. It is indeed a beautiful thing and one which I shall treasure the rest of my life.

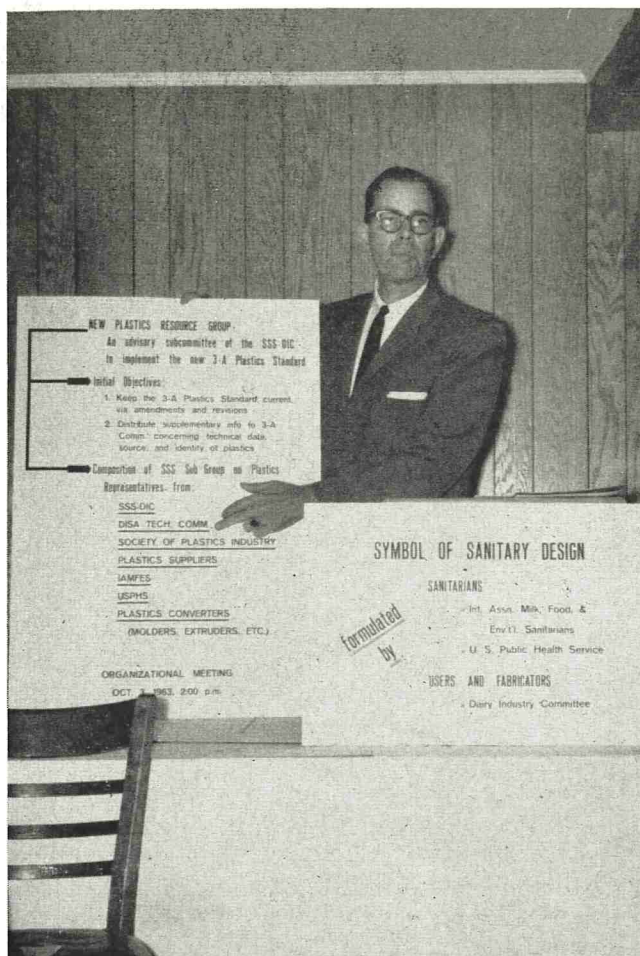
I wish to thank all of you most sincerely not only for this honor, but also for the warmth and friendships which I have enjoyed with so many of you for so many years.

Once again permit me to extend my very best wishes to the Association and principles for which it stands.

Sincerely yours,
Claire B. Shogren

3RD LATIN-AMERICAN MICROBIOLOGY CONGRESS

On December 6-12, 1964, the 3rd Latin-American Microbiology Congress will be held in Bogota, Columbia. Simultaneous translations will be made at all sessions. Special transportation rates are available to Bogota. For further information, contact Dr. Eduardo Castello, Coordination and Public Relations, 3rd Latin-American Microbiology Congress, Instituto Nacional de Salud, Calle 57, No. 8-35 Apdo Aereo 3495, Bogota D.E., Colombia, South America.



Dick Whitehead, Klenzade Company, Jackson, Mississippi was the September speaker for the Eastern and Western North Carolina Dairy Technology Societies. Mr. Whitehead discussed 3A-Standards. Before joining Klenzade Company, Mr. Whitehead served as Director of the Milk Division of the Mississippi Department of Health. At present he is serving as Chairman of the International Association of Milk, Food and Environmental Sanitarians 3A Sanitary Standards Committee.

REPORT ON THE SANITARIAN'S JOINT COUNCIL TO IAMFES FOR 1963-1964

The Sanitarian's Joint Council has continued its activities during the past year toward the accomplishment of its declared objective; namely, to improve the professional status of the Sanitarian.

The Council met for its annual meeting during the APHA convention in Kansas City, Missouri, on November 12, 1963. In 1961-62, the Council began work on a *Plan for the Establishment of the American Intersociety Board for Certification of Sanitarians*, and at the 1963 meeting deliberations on this Plan were continued. Necessary changes and refinements were incorporated to the point where the Plan is now in appropriate form for formal adoption by the three Associations sponsoring the Sanitarian's Joint Council,

which are the American Public Health Association, National Association of Sanitarian's, and our own, International.

The Council has sent letters to the APHA, IAMFES and NAS requesting formal action on the Plan. Since such action must be taken through regular administrative channels in the case of all three sponsors, there normally has been some delay.

In addition to the formal endorsement of the Plan, there is another stipulation which has been recommended by the Council and transmitted to each of the three sponsors. This involves the preliminary financing. It has been recommended that each of the three sponsors grant a loan to the Council of \$1,000.00 each. Based upon the experience of similar Certification Boards, such loan has been repaid in approximately three (3) years, without interest. Again it has been the experience of other Boards that the full implementation of such a Plan, with sufficient revenue to sustain the operation, required about three (3) years.

The Sanitarian's Joint Council, once it receives the requested financial support in the form of loans in the aggregate amount of \$3,000.00, will then be in a position to form the Board of Certification and begin the program of certifying Sanitarians whose training experience and qualifications make them eligible for such distinction. However, until this comes about, no definitive action can be taken and the Council must turn its attention to other issues of interest to the Sanitarian profession.

We are pleased to report that the Executive Board of International took favorable action on the loan request and by letter dated May 11, 1964, from President, John H. Fritz, indicated that such loan would be made pending similar action on the part of the other two sponsors.

In April 1964, the Sanitarian's Joint Council was requested by the U. S. Department of Labor to become the signatory agency for the career briefing on the Sanitarian which is to appear in the forthcoming revision of the Health Careers Guidebook. The original briefing was considered highly unsatisfactory since it depicted the Sanitarian largely as a technician. The revised briefing, to which all members of the SJC contributed, was written to reflect the sanitarian career as a truly professional and challenging field.

The mission and future role of the Sanitarian's Joint Council appears at the moment to be somewhat unclear. As the result of a resolution by this Association at its meeting in Toronto, another IAMFES committee has been appointed to work with the National Association of Sanitarians and the National Society of Professional Sanitarians "to bring the Association together under a unified approach in attaining professional objectives. "This is essentially a dupli-

cation of previously stated objectives of the Sanitarian's Joint Council. This Association's delegates to the Sanitarian's Joint Council have also been appointed as this Association's representatives to the proposed intersociety group which should serve to provide some coordination pending a decision as to whether both the Joint Council and the intersociety group are needed.

Respectfully submitted by
IAMFES delegates,
H. S. Adams
W. V. Hickey
W. C. Miller

NEW PRODUCTS, SERVICES SHINE IN DAIRY AND FOOD INDUSTRIAL EXPOSITION

New designs, new applications, new materials and new ideas were abundant at the Dairy and Food Industrial Exposition at McCormick Place in Chicago during the week of October 4-9.

This first show to reflect the expanded scope of the sponsoring Dairy and Food Industries Supply Association seemed to have a greater than usual share of innovation, possibly because the inclusion of all aspects of food processing contributed to an aura of freshness and change. Certainly it was apparent that many items, usually thought of for other foods, have dairy applications and vice versa.

For example, pneumatic conveying equipment most commonly used for flour and grain was shown to be useful for the bulk handling of milk powder. Another item on display by some exhibitors was a liquid nitrogen refrigeration system for in-transit use. Other frozen foods have been using such equipment, but this is the first time it has been exhibited as a useful, low-maintenance, space-saving system for maintaining low temperatures in over-the-road ice cream transports.

There were also many items shown in the past as supplies and equipment for use by dairy processors, which this year were exhibited as highly useful for other foods. Containers especially fit into this category. Cartons used for milk, cream and ice cream were shown this year as adaptable to many additional products, such as potato salad, mayonnaise, seafoods, condiments, frozen foods, etc. Not only are the containers susceptible of many food applications, but so is the equipment to fill them. Exhibitors demonstrated how filling equipment can be used for virtually any free flowing liquid food product. There were even counter-type units on display which plug in like a toaster and fill and seal individual serving containers of cream, mustard, catsup, syrup, and such things, from one ounce down and up. They are particularly adaptable to restaurant and food serv-

ice applications.

If any one thing can be said to have played a leading role among the new products on exhibit at the Dairy and Food Show, perhaps the nod should go to plastics. Clearly, there was a lot of new interest in plastic milk bottles which were first introduced, by a single example, at the dairy show two years ago. This year four such bottles were shown, including an in-plant unit for blow molding plastic bottles. This makes it possible for milk plants to make bottles on the filling line, as needed, using interchangeable size molds of quart, half-gallon and gallon capacities.

There was also emphasis at the Show on home refrigerator-dispensers for milk. Now made in a 10-quart size, this disposable plastic bag is filled at the dairy and delivered in a "totable" paper bag. A rigid plastic box holds the bagged milk inside the refrigerator. The plastic bag has a disposable spigot. Fabricators claim wide consumer acceptance.

Also in the carton field, a new "zip open" milk carton was on exhibit which opens by merely pulling a tape. For vending machines and individual serve purposes, there was a half-pint carton with a lift tab and a V-notch for insertion of a straw.

Some interesting preformed containers and caps were shown, including aluminum patty pans, pie pans and containers for frozen food which can be made at the point of use. Also there were aluminum foil caps for creamer containers and individual portion containers, as well as pleated caps for soft drinks, wine, beverages, fruit juice, etc., which also can be applied to the bottle at the point of use.

The ways in which plastics lend themselves to merchandising food products were very much in evidence at the Exposition. Plastic is not only popular container material, but paper containers used plastic lids so that appetizing package contents were visible.

Several exhibitors showed all-plastic milk bottle crates — a new departure. These are not only practical, being rugged and light weight, but they are also fabricated in various colors, transforming these traditionally ugly necessities into quite an attractive item.

The Dairy and Food Industrial Exposition had some extremely practical innovations in the eye-filling expanse of processing and materials-handling equipment. Among the items shown were stackers and destackers, conveyers, soaker-washers, homogenizers, heat exchangers, deodorizers, processing vats, fittings, CIP equipment, HTST pasteurizers and the like, all of the most modern design and introducing many new engineering features.

Small dairy processors were much interested in pre-set tank gauges for use in batching applications. This equipment could give the small operator an answer to the high cost problem inherent in using metering or load cells.

There was a lot of attention given to a cheese cooker which provided continuous blending. The colloid mills on display were attention-getters also, because advanced design makes this equipment adjustable as to effect of rotor and stator action.

Exhibitors showed equipment to make up to 75,000 lbs. of ice for cooling water applications. There was also a new rinser for single-use bottles and cans in applications for food plants packaging in rigid containers.

On view for show visitors were tunnel washers to handle any item in a plant which may be inverted for self-draining. New destacker-inverters which handle 40 cases per minute were on exhibit. There were low-speed homogenizers with capacities up to 10,000 GPH; a new high capacity, high pressure plate heat exchanger designed to minimize floor space; and modern design deodorizers which guarantee uniform product with a capacity of up to 65,000 lbs. per hour.

An automatic very light weight refrigerator storage door was among the new products on display at the show. Reductions of up to 75% in weight were claimed together with a 25% increase in speed of operation. Defrosting problems have long plagued processors of frozen foods who will benefit from some new developments on display. There were automatic air defrost units which go into operation only when necessary. Other features of the show were some air screen barriers adaptable both for keeping cold in and insects out.

In the refrigeration field there were exhibits of rotary boosters with an oil distilling feature that eliminates the need for cooling water.

Another feature was a unitized cold storage room, making possible space control of refrigerated areas.

Aseptic pumps, processing pumps with emulsifying properties, pressurized lube systems, electronic chemical feed equipment, swivel fittings and countless other instances of engineering and technical advances were exhibited. Visitors saw an electronic PH indicator for use with control of fermentation and cheese manufacture. There was also a cheese vat which gives continuous weight readings, as well as a new departure in Swiss cheesemaking in the form of a mechanical kettle with built-in "harp" for production and draining.

The revolutionary applications of plastics were further pointed up in the use of these materials as machine parts. The Dairy and Food Show was rife with examples of this use, including chain conveyors and belts made entirely of plastic. These were presented as offering maximum sanitary advantages, as well as being long wearing and cleanable.

Up-to-the-minute delivery truck bodies were on

display using modern materials and designs that give better load handling and driver convenience.

The Dairy and Food Show was heavy with new ingredient developments. The Halloween and Thanksgiving season brought the development of a tasty pumpkin flavor. There was a new emulsion-type water-in-oil ice cream coating displayed. An appeal to the diet-conscious public was given some emphasis at the Show. Many low-calorie fruit drinks, some of them for dairy delivery, were available. Various ingredients related to this field were on exhibit, including viscosity builders for low calorie soft drinks.

Stabilizing ingredients were shown for applications to various products, such as for introduction into the cottage cheese creaming mixture.

Interesting developments with respect to devices for the introduction of ingredients into product had a good share of space and attention at the Show. For example, there was an air pressure pump for moving viscous flavoring materials.

Of great interest were innovations in the form of acid coagulants for many products. Acidulants for producing cultured-type products, first introduced at the 1962 Show with the demonstration of cheese and chip dips, have been projected to buttermilk. Demonstrations of this sensitive flavor product indicate a successful potential for improved uniformity and keeping quality. There were also new designs for measuring acid for dairy use.

Sanitizers and other cleaning ingredients and systems were much in evidence. The national concern for water pollution and the contribution to this made by detergents has evolved some biodegradable cleaners which were on display in Chicago. Exhibitors have geared their displays of these products to reach breweries, beverage and food processing plants, as well as dairies and dairy farms.

Food delivery firms which so often have need to change the markings on their vehicles to be in line with seasonal products, special promotions, etc., were much interested in a new slideable adhesive which makes it possible to position various markings easily. These are removable quickly and with no residue.

The Show was full of numberless other items, large and small. There were automated route accounting systems, attractive sales promotion and premium programs, and on and on, *ad infinitum*. It was all modern in the extreme, embracing highly advanced engineering, and merchandising techniques. Truly, it was plain that in the dairy and food industries the last two years have been marked by constructive and productive change. Perhaps one of the most constructive was the expansion of the Show to bring together in one exposition the entire food processing industry.

STRICTER CONTROLS ON BACTERIA SEEN IN FUTURE FOOD PROCESSING

Microbiological control of foods will assume major importance in the years ahead because of increasingly centralized production facilities, higher volume equipment and larger product batches.

This point was made by Professor E. M. Foster of the University of Wisconsin's Bacteriology Department, in a paper given to food processors at the Dairy and Food Industrial Exposition at McCormick Place in Chicago on October 8th. Dr. Foster was speaking as a member of a panel on the subject of "Food in the Future: Concepts for Planning" under the auspices of the Dairy and Food Industries Supply Association.

Professor Foster's paper, "Microbes and Foods of Today and Tomorrow", brought out that, up to now, milk has been the only food that was subject to strict microbiological control. There is need for such control to extend to other food, but fixing standards both possible of compliance and productive of safety is a difficult task presently occupying the attention of numerous regulatory and scientific groups, Dr. Foster said.

The technological revolution in the food processing industry renders a seemingly minor failure at some point a monumental hazard to thousands of consumers, the speaker said, citing recent experience as an illustration.

Dr. Foster listed the various types of food-borne illnesses and the offending microbe forms, emphasizing that salmonellosis has gone up more than 20-fold since 1946. In 1964 there have already been 14,000 cases — a rise of 6% over last year. Although some of this increase can be attributed to better detection and reporting, much of it is due to centralization of processing and bulk food distribution. However, the story is not fully known because reporting food-borne diseases is not mandatory in the United States and statistics cannot, therefore, be considered reliable.

It is known, according to the Wisconsin microbiologist, that between 1951 and 1960 93% of known food-borne disease was caused by food other than milk; milk accounted for 4%; and water for 3%.

Many of the new processing techniques present special problems, Dr. Foster said, listing freezing; milk processing; vacuum packing; and automatic vending among the vulnerable practices.

More controls are indicated the speaker said. However, he said that many experts feel that it is premature at this time to set legal microbiological standards for food other than milk and water. As reasons

for this, Dr. Foster cited: (1) hazards for most foods still are only potential; (2) there is insufficient information on which to base standards for most products; and (3) there is still much to be learned about sampling and testing various foods for significant organisms.

These problems will be solved, Professor Foster predicted. "The regulatory agencies clearly are preparing for closer supervision of the industry," he continued. "This point is shown by the recent growth of the Federal Food and Drug Administration The number of microbiologists is being increased considerably, and there are plans for more frequent inspections of food processing plants. Some of the states also are strengthening their food control agencies."

Dr. Foster believes industry would be wise to cooperate with microbiological control programs, pointing to the enormous cost of an occurrence such as the tuna fish botulism incident of 1963.

There were several recommendations for industry included in Dr. Foster's paper. First, he said there should be careful investigation of microbiological implications of all new products. Second, there should be rigidly applied sanitary practices. The professor's third suggestion was to establish microbiological specifications for raw products, where appropriate. Fourth, Dr. Foster urged establishment of a plant's own bacterial standards. Fifth, suppliers to food processors should be interested in how their products are going to be used. The sixth and last recommendation was that procedures be continually evaluated.

Dr. Foster stressed that this was no time for complacency. He said: "The modern food processing industry faces problems that it has never faced before. These problems are soluble, but they will require serious attention."

CDC OFFERS TRAINING COURSE

The course, "Communicable Disease Control in the Community — Administrative," No. 324 in the series offered by the Training Branch of the Communicable Disease Center, Public Health Service, will be presented in Atlanta, November 16-20, 1964. This course is intended primarily for persons with administrative responsibility for environmental sanitation activities. It is based on classroom solutions of a series of pertinent administrative problems laid in a thoroughly documented typical community. Applications or requests for information should be addressed to the Chief, Community Services Training Section, Training Branch, Communicable Disease Center, Atlanta, Georgia 30333.

ERRATUM

The Wisconsin Mastitis Test—An Indirect Estimation of Leucocytes In Milk, Vol. 27, No. 9, 271-275, 1964. Page 271, Summary, line 7 should read: "after a 15-sec. outflow through a cap having an orifice 1.15." Page 273, column 1, line 3 should read: a continuous pipetting outfit⁶; Footnote: "Mechanical pipetting and Cannula are essential to mixing without layering. Pipetting of reagent by hand may yield erroneous results." Page 274, Figure 8 should read: "Regression Equation $Y = 1.14 + 0.32X$."

FDA-FLI ANNUAL CONFERENCE TO FEATURE PANEL WORKSHOPS

Industry and consumers will have an opportunity to discuss mutual interests with the Food and Drug Administration, U. S. Department of Health, Education, and Welfare, in the Eighth Annual Conference sponsored by the Food and Drug Administration and the Food Law Institute.

The conference will be held at the Marriott Motor Hotel (Twin Bridges) in Washington, D. C. on Monday, November 30.

The purpose of the joint conference is to promote understanding of and voluntary compliance with the Nation's pure food and drug law. Four food and drug workshop sessions will have as their theme "What Industry Needs from FDA for Better Compliance." A consumer panel will have the theme "What the Public Wants in Consumer Education."

So that all participants in the conference can get the benefits of the five separate sections, experts in the fields covered by each panel have been designated as reporters to sum up at a joint session the highlights of each workshop.

These innovations in the usual program for the one-day annual conference were announced today by Shelby T. Grey, Acting Director of FDA's new Bureau of Education and Voluntary Compliance, and FLI President Franklin M. Depew.

The use of simultaneous workshop panel sessions in this fashion will permit a broader coverage of subject matter than heretofore has been possible for the one-day conference and also will facilitate a freer exchange of information and views, Messrs. Grey and Depew said.

A further innovation for this year's conference will be an exhibition of outstanding visual communications

chosen by a special review committee from entries submitted by Government agencies and industry. These will include outstanding motion pictures, filmstrips, and exhibits used to answer public interest in the integrity of foods, drugs, and cosmetics; to further good manufacturing and marketing practices, and to promote voluntary compliance.

The morning session of the conference, which will be welcomed by Secretary of Health, Education, and Welfare Anthony J. Celebrezze, will feature a keynote address by Food and Drug Commissioner George P. Larrick, a response from the Food Law Institute by Mr. Depew, and addresses by other FDA officials and industry leaders, as follows:

An Ounce of Prevention—Shelby T. Grey, of FDA.

Self Regulation in the Food Industry—Dr. Richard L. Hall, Director of Research and Development, McCormick and Co., Inc.

Self Regulation in the Drug Industry—Dr. Robert P. Parker, General Manager of Lederle Laboratories.

Science Promotes Voluntary Compliance—Dr. O. L. Kline, FDA Assistant Commissioner for Science Resources; Dr. J. F. Sadusk, Director of FDA's Bureau of Medicine; Dr. Austin Smith, President, Pharmaceutical Manufacturers Association; Dr. Robert M. Schaffner, Vice President, Libby, McNeill & Libby.

Regulations as an Aid to Voluntary Compliance—William W. Goodrich, Assistant General Counsel, Department of Health, Education, and Welfare.

The panel workshops, each with a moderator and four expert panelists — two each from FDA and industry — will be conducted during the afternoon. They will include, in the food area, sections devoted to (1) Sanitation and Quality Control, moderated by Robert S. Roe, Director of FDA's Bureau of Scientific Standards and Evaluation; and (2) Additives and Pesticides, moderated by Kenneth E. Mulford, Assistant to the Executive Vice President of Atlas Chemical Industries.

The two drug panel workshops will include: (1) New and Investigational Drugs, moderated by Dr. Maurice L. Tainter, Vice President of Sterling Drugs; and (2) Drug Labeling and Promotion, moderated by Harold F. O'Keefe, Chief of FDA's Advisory Opinions Branch.

The workshop on consumer education will be moderated by James L. Trawick, Director of FDA's Division of Consumer Education.

Summations of the conference will be presented by Mr. Depew, for FLI, and by Deputy Commissioner John L. Harvey, for FDA.

Mrs. Glenna McGinnis, Food and Equipment Editor of the publication "Woman's Day," will address the conference's closing dinner.

AC'CENT INTERNATIONAL AND FSEA CONTINUE ACCENT ON EDUCATION PROGRAM

In August 1963 Ac'cent International joined with the Food Service Executives Association to launch a unique vocational education assistance program. In the first year of its administration of a \$1,000 grant provided by Ac'cent, the FSEA has added over 200 books on food service trades and management subjects to libraries of high schools and adult education institutions.

Announcing continued participation in this program, Ac'cent General Sales Manager, John Q. Herzog, presented another \$1,000 check to FSEA International President, Lawrence B. Wong, at the Association's 63rd annual convention held in Portland, Oregon, August 9-12.

The Ac'cent-FSEA program is aimed at helping schools that have food service training classes acquire needed collections of books and other publications.

First priority for assistance goes to tax supported public or vocational schools. Schools may obtain full information and applications for participation in this program from the Food Service Executives Association, 3801 Mt. Vernon Ave., Alexandria, Va. 22305. Applications should be submitted through local FSEA branches where possible for assistance in establishing needs. Branches will forward applications to FSEA International Headquarters with supporting information and recommendations.

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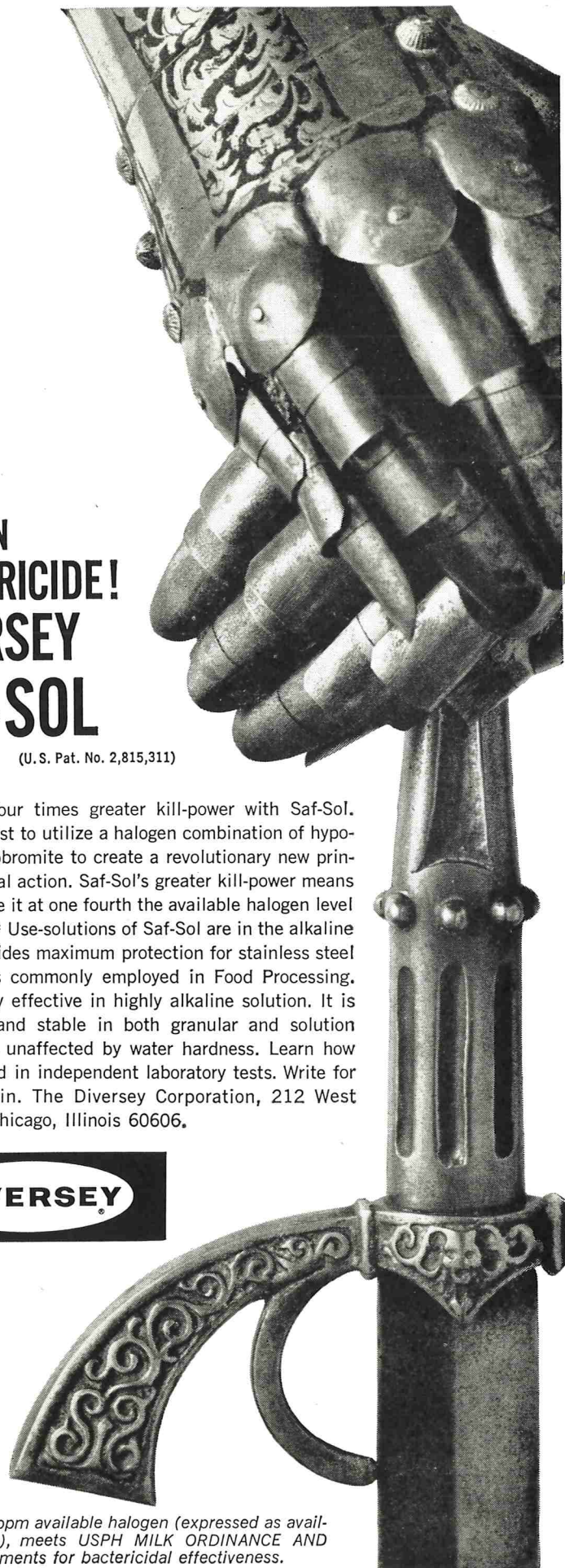
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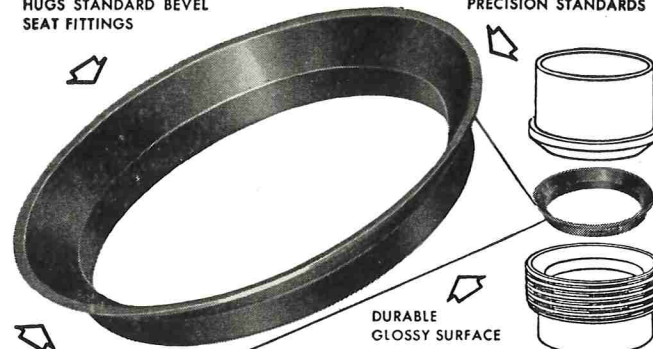
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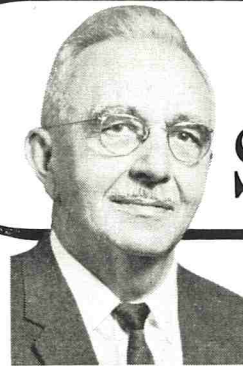
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COW SENSE

a reprint of an authoritative talk
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Dr. W. E. Petersen, Professor Emeritus
University of Minnesota

"The milking machine should not be put on the cow until the milk has been completely let down. That brings up the very important problem of how to get the maximum let-down of milk. We can emulate the calf. As a matter of fact, we can do a pretty good job of imitating the calf, using a warm water wash. Water as warm as the hand will bear and then a towel that contains quite sizable quantities of water. And then massage the teats in the lower part of the udder.

"But even before we do that, there are some other considerations. The cow must be completely at ease. There must be no disturbances or distractions because response to the stimulus is of a low order and will be superseded by any distractions or disturbances.

"When the udder and teats are distended as the indication that the milk has been let down, the milking machine should be attached. Not before, because if it is, then the milk that is down will be drawn before it is replenished from the upper structures of the udder and damage can ensue.

"And this is very important—timing the attachment of the milking machine to coincide with the let-down of milk.

"But of even greater importance in timing is the removal of the teat cups just as soon as the milk has ceased flowing in each quarter."

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Ever since I was a little boy there have been schools. Of course, you and I know about the schools that we went to when we were young . . . some of us went because we wanted to go . . . but a lot of us went because we were MADE to go. Once in a while we would "skip" school, sometimes to go fishing, or swimming, but whatever we did it was a good bet we would be in trouble if we were caught. (I know because I was caught a few times.)

Now many of us are grown up and there is no one to make us do the things we should do . . . so we don't do them. Most of us reason, "I've been to school, why should I keep on going?" That's a good question!

No matter where we turn we see great changes taking place in agriculture. Dairying is the largest single segment of agriculture, and there are great changes taking place in Dairying . . . in many places faster than you and I would like to admit.

● THESE CHANGES ARE GOING TO TAKE PLACE . . .

The question every Dairymen must ask himself is: "Am I myself going to make these changes . . . or will the changes be made and leave me behind?"

Most people don't really like CHANGE . . . because changes upset things and create problems. Problems must be solved . . . and all of us have enough trouble just going about our daily lives without MORE problems to cope with. So—CHANGES, to say the least, are very upsetting.

Dairymen can face these changes in two ways:

1. Ignore them—Keep on doing things in the same old way. If you do this, you may go broke . . . or you may be rich enough to hang on in spite of the changes, and by doing it this way you will escape the disagreeable problems that come from making any change. *But it will cost you money.*
2. Or . . . you can face up to the fact that *the world is changing. Dairying is changing* and you can decide that you are going to do something about it. **THIS MEANS YOU, YOURSELF, MUST MAKE A CHANGE.**

There is no use talking about the whole affair if you fall into the first category. The road you will take is marked very clearly. It has none of the satisfaction of success . . . but, you will not have to change. Dull as this is, you may wish it this way.

So, now let's talk about the second category . . . the number two group. It's very simple—Dairying (the *business* of milking cows) is going to become more and more like a business. If you are going to milk cows, you are going to run a business . . . and the **ONLY** way you can **STAY** in any business is to be a **SUCCESS** at it.

THE WORLD IS NOT GOING TO STAND STILL TO MAKE YOU A SUCCESS . . . YOU MUST CHANGE YOURSELF TO BE A SUCCESS IN TODAY'S WORLD.

You and I know a lot of people who are sitting around *waiting* to be successful . . . most of them *never* will succeed. *You must do what successful men do if you want to be a success.*

The man who milks cows . . . and is going to be a success at it . . . will make the changes that need to be made.

It might be easier for him if he could sign an order for some new equipment and get this job done. But the big change he will have to make is in himself . . . and that is harder than buying equipment, putting up new buildings, and paying for them.

● WHY WE RUN A DAIRY SCHOOL . . .

Now that I have dealt with some simple truths . . . why is

Babson Bros. sticking its nose into this whole affair with such a thing as a Dairy School?

This is very simple. We, here at Babsons, know very well that if the Dairy Industry is going to be a success . . . it will need successful men milking the cows. It is just that simple. *If we have nothing but failures among the men who milk cows . . . then we will have nothing but failure in the Dairy Industry.*

This means that the success of our business depends on a lot more than advertising campaigns and sales talk. Your success, the success of the Dairy Industry, and the success of the Surge are all part of one big picture.

● WHY SHOULD I GO TO SCHOOL . . .

Now about this going to school . . . I have known, during my lifetime, a number of successful men. They never stopped trying to learn more about *how to be a success*. Sometimes they would call in consultants and pay them a fee to find out what they should do . . . often they would attend schools, conducted by very competent men, to try to learn more. But, they never stopped trying to learn . . . **THIS IS A PATTERN OF ALL SUCCESSFUL BUSINESSMEN.**

Can you tell me why a man who milks cows shouldn't follow the same pattern if he wants to succeed?

● SHOULD A COMMERCIAL COMPANY RUN A SCHOOL . . .

Now how about going to a school that is conducted by a commercial company?

The word "school" has often been abused by some companies, and such "schools" have been twisted into sales meetings. This is bad . . . and these kinds of "schools" seldom last very long.

But, I can't see any really good sound reason why a commercial company would hesitate to run a school based on telling facts as they see them . . . especially about an industry of which they are a part. Neither do I see any reason why I should apologize because Babson Bros. builds the Surge and that we sell it. I think that, so long as we conduct our school properly, we not only have a *right to conduct a school* but that it is also our *duty to provide such a school*. Consequently, we have an obligation **NOT** to abuse the privilege of having dairymen attend.

● WHAT ABOUT IT? . . .

The Surge Dairy School started in 1961. We have had thousands of Dairymen at the school, as well as many Veterinarians, Sanitarians, Bankers, County Agents, and others who make up the Dairy community. These men have come from all over the United States and Canada . . . some from other countries as well.

I am very proud that I work for a company that runs a school of this kind. I am sure that if you will come, you not only will say it was worthwhile but that you will be as proud of this School as I am.

If you want to attend, see your Surge Dealer . . . or write me and I will send you all the information.

Robert Mathur

P.S. The tuition is \$71.50 . . . this covers hotel and meals, plus your school supplies. If you come and are disappointed, write me and your money will be refunded. (Incidentally, we have never been asked to return any money yet.)

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