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JULY 1990

AMFES ANNUAL
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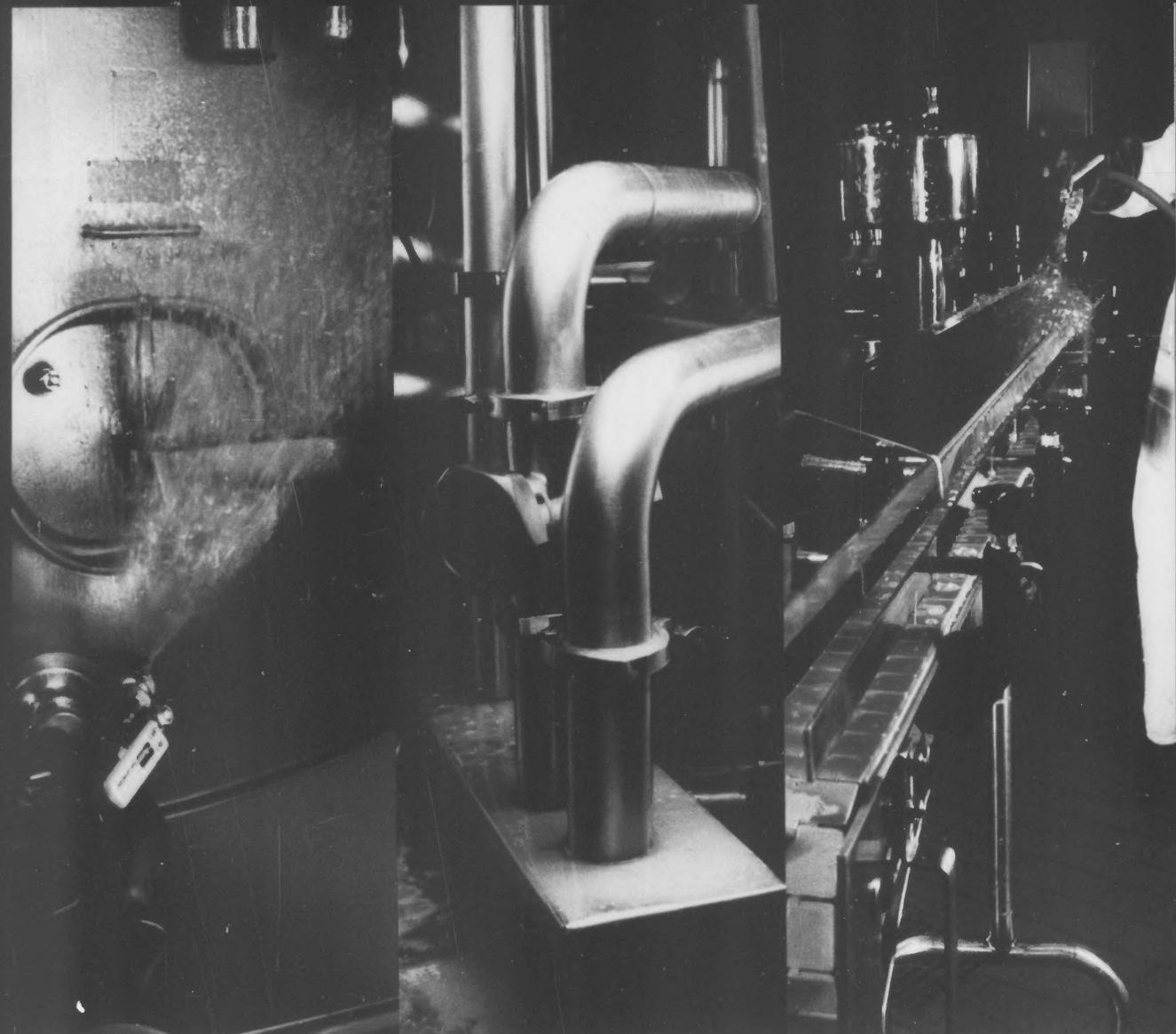
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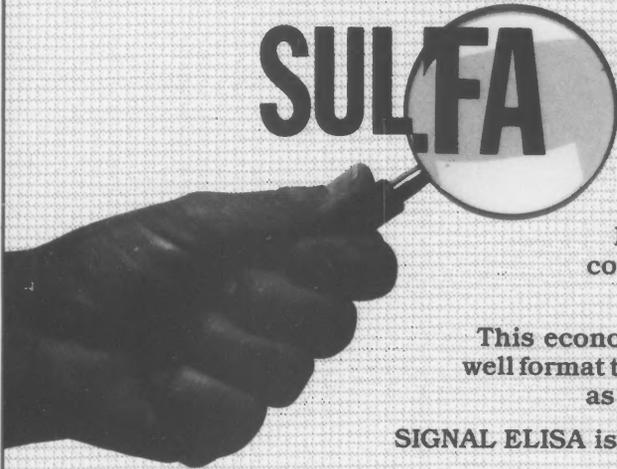
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Dairy, Food and Environmental Sanitation

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Thoughts From the President . . .

By
Ron Case
IAMFES President



Associations are not built in a year. The IAMFES we have now is the accumulation of all that happened before us. Each president leaves a mark on the Association. Hopefully I leave a good mark.

This has been an interesting year. Much effort this year has been spent on the streamlining of the Ames office operation. Your Executive Board and new Executive Manager, Steve Halstead, have taken a close look at where we are spending your money and our efforts to run the association. This evaluation has resulted in redirecting resources to affiliate and membership services. A personnel policy manual has been developed and the policies implemented. Putting written policies together clarifies issues and provides uniform application among all employees.

Improved communication has been a goal this year. I have continued the monthly Thoughts from the President which Bob Gravani started last year. In this column I have reported on actions of the board following board meetings and have discussed issues members have raised such as needs in developing countries and a name change for IAMFES. I have attended several affiliate meetings and have represented IAMFES at other meetings. I have visited with European members about the possibility of establishing an affiliate outside North America. These meetings have allowed me to get to know the membership better and to hear some of your concerns.

During my time on your Executive Board I have been very impressed with the dedication of the members. We have members who regularly give of their time to help improve the status of the sanitarian and to promote IAMFES. Members organize meetings, publish newsletters, write articles, help to set regulations and standards related to food and environmental safety, and in general work to make this a better world to live in. The Journal of Food Protection has become the premier journal for publication of information about food safety. Dairy, Food and Environmental Sanitation is becoming a major source of practical up-to-date information for the sanitarian. These journals don't just happen. They are the result of hard work by authors, editors, reviewers, and staff. Thanks to all of you for this great service you supply!

As your new secretary, Harold Bengsch, and new Affiliate Council Chair, Ron Schmidt, come on the board, I hope I have left them an IAMFES which is prepared to deal with the issues of the nineties. I have been very fortunate to have great boards to serve with the last few years. Harold and Ron will continue to give you the good leadership you deserve and will support Bob Sanders as next year's president.

Thank you for the opportunity to serve as your president.

Hazard Analysis Critical Control Point (HACCP) Concept

Frank L. Bryan
Food Safety Consultation and Training
8233 Pleasant Hill Road, Lithonia, GA 30058

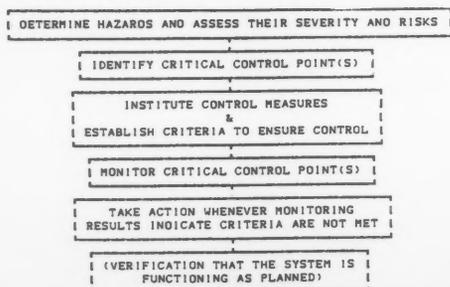
Abstract

The hazard analysis critical control point (HACCP) system is a series of actions that should be taken to ensure food safety for all processed/prepared foods. These are: (a) detecting hazards and assessing their severity and probability of occurrence, (b) identifying critical control points, (c) establishing criteria for control and putting control measures into effect, (d) monitoring the critical control points, and (e) taking immediate action to correct problems whenever the results of monitoring indicate that the criteria are not met. Systems should be verified for completeness of the plan and whether monitoring is properly carried out. The HACCP concept is rational because it is based on historical data of the causes of illness and spoilage. It is comprehensive because it deals with ingredients, processes and use of products. It is continuous because problems are detected when they occur, and action is taken then to correct them. It is systematic because it is a thorough plan which covers step-by-step operations and procedures. The HACCP system is the most effective and efficient means yet devised to ensure safety of food processing and preparation operations. It is state-of-the-art technology for food safety.

There are microbiological hazards and risks associated with preparation and storage of foods through out all links of the food chain from production to consumption. If these hazards are not controlled, foodborne illness can occur and shelf-life of products will be shortened and spoilage can result.

The most effective way to ensure that these adverse situations will not happen is implementation of the hazard analysis critical control point (HACCP) system. This system is a series of actions that should be taken for the production, processing and/or preparation of foods to ensure food safety.

The HACCP system is illustrated below:



Definitions associated with the HACCP system are: (3-5).

•A *hazard* is unacceptable contamination, unacceptable growth, or unacceptable survival of microorganisms of concern to safety or spoilage and/or unacceptable production or persistence in foods of products of microbial metabolism (e.g., toxins, enzymes, biogenic amines).

•*Severity* is the seriousness (magnitude) of a hazard, or stated in a different way, the degree of consequences that can result when a hazard exists.

•*Risk* is an estimate of the likely (or probability of) occurrence of a hazard, or the likely sequential occurrences of several hazards.

•A *critical control point* is an operation (practice, procedure, process or location) at or by which a preventive or control measure can be exercised over one or more factors which, if controlled, would prevent or minimize a hazard. The ICMSF specifies two types of CCPs (5). CCP₁ will ensure control of a hazard. CCP₂ will minimize but cannot ensure control of a hazard.

•*Criteria* are specified limits or characteristics of a physical (e.g., time or temperature), chemical (e.g., salt or acetic acid), or biological (e.g., sensorial or microbiological) nature.

•*Monitoring* is the checking that a processing or handling procedure at each critical control point meets the established criteria and, hence, is properly carried out and is under control. It involves systematic observation, measurement, and/or recording of the significant factors for prevention or control of hazards.

•*Verification* is the use of supplemental tests of review of records of previous monitoring to ensure that the HACCP system is in place and functioning as planned.

Information about the formulation or recipe, the processor preparation steps, and the expected use of foods being prepared are needed during HACCP evaluation (1,2,5). Answers are needed to the following questions:

Questions about formulation or recipe to ask during hazard analyses:

1. What raw materials or ingredients are used?
2. Are microorganisms of concern likely to be present on/in these materials, and if so what are they?
3. Do any of the ingredients have toxic properties?

4. Are preservatives used, and if so, what are they?
5. Are any of the ingredients used in quantities either excessive or deficient for desired functional properties or culinary needs?
6. What is the pH of the final product and will microorganisms survive and/or grow in such a product?
7. What is the water activity of the final product and will microorganisms grow in such a product?

Questions about food preparation to ask during hazard analyses:

1. Can contaminants reach the product during preparation or storage?
2. Will microorganisms or toxic substances of concern be inactivated during heat processing (cooking), reheating, or other potentially-lethal processes?
3. Could any microorganism or toxin of concern contaminate the food after heating?
4. Could any microorganism of concern multiply during processing/preparation or storage?
5. How does the package or container influence survival and/or growth of microorganisms?
6. What is the time sequence of processing/preparation and storage?

Questions about expected use of prepared food after they leave the store to ask during hazard analyses:

1. Is the food expected to be held warm, chilled, frozen or at ambient temperature after it leaves the place of processing/preparation/sale?
2. Will the time-temperature exposure used for reheating inactivate microorganisms and/or toxins of concern?
3. If held after reheating, will the food be held warm or at ambient temperature?
4. Will the food be handled or subjected to other contamination?

Answers to these questions may indicate hazards and provide information upon which to determine severity and risks. When this information is considered in reference to step-by-step preparation of a food, critical control points can be determined, criteria for control established, control initiated, the critical control points monitored, and immediate action taken whenever results of monitoring indicate that the criteria are not met.

There are certain requirements for an operation to be considered as a Critical Control Point: These are:

1. The operation must be such that appropriate action will prevent, control or at least minimize one or more hazard(s).
2. The severity and/or risks of the situation must be considered as being high or at least moderate, but not low.
3. Criteria for control must be established and stipulated.

4. The critical control point must be capable of being monitored.
5. The critical control point must be monitored either before start up and/or during operations.
6. Appropriate action must be taken when the results of monitoring indicate that the specified criteria are not met.

To implement a hazard analysis critical control point program, the following actions need to be taken:

1. HACCP evaluations must be conducted of the food production/processing/preparation steps and the severity of the consequences of contamination, survival or growth of microorganisms and probability of occurrence of these events must be assessed; critical control points are based upon this assessment. Such evaluations include drawing a flow process of operations and indicating hazards and critical control points.
2. Criteria for control must be established for each critical control point; monitoring procedures need to be selected and implemented; and courses of action decided upon whenever the criteria are not met.
3. A HACCP plan must be developed for all foods of concern. Note that related types of foods processed/prepared in a similar manner with similar equipment usually have similar critical control points.
4. Personnel need to be trained so that they will be aware of hazards and know (a) the criteria for control, (b) how to monitor a critical control point and (c) the action to take when the criteria are not met.
5. The HACCP plan must be put into effect in the place of facility where food is produced, harvested, transported, stored, processed or prepared.
6. The HACCP plan and its implementation must be verified.

The HACCP concept is rational because it is based on historical data about causes of illness and spoilage. It is comprehensive because it takes into consideration ingredients, processes and subsequent use of products. It is continuous because problems are detected when they occur, and action is taken then for correction. It is systematic because it is a thorough plan covering step-by-step operations and procedures. Because of these features, the hazard analysis critical control point approach is the most effective and efficient means to ensure safety of food processing and preparation operations. It provides the greatest assurance to processors and preparers, regulatory officials, and the public that foodborne illness will not result from the ingestion of the foods that have been processed/prepared under this system. Hence, it is the best insurance policy for food safety that can be obtained. It is state-of-the-art technology for food safety.

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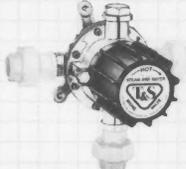
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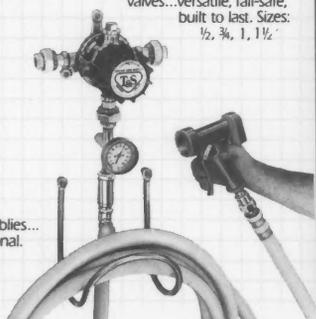
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The FDA has identified the need for a well organized and properly implemented sanitation program. It emphasizes the need for a clean plant environment extending from receiving areas to packaging rooms, and from floor drains to the air.

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The Hazard Communication Standard Implications for the Food Industry

Homer C. Emery, R.S., Ph.D., LTC MS, U.S. Army*
Florence P. Emery, Training Developer**

The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army or Department of Defense.

The Hazard Communication Standard was implemented by the Occupational Safety and Health Administration (OSHA) in 1983. Initially, this standard required only large scale industrial producers and users of hazardous chemicals to provide employees hazard communication (HAZCOM) training.

On 17 March, 1989, OSHA expanded the Hazard Communication Standard to require HAZCOM training for a broader segment of workers, to include the food industry. Sectors of the food industry that now need to develop and implement HAZCOM training programs include: processing plants, wholesale distributors, retail grocers, convenience stores, and restaurants.

While the use of hazardous chemicals in food related operations may not be as great as other industries, chemical exposures can still occur. During the cleaning and disinfecting of facilities and equipment, employees may come in contact with ammonia, bleach, drain cleaners, pesticides, and other potentially hazardous chemicals. Personnel using these substances need to be provided information on specific hazards of the product and hazards that may result from mixing incompatible chemicals (1).

In Congressional testimony the United Food and Commercial Workers International Union reported a case in which workers experienced dizziness, upper respiratory tract irritation and headaches from a solvent being used to remove old price labels from merchandise (2). During the period 1984 to 1987 the National Institutes of Health reported the death of six foodservice workers resulting from recreational exposure to nitrous oxide used (3).

Sanitarians in local and state health departments may be called upon to assist food service managers in developing HAZCOM programs. Sanitarians employed in industry quality assurance positions can be key resources in planning and managing company HAZCOM programs. While sanitarians are not experts in industrial hygiene or occupational health, their experience and training in public health and environmental science will make them valuable resources in developing and implementing HAZCOM training.

*Currently assigned U.S. Army Health Professional Support Agency, 5109 Leesburg Pike, Falls Church, VA 22041-3258

**Currently assigned Naval Medical Materiel Command, Fort Detrick, Frederick, MD 21701.

The purpose of this article is to provide an overview of OSHA's Hazard Communication Standard (HCS). In addition resources for developing HAZCOM programs in food industry will be identified.

The Hazard Communication Standard (HCS)

The HCS is "performance-oriented". OSHA prescribed general goals for employee training rather than establishing specific details on the length or number of training sessions. Producers or importers of hazardous chemicals are required to evaluate the hazards of chemical products produced or imported; provide product labels that communicate the hazards involved in use; and provide material safety data sheets (MSDS) to provide certain technical information on the product.

Users of hazardous chemicals must inform employees about the HCS; explain how the standard is implemented in their company; prepare an inventory of hazardous chemicals used in the workplace; and train employees in using and understanding product labels and the MSDS. In addition employee training in the use of hazardous chemicals and protective equipment is required (4).

The first step in developing a HAZCOM program is to inventory hazardous chemicals used in the workplace. The inventory should include the common name of the product and its chemical name as it appears on its label. It is recommended that the inventory include where the product is used, number of personnel using the product and the general hazards (flammable, explosive, acid) associated with its use.

Foods, drugs, cosmetics, and alcoholic beverages that are packaged for retail sale are exempt from listing on the inventory. In addition hazardous products that distributors or grocery stores sell but employees do not use may also be exempt from listing. An example would be industrial grade grease remover in ten gallon containers sold by a distributor warehouse. Employees in the warehouse would not need to be provided information on the use of this product. If warehouse personnel are responsible for cleaning up spills, they should be provided training in the general hazards and clean up procedures to follow.

Other examples of exempt items are office products that workers only occasionally use (e.g. copy machine chemicals). However, if an office worker were assigned responsibility for frequent handling of the chemicals

associated with the use of the copy machine that worker should be informed of the hazards and the products listed on the inventory. When in doubt if a product is exempt from the inventory contact the local or state agency responsible for the HAZCOM program.

Product labels are an important part of the HAZCOM program. Labels must include identity of the hazardous chemical; appropriate hazard warnings; and the name and address of the manufacturer, importer, or other responsible party. Each container used in the workplace must be labeled, tagged, or marked with the identity and hazard warnings (5).

The Material Safety Data Sheet (MSDS) has been called "the heart of the HAZCOM program." Distributors are responsible for providing copies of the MSDS to retail customers. Employees using the hazardous product must have the MSDS available for reference.

A specific MSDS format is not required. However, the MSDS must provide the following types of information; identity of manufacture; chemical and common name of product; identity of hazardous ingredients; exposure limits of hazardous ingredients; physical and chemical characteristics; fire and explosion hazards; routes of entry; signs and symptoms of exposure; precautions for safe handling and use; and control measures to reduce harmful exposure (6).

Employee training is a critical part of the HAZCOM program. Training cannot be a one time effort, but must be part of a well planned and comprehensive program. Each employee should initially be informed of the overall goals of the HCS and how the standard is implemented in their company.

Training on the health and physical hazards of chemicals that are commonly used will need to be provided. When a new process or new chemical is introduced, training will need to be provided on its use and potential hazards.

Employees must be able to understand the hazards indicated on product labels and the MSDS. In cases of low reading skills, the use of pictographs and other visual aids will be useful (7). The final measure of a HAZCOM program will be the ability of employees to obtain and use hazard information printed on product labels and the MSDS.

Only employees (e.g. warehouse, maintenance, housekeeping personnel) that use hazardous chemicals or are responsible for the clean up of spills need to be provided with detailed training. Other employees such as clerks, office staff, and service personnel will only need to know about the general provisions of the program.

OSHA requires a written description of the HAZCOM program. This document must include: designation of person responsible for obtaining and maintaining the Copies of the MSDS; how MSDSs are maintained; how workers can obtain copies of the Copies of the MSDS; how workers are trained in the use of hazardous chemicals; and the inventory of non-exempt hazardous chemicals used.

Training Resources

A number of HAZCOM training resources are available for use in the food industry. "Foodservice Operator's Guide to the OSHA HCS" can be obtained from the National Restaurant Association (1200 17th St. N.W., Washington, DC 20036). The National-American Wholesale Grocers' Association has produced "OSHA Hazard Communication Standard Compliance Program" that includes a training manual and videotape (201 Park Washington Court, Falls Church, VA 22046). "Hazard Communication - A Compliance Kit" and other training resources can be obtained from state and regional OSHA offices. Audiovisual materials can be obtained from the OSHA Training Institute, 1555 Times Drive, Des Plaines, IL 60018.

Sanitarians may need to review basic concepts and terms related to industrial hygiene and occupational health when they first become involved in HAZCOM programs. A number of workshops and training seminars are offered by private consulting firms, state and regional OSHA offices, and professional organizations.

The OSHA Training Institute in Des Plaines, Illinois, provides a wide range of basic and advanced industrial hygiene training. The Institute offers training for federal and state agency personnel as well as for private sector employers. The following industrial hygiene references are recommended: "Fundamentals of Industrial Hygiene" published by the National Safety Council; "Industrial Hygiene and Toxicology", F.A. Patty; and "Industrial Hygiene", R.W. Allen.

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Legionella in the Grocery Store: Assessment of Risk

George K. Morris, Brian G. Shelton and George W. Gorman
Pathogen Control Associates
2204 Hanfred Lane
Tucker, GA 30084

Abstract

An outbreak of Legionnaires' disease associated with a grocery store mister/fogger machine occurred in Louisiana in 1989. Since mister machines are used in many industrial settings, there is a need for the food industry to become better acquainted with this problem. *Legionella*, the causative bacterium of Legionnaires' disease and Pontiac fever, was first discovered in a 1976 outbreak in Philadelphia, but is known to have caused disease as early as 1943. Once considered exclusively an American disease associated only with air conditioning, outbreaks of Legionnaires' disease have occurred worldwide, and most recent outbreaks have been traced to breathing bioaerosols from potable water sources. There are 30 known species of legionellae bacteria and 48 serogroups. The bacteria are widespread in natural water environments and may be amplified in plumbing and cooling systems in buildings and industrial settings. The presence of legionellae bacteria does not always represent a health risk but systems which amplify the bacterium in water and disseminate the bacteria in the form of bioaerosols should be controlled.

Background

An outbreak of pneumonia occurred following an American Legion convention in Philadelphia, Pennsylvania in July, 1976, which led to the discovery of a previously unidentified bacterium (McDade, et al., 1977). The bacterium was given the name *Legionella pneumophila*, and the disease was called Legionnaires' disease.

Legionellosis

The diseases caused by *Legionella pneumophila*, or legionellosis, is currently recognized to occur in two distinct clinical forms, Legionnaires' disease and Pontiac fever. Of the two, Legionnaires' disease causes the more serious illness consisting of a pneumonic disease. Usually less than 5% of individuals exposed to contaminated aerosols during outbreaks develop disease, and the incubation period - the time from exposure to the pathogen to onset of disease - is usually 3 to 9 days. The most common symptoms of the disease are a dry non-productive cough, high fever (usually 101°F or higher), chest pain, shortness of breath, and mental confusion. Often there is accompanying abdominal pain and

mild diarrhea. Hospitalization with appropriate antibiotic therapy is required. The usual therapy is Erythromycin with or without Rifampin (Blackmon, 1981). Fatality rates may be 15% or higher. The second illness, Pontiac fever, is a non-fatal flu-like disease of short duration which does not cause pneumonia. In contrast to Legionnaires' disease, 95% of the individuals exposed become ill within 48 to 72 hours. Fortunately, recovery is rapid and doesn't require antibiotic therapy or hospitalization.

Epidemiology

Although the epidemiology of the disease is not fully understood, cases may occur as outbreak clusters or as sporadic cases. The number of sporadic cases is probably under-reported. Less than a thousand cases of legionellosis were reported in 1985 (Centers for Disease Control, 1985), but it is estimated that 25,000 - 50,000 sporadic cases occur each year in the United States (Centers for Disease Control, 1985a). Serologic surveys have shown that many people have serum antibodies to legionellae, which may be attributed to cases of Pontiac fever or very mild cases of Legionnaires' disease. Most of the earlier outbreaks were traced to contaminated aerosols from either cooling towers or evaporative condensers, but the majority of recent outbreaks have been traced to potable water services and components such as hot water heaters, showers, whirlpool baths (Best, et al., 1983, States, et al., 1987), and most recently an outbreak was associated with mister machines (Centers for Disease Control, 1990). Distribution of epidemics is usually seasonal, most occurring in the summer. The occurrence of sporadic cases is not seasonal and occur throughout the year.

The Bacterium

Legionellosis is caused by a group of small rod shaped bacteria that are usually 1 by 3 micrometers, are Gram negative, and do not produce endospores. To grow *Legionella* organisms in the laboratory requires special media containing L-cysteine, soluble iron, and a pH of 6.9 (Brenner, 1984). These organisms proliferate in a wide variety of fresh waters. Currently there are thirty known species and 48 serogroups of legionellae, i.e., 14 serogroups of *L. pneumophila*, 2 serogroups of *L. bozemanii*, 2 serogroups of *L. feeleeii*, 2 serogroups of *L. hackeliae*, 2

serogroups of *L. longbeachae*, 2 serogroups of *L. sainthelensi*, and 1 serogroup of each of the other 24 species. Of the 30 known species, 16 have been associated with human disease (Table 1). It is possible that some species have not yet been associated with human disease because they occur so rarely in nature; therefore, all species should be considered as potential pathogens.

Environmental Sources

The first isolation of the bacteria from environmental samples was during an outbreak investigation at a midwestern university, at which time the bacteria were isolated from a cooling tower, a nearby stream, and mud near the stream (Morris, et al., 1979). Since that time, many lakes and streams, especially those that are thermally polluted, have been found to harbor the organism. Although excavation of soil was thought to be a risk factor, *Legionella* has been found to be a water organism rather than a soil organism.

Many natural or man-made aquatic systems serve as amplifiers for *Legionella* by providing suitable conditions for multiplication. Cooling towers, evaporative condensers, humidifiers, potable water heaters and holding tanks, pipes containing stagnant warm water, shower heads, faucet aerators, mister reservoirs, and whirlpool baths are examples. *Legionella* sometimes survive in the routine water treatment used to produce potable water, and may be carried in the treated drinking water into buildings where they colonize the plumbing fixtures, especially in hot water systems (Wadowski, et al., 1982). The most probable mechanism by which cooling towers and other wet type heat rejection systems become contaminated is from the make-up water.

The best approach to effective control is an effective equipment maintenance program, in that well maintained cooling towers are less likely to be implicated in an outbreak than poorly maintained ones. Conditions that promote the collection of warm stagnant water and growth of microorganisms such as algae and protozoa have been documented to be excellent amplifiers of *Legionella* (Fields, et al., 1989; and Tison, et al., 1980). Protozoa specifically appear to selectively amplify *Legionella* in some water systems (Barbaree, et al., 1986). Association of *Legionella* with protozoa in the environment, and the ability of the legionellae to survive within protozoan cells, may provide mechanisms for legionellae to survive harsh environmental conditions.

Risk of Infection

The infectious dose for humans has not been definitively determined. It is thought by some scientists that the number of *Legionella* must exceed 1,000 per milliliter of cooling tower water for an outbreak to occur. However, in one outbreak associated with mister/foggers, as few as 10 colony forming units of *L. pneumophila* serogroup 1 per milliliter of mister reservoir water may have caused Legionnaires' disease in people exposed directly to the aerosol from the mister. More importantly, most cases of

legionellosis occur as sporadic cases, not outbreaks, and it is not known how few organisms in water sources may be responsible for sporadic cases.

The mere presence of legionellae either in aerosol producing systems or potable water services will not in itself cause disease. In order for this to occur, several conditions must exist simultaneously:

1. The legionellae must be sufficiently virulent or capable of causing disease -- many species have not been associated with human disease.
2. The legionellae must be present in sufficiently high numbers to cause an infection.
3. The legionellae must reach the human host via air without extensive damage to the bacterial cell.
4. The legionellae must be inhaled by the potential host as particles less than 5 µm in size and subsequently impact deeply in the alveolar sacs of the lung.
5. The host's defense system must be unable to stop the infection.

Since legionellosis is caused by airborne legionellae, harsh conditions relative to ambient temperature, moisture, and solar radiation may reduce the likelihood of infections. Also, the source of legionellae is usually less than 300 meters in distance from the site of human exposure.

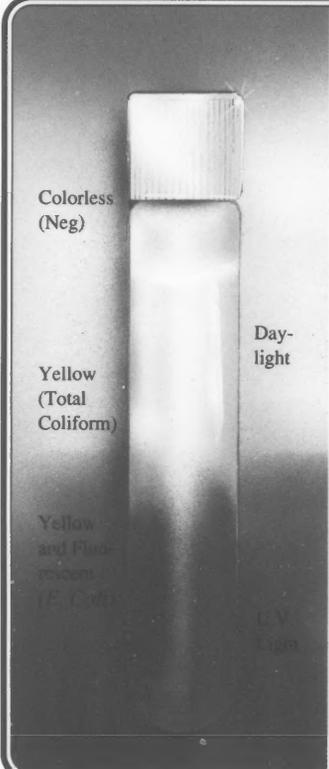
Certain risk factors are associated with a greater likelihood of infection. Also, these same risk factors are probably associated with a person being susceptible to a lower number bacteria than health individuals having no risk factors. Legionnaires' disease is likely to occur more frequently in males, in middle-aged or older individuals, in people who smoke and ex-smokers, those who drink alcohol excessively, those who have chronic illness, cancer patients, AIDS patients, transplant patients, and those receiving immunosuppressive therapy.

Some people have expressed concern that legionellosis could result by drinking contaminated water especially if it should be aspirated into the lungs. Even though over 50 percent of individuals with legionellosis suffer diarrhea and abdominal pain, there is no evidence to suggest that Legionnaires' disease is acquired through the intestinal route. The intestinal symptoms are probably produced by toxic substances released from legionellae in the lungs or other organs. Therefore, the concerns of legionellae in grocery stores should be directed toward breathing contaminated bioaerosols, not from consumption of food and water.

Associated with Human Disease	Not Associated with Human Disease
<i>L. anisa</i>	<i>L. bruensis</i>
<i>L. Birminghamensis</i>	<i>L. cherrii</i>
<i>L. bozemanii</i>	<i>L. erythra</i>
<i>L. cincinnatiensis</i>	<i>L. gratiana</i>
<i>L. dumoffii</i>	<i>L. israelensis</i>
<i>L. feeleii</i>	<i>L. jamestowniensis</i>
<i>L. gormanii</i>	<i>L. moravica</i>
<i>L. hackeliae</i>	<i>L. oakridgensis</i>
<i>L. Jordanis</i>	<i>L. parisiensis</i>
<i>L. longbeachae</i>	<i>L. quinlivanii</i>
<i>L. maceachernii</i>	<i>L. rubrilucens</i>
<i>L. micdadei</i>	<i>L. santacrucis</i>
<i>L. pneumophila</i>	<i>L. spiritensis</i>
<i>L. sainthelensi</i>	<i>L. steigerwaltii</i>
<i>L. wadsworthii</i>	
<i>L. tucsonensis</i>	

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Perspective on Food Biotechnology

Henry I. Miller, M.D.¹ and Stephen J. Ackerman²

The "new biotechnology" is in the news so much these days that it now goes by the handy nickname "biotech." In medicine, it has assumed heroic proportions, with *Science* magazine hailing it as the last great technical innovation of the 20th century -- the progenitor of genetic probes, synthetic hormones, and other life-saving marvels.

In food production, however, it has not been so warmly welcomed:

- The European Economic Community has banned use of a genetically engineered hormone to increase milk production in dairy cows.
- American grocery chains have refused milk from such cattle.
- Activists fearing agricultural experimentation have sued to prevent field testing even of genetically engineered petunias.

What's going on with our food supply?

The short answer is "the new biotechnology," a scientific revolution less than 20 years old that's already changing the foods we eat.

The jargon of the "new biotech" may sound pretty ominous to the average consumer. "Cloning," "genetic manipulation," "cell fusion," and "mutation" may seem more like fantasies out of "Star Trek" than the results of processes we want to contemplate at the supermarket. Nonetheless, these scientific processes are soon likely to be applied to more and more of our foods.

It's important to understand what food biotechnology is before forming our opinions about it. Although the jargon may sound unnatural, the science is the reverse. In fact, it can be viewed as a method of organizing nature to bring out the best in nature. It's essentially a refinement of what we've known -- and done -- for a very long time.

"Biotech" Old and New

Biotechnology is the use of biological systems -- living things -- to create or modify products.

Traditional biotechnology is almost as old as agriculture itself. The first farmer who bred the best bull with the best cow in the herd to improve the stock, rather than allowing the animals to breed randomly, was implementing biotechnology in a simple sense. The first baker who used yeast enzymes to make bread rise was likewise using a living thing to produce an improved product. Indeed, one anthropologist argues that a desire to raise grain for brewing beer -- a classic biotechnology

product -- was the impetus for the first systematic farming 10,000 years ago.

The "old biotech" that produced these changes is obviously not a single process but a number of different methods. The one feature common to these traditional biotechnologies is use of natural processes to introduce changes in foods.

The "new biotechnology" is likewise a number of methods of using organisms to make or modify products. It differs from traditional methods by modifying the genetic material of organisms directly and precisely. It enables the transfer of genes between diverse organisms, allowing combinations unlikely to occur by conventional means.

Unlike their predecessors, who progressed by trial and error, today's farmers can exploit the subtleties of genetics. Science has found ways for them to introduce - quickly and directly - specific crop and animal improvements that formerly took generations. The result may be the same, but the new precision multiplies the possibilities available for achieving specific practical results.

It was not always thus. Mark Twain spins the tongue-in-cheek yarn of an agricultural experimenter named William Beazeley who pined away because of his obsessive, but futile, desire to grow turnips on vines. Nineteenth-century readers scoffed at this absurd idea, but that satire of the 1860s could become a technical possibility in the 1990s if there were any point to achieving it. Fortunately, the new biotech projects in view have more practical goals than Beazeley's.

New biotech springs from our ability to rearrange or recombine DNA, the basic genetic material of living things, a feat made possible in 1974, when American scientists first cloned (isolated and duplicated) a specific gene. From that beginning, the new biotechnology has developed as wide a range of applications as traditional methods. In food production, it is revolutionizing old processes like fermentation and cross-breeding. Both in the field and in the food-processing plant, it is joining in the age-old quest for a healthy, abundant and nutritious food supply.

Evolution or Revolution?

In the 1860s, Gregor Mendel, an Austrian priest (who, ironically, had flunked biology in his teacher's examination), deduced the laws of heredity. Working with pea plants in his monastery garden, Mendel discovered he could predict the characteristics of plants bred from specific types of parents. From there it was just a short step to producing at will such characteristics as color, height, and pod position or appearance. Although published in the 1860s, his

¹Director of FDA's Office of Biotechnology.

²Writer and Consultant in Washington, DC.

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Danny Thomas, Founder

findings were ignored until researchers rediscovered and confirmed them in 1900.

Mendel's work ultimately made possible scientific farming based on genetics. By the 1930s, organ culture techniques made it possible to isolate plant embryos as a basis for breeding more successful hybrids. Corn production in the United States quickly doubled as a result. Through such methods, agricultural wheat was crossed with wild grasses in order to acquire such properties as greater yield, increased resistance to mildew and bacterial diseases, and tolerance for salt or adverse climate conditions.

Similar progress with many foodstuffs enabled China and India, threatened with famine in the mid-1970's, to invigorate their agriculture to the point that today they are net exporters of grain. Although much of this achievement came from ambitious applications of traditional biotechnology, the new biotech now sustains it, notably in work on rice and the other grains on which so many people worldwide subsist. Today, the new biotech strives to develop drought-tolerant crops that, in time, could alleviate the famines devastating Africa.

New biotech continues its quest for fruitful harvests only under protest. In one case in Maryland, opponents long delayed field testing of corn engineered to resist the European corn borer, a caterpillar that annually spoils \$400 million in American crops unless deterred by heavy treatments with pesticides. In Wisconsin, where farmers forfeit \$800,000 yearly in crops and pesticide expenses in their losing battle against brown spot disease in green beans, university researchers had to curb their hunt for a new-biotech alternative because of difficulties getting approval for field tests.

One current focus of research is a tomato genetically engineered not to go soft for far longer than ordinary products. Its developer claims that it looks the same, feels the same, and tastes the same as other tomatoes; its nutritional value is identical. The only difference researchers found -- a difference achieved by isolating and counteracting a single gene that makes tomatoes rot rapidly -- is that this tomato keeps longer. The reversal of that one gene in the 10,000 making up the plant is all that was needed to make this biotech tomato significant.

Waiting in the wings is another tomato plant altered to contain a bacterial protein toxic to plant-attacking insects but not to other living things. The primary safety issues with both of these "new" tomatoes are whether their introduction of single new properties might mask other unforeseen changes as well, and whether the products of these new genes are safe to eat.

The Context of Controversy

Traditional biotechnology also continues to develop even as the new biotech comes into play. A recent triumph is the "beefalo," a hybrid animal whose meat combines the tenderness of domestic beef with the leanness of American buffalo. This development alarmed nobody and has won consumer acceptance.

Yet, when the traditional biotechnology of farmyard

and field moves toward the "new biotech" of the laboratory, many people become alarmed at its very efficiency. As Margaret Mellon of the National Wildlife Federation put it, "I feel an affection for the natural world the way it is -- the way 4 billion years of evolution have made it. I resist the notion of improving nature in the future, just as I lament the loss of nature as it was in the past." Refinements that once would have taken generations may now be induced deliberately and rapidly -- too rapidly for such observers.

Perhaps our imaginations have been colored by gimmick picture postcards of gigantic foodstuffs, whether gondola-sized potatoes or enormous bass asserted to be typical of particular resorts. Perhaps films showing humanity beleaguered by Frankenstein monsters of mutant insects dispose us to envision enormities. More soberly, some critics make analogies to past introductions of novelties into our environment, such as kudzu plant, which became a troublesome weed, or the starlings whimsically imported into North America only to multiply and foul our cities. Others fear harm to consumers from new foodstuffs.

What is the individual to make of these fears? Is the new biotech following in the steps of the pioneer Mendel or the crackpot Beazeley? For example, bST (bovine somatotropin), a pituitary hormone produced in cattle, was recognized to increase milk production when injected into dairy cows as early as the 1930s. The recombinant technology of the 1980s allowed production of large amounts of pure bST, which could be used to increase milk yield and efficiency of production during part of the cow's lactation period.

Because it is a protein, bST is digested and inactivated when eaten. Furthermore, bST is inactive in humans. People produce *human* somatotropin, but it is considerably different in structure from bST.

Since cows produce bST naturally, it is and has always been present in their milk. Treating the animals with the proposed levels of bST doesn't increase the level of bST in milk above the levels occurring naturally. Nor does bST treatment alter the nutrient composition of milk. While FDA is still evaluating the animal and environmental safety of bST, the agency has determined that the milk from treated animals is safe for humans.

Recently, five U.S. supermarket chains publicized their refusal to buy dairy products from cows treated with bST. They curtailed purchases under pressure from a coalition of groups concerned with issues ranging from animal rights to an alleged current milk surplus and the survival of the small family farm. Uneasiness about the safety of consuming dairy products from "experimental animals" also apparently influenced the decision.

When it comes to farm crops, the U.S. National Academy of Sciences and its parent, the National Research Council (NRC), have not found any difference between the environmental safety of old and new biotech-derived plants. In 1989, NRC reported that "crops modified by molecular and cellular methods [i.e., the new biotechnology] pose risks no different from those modified by classical genetic methods for similar traits." It also noted that no adverse

effects have developed from introductions of genetically modified organisms.

Moreover, some scientists argue that the precisely directed alterations of recombinant-DNA technology might in fact be far safer than the random shuffling of characteristics inevitable under more traditional techniques. As the NRC puts it, because "the new molecular methods are more specific, users of these methods will be more certain about the traits they introduce into plants" than those using traditional methods. Many projects now in the works to promote food safety (from displacing chemical pesticides or preservatives to improving food sanitation) are possible only through the new methods.

New Challenges for FDA

In insuring a safe, nutritious food supply, FDA can't be complacent about the implications of the new biotechnology -- or any technology. Old biotechnology occasionally posed regulatory puzzles, and FDA recognizes that the products of genetic technology give new twists to old regulatory questions.

Take the concept of food adulteration, for instance. The traditional idea of adulteration was that of impurities being added to a food -- for instance, when milk might be exposed to *Salmonella* bacteria or in the case of fillers added to cereals. The new biotechnology, however, makes it possible to remove properties as well as to add them: the long-lasting tomato, for example. There are many exciting possibilities -- like engineering cows or hens to eliminate the properties some people are allergic to in milk or eggs -- but these undeniably raise questions about changes in quality.

The ultimate question may be how many properties can be changed in an organism before it becomes something else. A tomato improved in one specific way seems obviously to be still a tomato, but does it remain one if you alter it in 10 ways, or 20? When traditional methods crossed the tangerine with a grapefruit, the new genetic structure was clearly something else, now sold as a tangelo. The new biotech questions are far more subtle. FDA must grapple with concepts of this sort as it considers the many new biotech food applications now being developed.

Biotechnology on Your Table

Markedly different or even novel foods probably won't appear on the grocery shelves any time soon. In less

spectacular form, however, the new biotechnology is already keeping its dinner date. For instance, Canadian salmon have been treated for most of this decade with a hormone that allows them to mature three times faster than normal, without changing the fish in any other way.

Most of the new biotech projects now in the works would do little to affect the taste or appearance of the food on the plate, although a few promise to improve the flavors and consistency of some vegetables or reduce the fat content of some meats. Most address foods in ways that can't readily be seen -- by improving nutrition content, preventing spoilage, or even eliminating the need for chemical pesticides. Gene probes to detect rapidly the source of food-borne illnesses have already proven their worth to health authorities. For example, a synthetic DNA probe recently was used to detect a shell-fish-related disease when other detection methods failed.

FDA recently surveyed more than 100 experts from government, business, and the universities to find out what sorts of developments in food biotechnology to expect in the near future. The survey made clear that the floodgates of innovation are opening. Nearly 800 different developments were reported as technically feasible, three-quarters of them potentially ready for commercial applications in a few years.

Prospects include meats with lower sodium and cholesterol content and longer shelf life, as well as weather-resistant crops with more abundant yield and nutritional content. Methods to better detect *Listeria* species or other food-borne germs are coming, to join the valuable gene probes already in use for detecting *Salmonella* and other bacteria. Plants engineered to do without chemical pesticides are beginning to sprout. Potatoes might some day be raised to last without preservatives. To the consumer's eye and palate, these first fruits of the new biotechnology will seem only subtly different, but the benefits should be substantial.

"Biotech Burgers" won't be available at the drive-in any time soon. Apples the size of pumpkins aren't right around the corner. And don't hold your breath waiting for Beazeley's turnip vines. But there may soon be the option of buying low-fat, low-cholesterol steaks, long-lasting, nutritionally superior vegetables, and pesticide-free fruits abundant because of an extended growing season, all courtesy of the new biotechnology.

Reprinted from the FDA Consumer, March 1990.



Harold Bengsch

IAMFES Secretary Winner

Harold Bengsch through vote of the IAMFES membership will begin his term on the IAMFES Executive Board in August, 1990.

Harold Bengsch is Director of the Springfield-Greene County Missouri Department of Health and has 30 years of continuous service in the field of public health with much of his professional experience in environmental microbiology and epidemiology.

Harold was raised on a dairy farm in Southwest Missouri and after completing high school at Billings he attended college at Southwest Missouri State University in Springfield where he received his B.S. in a double major in Agriculture Science. Later he earned his Master of Science in Public Health from the University of Missouri, Columbia, School of Medicine.

In addition, he has completed post graduate training with the United States Public Health Service and the Environmental Protection Agency in the field of Analysis and Biomedical Effects of Environmental Contaminants.

Harold has been a long time member of the IAMFES and is past president of the Missouri affiliate. He has served on several different committees of the International and is currently a member of the Applied Laboratory Methods Committee and is Chairman of the Publications Committee of *Dairy, Food and Environmental Sanitation*. As Chairman of the DFES Publication Committee his major goal has been that of enhancing the visibility of the International among practicing sanitarians and the promotion of professional growth of the Journals' readership.

Harold has just completed a 12 year period of service on the Executive Board of the National Conference on Interstate Milk Shipments and is a current member of the MCIMS Laboratory Methods Committee. He is currently a member of the State of Missouri Food Advisory Council and the State Milk Board. In addition, he serves the Task Force on Clean Air, Clean Water and Toxic Waste Superfund of the United States Conference of Local Health Officers.

A highlight of Harold's career occurred in 1977 when the IAMFES bestowed on him the Sanitarians Distinguished Service Award.

Harold and his wife, Darlene, live in Springfield where they enjoy gardening, photography, church activities and spoiling their grandkids.

American Academy of Sanitarians

If you have helped or are helping improve the environmental status of man, you may be eligible for certification through the American Intersociety Academy for Certification of Sanitarians.

The society, formed in 1966, is dedicated to the recognition of professional quality and achievement among sanitarians. Its members hope to provide cohesion for this multi-disciplined and growing field.

Plans for the Academy were developed over a period of several years by the Sanitarians Joint Council, founded in 1956. The Council was composed of representatives of the International Association of Milk, Food and Environmental Sanitarians, the National Association of Sanitarians and the American Public Health Association. The implementation of the AIACS was made possible through support by all the sponsors.

The AIACS provides cohesion for the multi-disciplined group, sanitarians. It recognizes the many talents of people active in environmental health activities. It certifies those who excel.

Certification as a Diplomate is not only a recognition of professional achievements, but it also enhances professional advancement. A diplomate is outstanding in the field. A diplomate can excel in leadership positions.

Unlike registration, which is merely a process or listing, certification recognizes high achievement resulting from education and practice in the chosen profession. It can't be granted at the beginning of a career, nor does it grant authority to practice the profession.

The requirements to become a Certified Diplomate are:

1. Good moral character with acceptable ethical and professional standing;
2. Graduation, with a baccalaureate degree from an accredited college or university whose transcript indicates the successful completion of at least 30 credit hours in the physical and biological sciences. Also, a master's or higher degree in public health, the environmental health sciences, or in an area of scientific or administrative specialization bearing upon environmental management must be possessed;
3. Evidence of qualification through education and

experience to manage environmental factors for the purpose of protecting and promoting the health and quality of life of people;

4. Legal registration as a sanitarian in states that require registration, or approval of the Academy's Board of Directors if employed in a state not requiring registration. Criteria for approval are based upon the Model Act for Registration of Sanitarians; and

5. Seven years of acceptable experience within the various fields of environmental health. Acceptable experience includes: at least five years of full-time work in which the scope of duties was on a professional level with the additional two years in a capacity of responsible charge of work above staff level. Time spent in acquiring undergraduate and graduate degrees is not creditable as experience except that time spent in obtaining a doctoral degree will be creditable less course time.

One or more of the following - a written examination, an essay, and an oral interview - are also required to be certified as a Diplomat.

Fees for the process include:

1. Application fee of \$15
2. Certification fee of \$25 upon acceptance; and
3. Renewal fee of \$10 annually.

All applications and fees should be made payable to:

American Academy of Sanitarians
CAPT James W. Pees, USPHS
Executive Secretary-Treasurer
14151 91st Court NE
Bothell, WA 98011
(206)483-4956

Academy chairperson is Webster Young, Jr., Captain USPHS, 19034 Quail Valley Blvd., Gaithersburg, MD 20879 (301)443-4644.

New Literature Reviews Guidelines for Managing Hazardous Waste by Small Quantity Generators

New literature from Dexter Water Management Systems Division, Chagrin Falls, Ohio, provides essential information pertaining to handling small quantities of hazardous waste in compliance with EPA guidelines.

The literature concisely presents guides to help businesses which generate "small" quantities of waste material. This "small" amount is defined by the EPA as being no more than 2,200 pounds per month. Because state regulations vary, information in the literature is limited to federal regulations on handling hazardous waste.

Procedures and precautions are outlined for safe handling of corrosive, ignitable, reactive, and toxic wastes. This information includes suggestions for

maintaining safety through clear identification of toxic materials with recommendations for safe storage practices before final disposal is made. Information on corrective procedures to cope with an accidental release of hazardous waste also is included.

To receive a copy of this new informative and helpful literature on hazardous waste management, contact Dexter Water Management Systems Division, 7145 Pine Street, P.O. Box 200, Chagrin Falls, Ohio 44022. Telephone: (216)247-5000.

New Executive Director for the Applied BioTreatment Association (ABTA)

Ms. Katherine Devine succeeded Ms. Sue Moreland as the Executive Director of the Applied BioTreatment Association (ABTA), which is comprised of biotreatment firms interested in promoting the use of biological waste treatment. Ms. Devine has a B.S. in Animal Science and a M.S. in Agricultural Economics and Marketing from the College of Agriculture and Environmental Science of Rutgers University. Ms. Devine spent over ten years at the U.S. Environmental Protection Agency in the office of Pesticide Programs and the office of Toxic Substances as a cost/benefit analyst of Agency regulations. Ms. Devine's work in the area of biotechnology has included: a regulatory impact analysis of the 1988 draft proposed Office of Toxic Substances' biotechnology rule, assessments of the benefits of usage of microorganisms that were the subject of the first industry notifications received in the Office of Toxic Substances as well as coordinating Agency review of some of the more recent notifications submitted for released and contained uses of microorganisms.

For more information contact Keith Kaufman, President of ABTA at (714)693-1877.

Pass The Sauce -- Heavy on the Spices, Hold the Salt and Fat

More and more Americans are working, and less time is being spent in the kitchen. Quick cuisine often depends heavily on convenience products such as prepared sauces to liven up a fast meal. Prepared sauces, dressings and gravies were a \$4.6 billion market in 1988 (all figures are in constant 1988 U.S. dollars). Sales of these products have been and will continue to be affected by the trend to health consciousness: low fat, low calorie and cholesterol-free products will gain in popularity. There is also an increased interest in premium and gourmet products and in exotic flavors, particularly spicy ones such as Cajun and Mexican.

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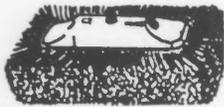
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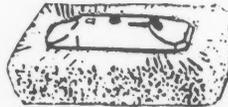
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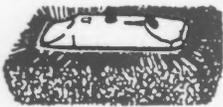
Custom molded white block 2 1/2" wide x 7" long with 3 threaded handle holes; 1 upright hole in center of block. Heavy fill of deep crimped nylon 1 3/4" trim. Brush 6" wide x 10" long overall. Individually boxed, 1/2 dozen to a shipping carton with white 4' fiberglass handles.



20476 330NR Black Nylon



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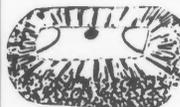
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20481 330NB Blue Nylon

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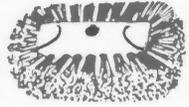
Custom molded block 2 1/4" wide x 5 1/2" long with threaded handle hole in center of block. Crimped nylon 1 1/4" trim. Brush 4 3/4" wide x 8" long overall. Individually boxed, 1 dozen to a shipping carton with white 3' fiberglass handles.



20464 130NR White Nylon



20463 130ND Red Nylon



20462 130NB Blue Nylon

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Attractive lightweight foam block makes the No. 623 a heavy duty brush which eliminates the danger of deadly bacteria. Crimped nylon permits longer brush life. Top performance at economical price. 2" trim.



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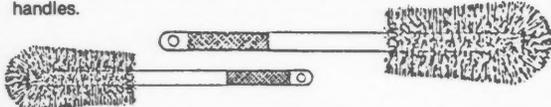
20730 623B Blue Nylon



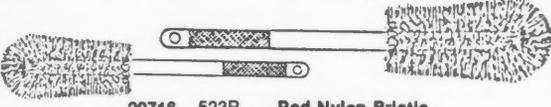
20732 623R Red Nylon

BOTTLE, GLASS & JAR BRUSHES

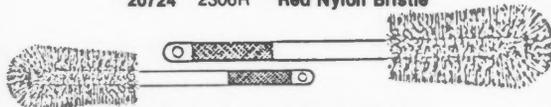
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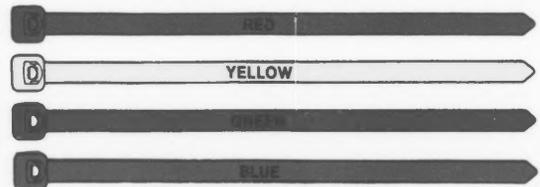


20716 523R Red Nylon Bristle
20724 2306R Red Nylon Bristle



20720 523B Blue Nylon Bristle
20728 2306B Blue Nylon Bristle

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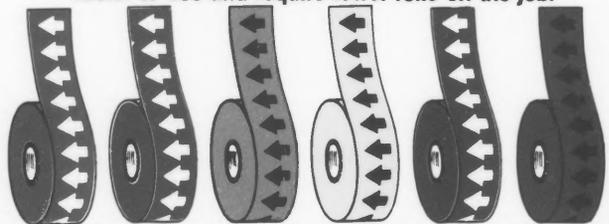
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VERNON, NEW YORK

A new 282-page report by Frost & Sullivan, "Sauces, Dressings and Gravy Market in the U.S." (#A2059) examines this market in depth and offers five-year growth forecasts. Leading manufactures and marketing strategies are detailed, as well as statistics and demographics. The overall market is expected to reach \$5.5 billion by 1993.

Spaghetti sauce is the largest market sector, with sales of \$992 million in 1988. It has and will continue to benefit from the popularity of pasta. A pasta-and-sauce meal is quick and easy to prepare and also economical. Recent line extensions include thick and chunky preparations, and products stressing premium ingredients. 1993 sales are forecast to reach \$1.2 billion. The sector is dominated by Ragu (Unilever) and Prego (Campbell Soup); these two brands accounted for approximately 74% of 1988 sales.

The highest growth level is forecast for specialty sauces, with 1988 sales of \$230 million expected to reach \$415 million by 1993. This sector is broken down into four subgroups: hot/cajun, gourmet dry, gourmet liquid, and seafood/cocktail. These products will benefit from an increased demand for spicy and gourmet foods.

Oriental sauces will also experience a high level of growth. This is due to a consumer association of oriental foods with healthfulness: light preparations of poultry, seafood and vegetables. Although many of these products are very salty, low-sodium formulations are offered. 1988 sales of \$72 million are projected to increase to \$128 million over the forecast period.

The fashion for ethnic and spicy foods will fuel the growth of Mexican sauces. Sales of \$264 million in 1988 are anticipated to grow to \$420 million by 1993. Whitman's old El Paso line is the market leader here, accounting for 32.2% of 1988 sales.

Barbeque sauces and meat/poultry sauces will also grow, driven by different-flavor line extensions, the preference for spicy foods, and the targeting by both sectors for use in poultry dishes, as health-conscious consumers move away from red meat.

Some of the largest market sectors will be stagnant and even decline, due to the public's avoidance of high salt, high-fat products. Ketchup, a \$470 million market segment, will suffer from its long-time association with hamburgers and french fries, and from its high salt content. Sales of mayonnaise, which were \$680 million in 1988, will also drop, due to the high-fat and cholesterol content of the product.

Other products studied in the report include gravy, spoonable and pourable salad dressings, and mustard.

For information, contact Customer Service, Frost & Sullivan, Inc., 106 Fulton Street, New York, NY 10038. (212)233-1080.

Silliker Labs Offers Antibiotic Screening

Responding to numerous requests for antibiotic screening in milk, Silliker Laboratories announces the addition of antibiotic screens, using the Charm II test, to the lists of analyses offered by Silliker's Chemistry Department.

The presence of antibiotics in milk has been a concern of the dairy industry, government regulatory agencies, consumer groups and the public for many years. An article appearing in the December 29th *Wall Street Journal* prompted the recent attention. The article, written by Bruce Ingersoll, describes a survey of fifty retail milk samples from ten major U.S. cities and a twenty sample survey from Washington, DC supermarkets. The nationwide survey detected residues of sulfonamides, penicillin, erythromycin or streptomycin in 38% of the samples. The DC study found sulfonamide residues in the range of 5-10 ppb in 20% of the samples.

Regarding these findings, FDA spokesperson Bonnie Aikman stated, "FDA sees no public health threat associated with animal drug residues in milk at the levels reported by the *Wall Street Journal*." Nevertheless, the Food and Drug Administration has subsequently announced that it has initiated a survey of grocery store shelf milk in 13 U.S. cities.

Silliker Laboratories, a leading independent food-testing, consulting and research laboratory, has received many inquiries in the past several weeks regarding antibiotic testing in milk. In response to this demand, Silliker's principals announced that the Charm II antibiotic screen for milk has been added to the analyses offered by their Chemistry Department.

The antibiotics included in the screen and sensitivity of these assays are: Beta lactam (0.008 IU/ml), Tetracycline (200 ppb), Erythromycin (100 ppb), Streptomycin (100 ppb), Novobiocin (50 ppb), Sulfonamides (10 ppb), Chloramphenicol (100 ppb) and Gentamycin (50 ppb). The option of screening for individual antibiotics is available. Silliker assures rapid turn-around time.

For more information, call Dr. William Ikins, Chemistry Lab Manager, or Mark Moorman, Laboratory Supervisor at (708)756-3210, or write Silliker Laboratories, Inc., 1304 Halsted Street, Chicago Heights, IL 60411. Silliker Laboratories, providing the food industry with professional and high-quality service for over 23 years, has laboratories located in California, Illinois, Ohio, Georgia, Pennsylvania, New Jersey and Canada.

Sanitarian Professional Advisory Committee Meets

The 82nd meeting of the Sanitarian Professional Advisory Committee of the Public Health Service was held at 9:00 a.m. on March 1, 1990, in Atlanta, Georgia.

The group discussed their Sanitarian Recruitment Plan, gave the Civil Service Report and discussed the Agency Representative Network throughout the course of the meeting.

As of December 31, 1989, 299 commissioned officers, including 24 females, had been recruited as sanitarians. Also included in this number are 25 Native Americans, 3 Asians, 6 Blacks and 6 Hispanics.

To aid the process, a recruiting pamphlet was distributed at the National Environmental Health Association Annual Education Conference in Charlotte, NC, June 23-28.

Professional registration was emphasized as part of the Civil Service Report. To ensure that registration listings are current, provide documentation to LT Martha Kent, Div. of Commissioned Personnel, OSG, 5600 Fishers Lane, Parklawn Building, Room 4A-18, Rockville, MD 20857.

Under review, as part of the Agency Representative Network, is the 30-year retirement policy. Right now, each agency can choose the policy it uses. The Force Management Model states that at least 15% of all officers reaching 30 years of service could be retained. The Offset Promotion Policy allows the 15% retention rate, but, excess of this would result in a corresponding officer not receiving a temporary promotion. The issue is whether or not the Force Management Model should be used exclusively.

The goals of the committee for the remainder of 1990 are:

1. Recruitment brochure-complete revision and have it printed for distribution;
2. SPAC Bluebook and Training Resource Book-complete revisions and have printed and distributed;
3. Registration/Licensure Issue-appoint a committee to make initial recommendation;
4. Assimilation criteria-reach agreement on type of masters degree required;
5. Recruitment plan-update and prepare annual reports;
6. GS-688 Series-continue to address issue of upgrading Qualifications Standards or develop a comprehensive set of Classification Standards;
7. Career development-discuss writing a career development program;
8. Advice to Surgeon General-continue to serve advocacy role and be prepared to advise on environmental issues when appropriate.

Some awards were also given at this meeting: LT Martha Kent was presented the PHS Citation and Plaque for her support to the SPAC; Richard J. Smith received an award of excellence from the John Hopkins University Injury Prevention Center for his leadership in developing an awareness that injuries are a compelling problem in

Native American populations; and Author Banks received the NSF Environmental Leadership Award for being a strong proponent of voluntary consensus standards in the food industry.

In January, the Senate received nominations of the sanitarians, Daniel Almaguer and Charles Stanley for appointment to the Regular Corps. The SPAC sends congratulations to these officers on their appointment.

The SPAC will attempt to have future meetings of the PHS coincide with several professional meetings and to also exhibit at these meetings. The professional meetings now included in this plan are the Commissioned Officers Committee in June and the International Association of Milk, Food and Environmental Sanitarians in August.

Milton Hult, Longtime President of Dairy Council, Dies

Milton Hult, president of National Dairy Council from 1936 to 1968, died in Chicago May 7. He was 93.

Under his leadership, Dairy Council grew from a headquarters office and 20 affiliated offices to headquarters and more than 90 affiliated offices. The organization also increased its prominence in the field of nutrition research and nutrition education during his 32-year tenure.

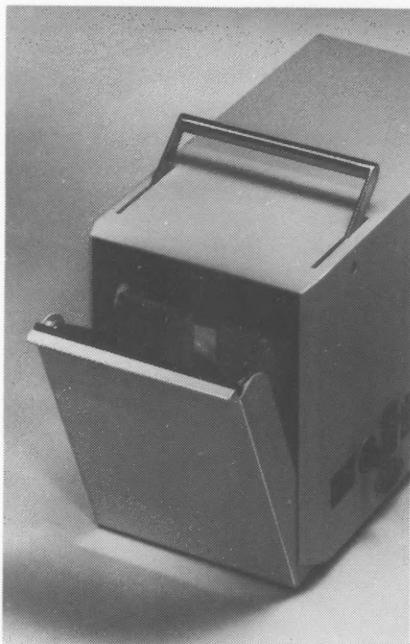
An alumnus of Knox College in Galesburg, IL, Mr. Hult also was graduated from the Harvard University School of Business Administration. He began his career by founding Superior Dairy Co. in Davenport, IA. He was active in several government, nutrition and dairy industry organizations. He served as chairman of the Dairy Society International and won numerous awards, including the New York World's Fair Award for distinguished service to agriculture. He was honored by the American Dairy Science Association in 1968.

Mr. Hult represented the United States as an official delegate to three International Dairy Congresses -- at the Hague in 1953, at Rome in 1956 and at London in 1959.

During World War II, Mr. Hult worked for the Food and Nutrition Commission, which coordinated food production and distribution to the armed forces, civilian population and the Allies. He later became a consultant to the U.S. Department of Agriculture. He was appointed to the Council of Physical Fitness by President Dwight D. Eisenhower.

Mr. Hult was a longtime resident of Lake Shore Drive, Chicago. He is survived by his wife, Alice Cooley Hult. A May 18 memorial service is planned at Emmanuel Lutheran Church in Rockford, IL, the town where he was born.

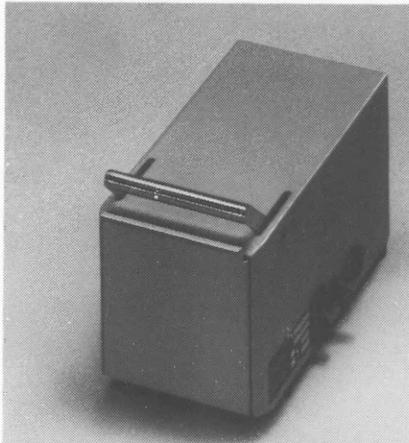
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Food and Environmental Hazards To Health

Lead Poisoning in Bridge Demolition Workers - Massachusetts

In March 1988, lead poisoning was diagnosed in five of nine workers employed by a contractor to demolish a bridge spanning a river in western Massachusetts. A subsequent investigation by the Occupational Safety and Health Administration (OSHA) determined that from November 1987 through early March 1988 four of the affected workers had used acetylene torches to cut apart large sections of the bridge; the fifth had cut these sections into smaller pieces on a barge moored below the bridge.

In March 1988, two of the five workers involved in the cutting process sought medical advice: one had headaches and myalgia, and the other had nausea and arthralgia. Blood-lead levels (BLL) (tested on the basis of occupational history) were 78 and 67 $\mu\text{g}/\text{dL}$, respectively. The three other workers involved in the cutting process were then evaluated; their reported symptoms included joint stiffness, abdominal pain, irritability, and memory loss. BLLs in these workers were 58, 74, and 160 $\mu\text{g}/\text{dL}$. The highest BLL, 160 $\mu\text{g}/\text{dL}$, occurred in the worker assigned to the barge. Because the four remaining crew members had not worked in areas where they would have been exposed to lead fumes, they were not tested.

Four of the five affected workers were treated with chelation therapy (calcium ethylenediaminetetraacetic acid [EDTA]). Each worker excreted substantial amounts of lead and experienced a decline in symptoms. The fifth worker, who had a BLL of 58 $\mu\text{g}/\text{dL}$, demonstrated elevated lead excretion when given a test dose of EDTA. However, because he had become asymptomatic and had no evidence of organ damage, he was not treated with chelation therapy.

The OSHA investigation determined that paint covering the bridge contained 30% lead (by weight). Respirators available to the workers were not always equipped with cartridges that protected against lead fumes. The workers were not trained to OSHA standards in respirator use and wore the respirators infrequently. In addition, the employer had not provided clean work clothing or handwashing and eating facilities for the workers. OSHA cited the contractor for violating several regulations governing proper use of respirators.

Editorial Note: Based on findings from the 1981-1983 National Occupational Exposure Survey, an estimated 827,650 U.S. workers have potential work-related exposure to lead (excluding leaded gasoline) (CDC, unpublished data). In the workplace, the respiratory tract is the major route of lead absorption. Clinical manifestations of occupational lead poisoning, which usually occur when BLLs exceed 40 $\mu\text{g}/\text{dL}$, can vary greatly in severity and include abdominal pain, anorexia, fatigue, arthralgia, headaches, irritability, depression, impotence, anemia, and hyperuricemia. Encephalopathy, peripheral neuropathies, and impaired renal function have been reported, but are

infrequently associated with occupational exposure.

Lead poisoning may occur when workers and employers fail to recognize the presence of lead or fail to adhere to accepted safety guidelines. Recent reviews of workers' compensation data and laboratory-based lead registries indicate that workers at highest risk for lead toxicity include persons who work in lead smelters, storage battery-manufacturing plants, plastic-compounding factories, and nonferrous foundries. Construction or demolition work that involves cutting through lead-coated metal structures, a process that generates high concentrations of lead fumes, can also present substantial risk for lead toxicity. Lead poisoning has been described in workers who repair and disassemble ships and roofs, dismantle elevated subway lines, and demolish and strip paint from bridges.

Construction workers in the United States are excluded from regulation under the OSHA Lead Standard. However, other OSHA regulations governing the construction industry require respiratory protection for workers who use torches to cut through toxic preservative coatings, such as lead-containing paints, and mandate engineering controls or respiratory protection for workers exposed to airborne lead at concentrations $>299 \mu\text{g}/\text{m}^3$.

As bridges in the United States age, they will require demolition or rebuilding. Construction workers engaged in these processes are at risk for hazardous lead exposure. Proper preventive measures, including engineering controls and appropriate use of respirators, should be carefully implemented. Physicians caring for construction workers should take thorough occupational histories and be aware that worker engaged in bridge demolition work may be at increased risk for occupational lead poisoning.

MMWR 10/13/89

Lead Poisoning Associated with Intravenous-Methamphetamine Use - Oregon, 1988

Between August 1 and September 6, 1988, 14 cases of non-A, non-B (NANB) hepatitis were reported in Marion County, Oregon, to the Oregon Health Division (OHD) by the county health department and private physicians. Previously, an average of less than one case per month was reported in the county. During the same period, OHD learned that eight intravenous-methamphetamine users (IVMUs) in Oregon thought to have NANB hepatitis had also been recently diagnosed with lead poisoning. A statewide media campaign describing the lead poisoning outbreak was conducted to alert IVMUs, physicians, and county health departments. In addition, OHD implemented a reporting system for suspected and confirmed lead poisoning cases.

A suspected case of IVMU-associated lead poisoning was defined as three or more of the following symptoms in

an IVMU: abdominal pain, nausea, vomiting, lower back and leg pains, weakness, weight loss, and anorexia. A confirmed case was defined as seronegativity for both acute hepatitis A and acute hepatitis B and a blood-lead level of $\geq 40 \mu\text{g/dL}$ ($1.93 \mu\text{mol/L}$) and/or an erythrocyte protoporphyrin (EP) level of $\geq 60 \mu\text{g/dL}$ ($1.06 \mu\text{mol/L}$) in an IVMU.

In 1988, 37 suspected and 14 confirmed cases were reported to OHD; in 1989, no suspected or confirmed cases were reported. Clinical evaluation for lead poisoning was completed for 19 suspected cases. In six, blood-lead levels were $< 25 \mu\text{g/dL}$ ($1.21 \mu\text{mol/L}$); the other 13 had blood-lead levels of $\geq 40 \mu\text{g/dL}$, and/or EP levels of $> 60 \mu\text{g/dL}$. One person with an uncertain history of methamphetamine use was asymptomatic but had a blood-lead level of $87 \mu\text{g/dL}$ ($4.2 \mu\text{mol/L}$).

The 14 confirmed case-patients ranged in age from 24 to 36 years (mean: 27.1; median: 29); 11 were male. Except for one person who had onset in March 1988, onset of symptoms occurred between July 20 and August 17, 1988. The most common symptoms were abdominal pain, vomiting, constipation, nausea, and weakness; duration of symptoms ranged from 3 weeks to 6 weeks. Blood-lead levels ranged from $49 \mu\text{g/dL}$ to $513 \mu\text{g/dL}$. Analysis of an illicit methamphetamine sample provided by one of the patients with confirmed lead poisoning detected 60% lead by weight.

Editorial Note: This report has two important clinical and public health implications. First, lead poisoning may not be diagnosed if physicians do not have a high index of suspicion, especially for illness in persons not usually considered to be at risk for lead poisoning. Second, illicit products may be grossly contaminated with poisonous substances. Products manufactured in clandestine laboratories have caused substantial mortality and morbidity (e.g., parkinsonism in drug users exposed to 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine-contaminated meperidine analogs and toxic-oil syndrome following use of contaminated rapeseed oil).

Acute lead poisoning from IV exposure to lead has been previously reported; some of these cases resulted from illicit methamphetamine use. In the Oregon outbreak, the total number of IVMUs affected by lead-contaminated methamphetamine was probably greater than reported because the case definition excluded IVMUs with blood-lead levels $< 40 \mu\text{g/dL}$. In addition, the population at risk (i.e., IVMUs) is difficult to study; almost half the suspected cases were lost to follow-up, and many exposed or ill persons probably did not identify themselves to health-care providers.

The clustering of cases within a 1-month period suggests a point-source epidemic. Whether contamination of the methamphetamine with lead-containing material was deliberate or a result of inadequate processing is unknown. However, lead acetate is a reagent in the manufacture of phenyl-2-propanone, a precursor of methamphetamine in the amalgam process.

Most of the Oregon patients had only slightly elevated

SGOT levels (median: 124IU/L). However, elevations of bilirubin (median: 2.4mg/dL) and marked increases in SGOT levels in some of these persons are unusual in lead poisoning. Particularly because IV-drug use is the most commonly identified risk factor reported by persons with NANB hepatitis, some of these patients may have had either acute or chronic NANB hepatitis of viral etiology in addition to lead poisoning. Alternatively, these abnormalities in SGOT and bilirubin may have resulted from exposure to solvents used to manufacture the methamphetamine. Physicians should be aware that acute lead poisoning can have many signs and symptoms similar to those of NANB hepatitis and that illicit methamphetamine can contain substantial amounts of lead.

During the outbreak, the OHD notified health care providers that any NANB hepatitis case should be reviewed for possible lead poisoning. Because there have been no indications of a continuing problem, no further actions have been taken.

MMWR 12/8/89

Dioxin and Milk Safety

FDA studies have shown that dioxin levels in milk from bleached paper cartons are extremely low and do not present a health hazard. The agency has confirmed reports that dioxin, which contains a compound known to cause cancer in animals, migrates from bleached paper cartons into the milk they contain. However, studies show that levels in these products measure well below 1 part per trillion.

If findings in test animals have a parallel in humans, FDA tentatively estimates that the lifetime cancer risk of consuming milk packaged in cartons over the next three to five years would be less than one in a million.

As FDA was testing dioxin levels in milk, the paper industry developed techniques for producing bleached paper containers that contribute no dioxin to milk and other foods they package.

"Because we now have the means to virtually eliminate even the low level of dioxin in milk from bleached paper cartons, it is prudent to do so," FDA Commissioner Frank E. Young, M.D., Ph.D., said. "However," he added, "during the short period of time it will take to complete corrective steps, milk is safe to drink."

Dioxin is chemical shorthand for a large family of compounds. The substance in milk cartons is formed from reactions between chlorine and certain materials in paper products. FDA will closely monitor the changes in paper manufacturing techniques and the levels of dioxin in milk as industry changes its production processes.

FDA Consumer, November 1989.

This is truly the information age. Access to the right information at the right time can make a non-expert an expert. Application of the right information at the right time can be the difference between prevention and a disease outbreak - between a non-accident and a community disaster.

Professionals with limited access to information will have a difficult time keeping up with new developments and technologies in their field. Professionals can obtain technical information from a number of sources: professional journals, trade publications, information hotlines, and computerized data bases to name a few. Many IAMFES members already use these sources of information on a routine basis.

One source that is missing from the above listing is the IAMFES Annual Meeting. Last year's annual meeting was a record breaking year for attendance. Even though 1989 attendance was high only 1 in 10 readers were able to attend. Make every effort to attend this year's meeting in Illinois and obtain information that will help you grow professionally.

Access to information is also important for organizations. Organizations with limited access to information may make important decisions based on inappropriate assumptions. IAMFES members will be making an important decision in the near future concerning a name change for our organization. Decisions on this issue need to be based on adequate information about the entire membership.

Last year our new Executive Manager, Steve Halstead, suggested an excellent way to obtain information about our diverse membership. Steve proposed that a member survey be conducted. By the time you read this column such a survey may already be in progress.

Hopefully, the membership survey will include questions concerning professional categories of members and employment; registration, certification, and other professional credentials; membership in other professional and trade organizations; and the range of environmental sanitation programs members are involved in.

No matter how well a survey is designed or the number of questions included the final success depends on individual members taking time to respond. When a membership survey is received take time to complete it and return it. Your response will help provide important information that will help this organization grow and to provide even better membership support.

If the information from a membership survey shows that we have far fewer sanitarians than in the past or that most members are only interested in food then a name change should certainly be considered. We may find that the "S" in IAMFES should stand for Scientists or maybe we need to change the "S" to an "E" for Experts/Executives/Engineers/ Educators.

OFF THE CLIPBOARD: - The Education Resources Information Center (ERIC) in Rockville, Maryland is a unique source of information. ERIC has published the *ERIC Directory of Education Related Information Centers* that serves as a guide to more than 200 sources of specialized information related to education. Many of the sources in this directory are concerned

with health issues. A copy of the ERIC Directory can be obtained for \$10 from: ACCESS ERIC, 1600 Research Blvd., Rockville, Maryland 20850.

- On October 17, 1990, the Federal Emergency Management Agency (FEMA) will broadcast a two hour television seminar on "Emergency Food and Shelter." The seminar will be available over the Emergency Education Network from 2 pm - 4 pm. FEMA also provides other televised seminars related to health aspects of community emergencies and disasters. To obtain more information on the October program and how this unique TV network can be used by your organization, write FEMA, Emergency Education Network, National Emergency Training Center, Emmitsbury, MD 21727, or call (301)447-1068.

- The state of Illinois has issued a technical release on Histamine/Scrombroid Foodborne Illness. The technical release provides an excellent outline for conducting a modified HACCP inspection as part of a foodborne illness investigation. Send a self addressed and stamped envelope to obtain a copy of the HACCP inspection outline.

- A new publication: "Public Health Consequences of Disasters 1989" can be obtained free from the Centers for Disease Control, Division of Environmental Hazards and Health Effects (F28), 1600 Clifton Road N.E., Atlanta, GA 30333, (404)488-4682.

Homer C. Emery, RS
Chair, FDA Interpretations Committee

July Field Inspection Quiz

You're the QA expert for "Southern Fried USA", a national restaurant chain. The Vice-President for marketing has asked you to prepare an information paper about the use of irradiation for the control of pathogenic and spoilage bacteria in poultry. What information should you include:

- Historically, FDA has approved food irradiation to control:
 - insects in wheat and wheat flour (1963)
 - sprout development in white potatoes (1964)
 - trichinosis in pork (1985)
 - All the above
- Levels of irradiation approved by FDA have been limited to:

A. 3 kiloGray	B. 30 rads
C. 0.3 kiloGray	D. 10 picoCuries
- For poultry FDA has approved the use of:

A. gamma radiation	B. electron radiation
C. X-ray	D. All the above
- Irradiation at the levels approved for poultry will:

A. Kill all pathogens	B. Sterilize the product
C. Reduce the number of bacteria present	
- Irradiated poultry at the approved levels will:
 - require proper refrigeration
 - be able to be stored at room temperature
 - be required to be stored at 50°F or below
 - be required to be frozen.

Answers to June FIQ: 1. (D); 2. (B); 3. (A); 4. (A); 5. (B)

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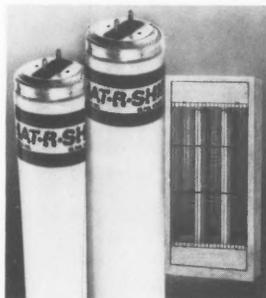
Seton Name Plates Company's wide selection of pressure sensitive Vinyl Pipe Markers is your answer to quick, economical pipe identification. Constructed of highly durable vinyl these markers are made to last. Available in many sizes and colors, and as individual or roll form markers, there's a marker to meet every need.

Seton offers over 100 standard legends, and most markers are in stock and ready for immediate shipment. Custom markers are also available to meet special color or wording requirements. A complete line of Arrows-On-A-Roll and Color-Coded Banding Tapes are also available to ensure marker adhesion.

For a complete listing of wordings, sizes and styles, and FREE catalog

Seton Name Plate - New Haven, CT

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New Plastic-Coated Fluorescent Lamps

Shat-R-Shield[®], Inc. announced a new addition to its line of plastic-coated fluorescent lamps. The company, after years of research and development, has introduced the first coated black light lamp, designed for use in insect light traps (ILTs) or insect electrocutors.

For the first time, food processors, food service companies and other manufacturers can use ILTs near production areas without the dangers associated with lamps accidentally broken. The plastic coating will contain virtually all broken glass and phosphors in the event of an accident. No longer is it necessary to move ILTs to a "safe" area during lamp change-over.

Shat-R-Shield, Inc. - Salisbury, NC

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New Microprocessor Controlled Nitrogen and Sulfur Analyzers

The new ANTEK 7000 Elemental Analyzer utilizes the proven technology of Pyro-chemiluminescent[™] Nitrogen Analysis and Pyro-fluorescent[™] Sulfur Analysis. The 7000 employs separate, easy-to-install detectors for nitrogen and sulfur. Buy one detector and add another at any time. The system can be configured for nitrogen analysis, sulfur analysis, or simultaneous nitrogen and sulfur analyses. ONE INJECTION - TWO RESULTS.

Completely microprocessor controlled, the ANTEK 7000 features onboard, dual channel data handling, battery protected methods and date storage, internal and external timed events, internal calibration and data reduction, and more.

The 7000 performs total nitrogen and/or total sulfur determination on gas, liquid, and solid samples. Typical analysis times are 30 seconds for gases and liquids, 1 to 10 minutes for solids and viscous liquids. A direct digital read-out displays results in concentration: parts per million, nanograms, percent, or other. The systems have an analytical range of low ppb to 3% nitrogen, and low ppb to 40% sulfur.

Antek Instruments, Inc. - Houston, TX

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The Surge Premium Soft inflation offers a softer, gentler touch with the longer life of a regular-formulation inflation (1,000 to 1,200 cow milkings).

New Milker Inflation Combines Soft Touch With Durability

Surge dealers are introducing a new milking inflation that provides the two characteristics (softness and durability) most dairy operators want, in one inflation. The Surge Premium Soft inflation uses a special tri-polymer rubber formulation to reduce slipping and squawking by combining flexibility with durability.

Research and field testing, based on more than 100 million cow milkings, led to the development of the Premium Soft inflation. The result is a softer, gentler touch with the longer life of a regular-formulation inflation (1,000 to 1,200 cow milkings).

It fits Jet-Flo shells and large-nippled milking units. The dome has been designed to fit special C.I.P. manifold cup holders for easier removal and a more positive seal with the shell.

Surge - Naperville, IL

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Announcement for VICAM

VICAM is proud to announce that a method using the AFLATEST immunoaffinity column has been granted Interim Official First Action status by the Association of Official Analytical Chemists (AOAC). The study was sponsored by the AOAC and the International Union of Pure and Applied Chemistry (IUPAC).

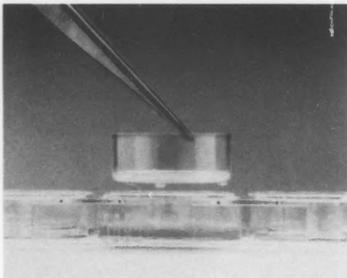
AFLATEST columns are used for rapid, quantitative detection of aflatoxins in feeds, foods, grains, nuts and dairy products. It is a

fast and easy technique utilizing monoclonal antibody technology.

A poster presentation of the recently approved method will be displayed at the Clarion Hotel in New Orleans from September 10-13 at the AOAC meeting. During this meeting, the method will be voted upon by the membership in consideration of Official First Action Status.

Vicam - Somerville, MA

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Wheaton/Anocell Porous Tissue Culture Insert Provides Superior Substrate for Observing Cultured Cells

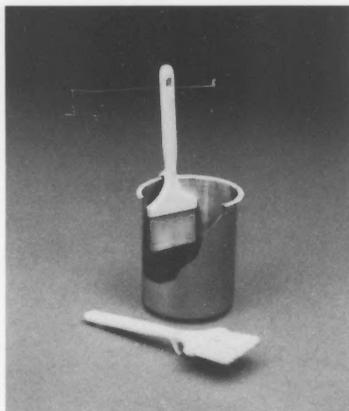
Wheaton/Anocell is a new porous Tissue Culture Plate Insert which offers Cell Biologists a superior system for observing cell growth during culturing and allows easy removal of the rigid membrane for further studies.

Wheaton/Anocell Inserts incorporate the unique Anopore inorganic membrane which provides a uniform surface for cell attachment and growth. The increased porosity of the membrane permits a free diffusion of ions, macromolecules and other nutrients to both the baso-lateral and apical plasma membranes of attached cells. In addition, the Anopore membrane becomes virtually transparent when wet providing excellent microscopic observation of cell growth.

Wheaton/Anocell Tissue Culture Inserts are available in two sizes, conveniently packaged in 6 well strips in boxes of 12 and 48. Anocell 10 devices are designed to fit standard 24 well plates and Anocell 25 devices are designed to fit standard 6 well plates.

The Wheaton Agency - Millville, NJ

**Please circle No. 307
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Sparta "Meteor" Pastry/Basting Brush

Sparta Brush Introduces Meteor Line

Sparta Brush Company has introduced a totally new concept in pastry/basting brushes with its Meteor line.

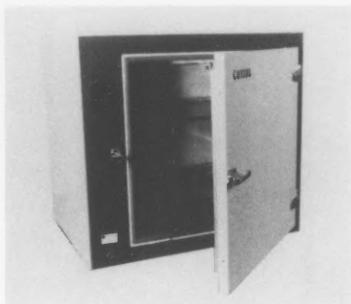
Sparta's Meteor pastry/basting brushes feature a molded-in-the-handle hook allowing it to hang on the lip of a bain marie or other basting pot. This feature eliminates bristle burn, melt and distortion which often results when the brush rests on the bottom of the hot pan. The hook also functions as a prop to elevate the bristles when laying the brush on a counter. The elevation keeps the bristles from picking up other food residues and possible bacteria from the counter top.

Meteor pastry/basting brushes are available in 2" and 3" sizes with white nylon bristles and white plastic handles or genuine bleached and sterilized bore bristles with plastic sandalwood color handles.

Sparta Brush Company is a leading manufacturer of high quality specialized brushes for the food service, dairy, process, janitor supply and gourmet industries.

Sparta Brush Company - Sparta, WI

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Bench Top Incubators

Science/Electronics introduces the Series "EI" Incubators for durable, accurate and dependable bench-top performance year after year. The "EI" Series is available in four models with sizes from 2 to 9 cubic feet. Temperatures range from above ambient to 80°C and feature sensitivity of $\pm 0.5^\circ\text{C}$, utilizing a proportional control system with platinum resistance sensing elements.

The four models feature plastic coated galvanized steel outer case and welded stainless steel interior, including moveable perforated trays. The Incubators are available with either convection or forced systems. Safety is provided via thermal sensors for over-temperature and heater burnout protection. The heavy duty single-latch insulated outside is backed up by a tempered glass inner door with seal allowing incubator observation without loss of environment.

Science/Electronics - Dayton, OH

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Clements Associates Inc. Manufactures Hand-Operated Soil Sampling Equipment

Clements Associates Inc. manufactures a complete line of hand-operated soil sampling equipment. Their free 24 page catalog describes several probe handles, bucket augers, and sampling tubes with removeable liners. It spotlights a probe that uses a sliding drop-hammer to drive a 36 inch long sampling tube into the ground and a food-operated jack to retrieve it. With their equipment, samples as small as 0.9 inches in diameter up to 3 inches in diameter from 10 feet or more below ground level may be obtained. Equipment is sold as complete kits or individual parts. Clements Associates Inc., R.R. #1, Box 186, Newton, IA 50208, Phone (515)792-8285 or (800)247-6630.

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Food safety certification—It's the only way to play.

Today, food safety is a key part of any successful game plan for foodservice operators. In fact, with customers more concerned about sanitation than ever, you can't play it too safe.

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This comprehensive program educates, tests and certifies managers in food safety using our Applied Foodservice Sanitation (AFS) course, the industry standard for more than 15 years. We provide all

course materials from in-house group training to independent home study.

SERVSAFE offers an array of food safety training resources to suit the needs of the foodservice industry. In addition to training and certifying managers, we provide products and services to train everyone from corporate trainers to line employees. Our staff can teach instructors how to present an effective sanitation course, or we can even conduct the course for you.

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National Restaurant Association

THE EDUCATIONAL FOUNDATION

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Book Reviews

The Clean Water Act Compliance Handbook by Russell S. Frye, Esq. is available through Executive Enterprises Publications Co., Inc., New York, New York.

This publication (part of a series of Environmental Compliance Handbooks) is designed to provide accurate and authoritative information regarding the Clean Water Act. The intention is to provide a summary of the regulatory programs under the Federal Clean Water Act to those parties responsible for complying with applicable legal requirements.

The majority of the handbook consists of eight chapters on the following topics:

- Overview of Obligations Under The Clean Water Act.
- NPDES Permit Requirements.
- Requirements for Industrial Dischargers to Publicly Owned Treatment Works.
- Reporting, Prevention, and Cleanup of Spills.
- Dredge and Fill Permit Program.
- Permit Requirements for Sewage Sludge Storage, Use, or Disposal.
- Understanding EPA and State Enforcement.
- Avoiding and Defending Citizen Suits.

The material in the handbook is aimed at compliance efforts. It concentrates on statutory and regulatory requirements key to maintaining compliance.

The remainder of the handbook contains four appendices that deal with reporting and inspection checklists, an excellent Glossary of Terms, and a very comprehensive Reading List.

Kevin Anderson
City Sanitarian, Ames Health Department
Ames, IA 50010

The RCRA Compliance Handbook by Charlotte L. Neitzel, Esq. is another text in a series of Environmental Compliance Handbooks available through Executive Enterprises Publications Co., Inc., New York, New York.

The RCRA Handbook consists of seven chapters on the following topics:

- What Materials are Hazardous Wastes that are Regulated Under RCRA.
- Standards Applicable to Generators and Transporters.
- Treatment, Storage and Disposable Facilities ("TSD Facilities").
- Land Disposal Restrictions.
- Permitting.

- Information - Gathering and Enforcement.
 - Underground Storage Tank Program Under Sub Title I.
- and a Glossary of Acronyms.

The Resource Conservation and Recovery Act (RCRA) tends to be very complicated and this text attempts to simplify and provide an overview of the RCRA for persons responsible for compliance by summarizing key statutory provisions, regulations, current EPA issues, and significant cases. It also familiarizes the reader with the RCRA regulatory scheme.

The reader is advised not to use this text to handle specific questions that address a particular set of facts. The text also does not address special provisions for farmers and for exports and imports of hazardous waste.

Kevin Anderson
City Sanitarian, Ames Health Department
Ames, IA 50010

Microbial Recontamination in Dairy Processing. Proceedings of the International Congress, Thiene, Italy, May 28th, 1987. Published by the Istituto di Tecnica e Sperimentazione Lattiero-casearia di Thiene, Italy. 110 pp.

Food scientists are usually on the lookout for new methods to prevent the microbial recontamination of processed foods. Unfortunately, this small book does little to enlighten one about this important food industry issue. Most food processors are already educated on the material covered in this book. It was apparent that the original text was prepared in a language other than English and the translation lost the general flow of the English we know and expect, including sentence structure, punctuation, and spelling.

The papers included in this book were directed toward the microbial contamination of butter and cheese during manufacturing. Much of the text was a review of yeasts and mold characteristics with only limited application to dairy products and processing. The chapter that included mold control in dairy plants may be of value to dairy foods processors as might the chapter on cheese mites.

This book is hardly a "must" for any technical library nor for dairy foods researchers and technologists.

Bill LaGrange
Extension Food Scientist
Iowa State University, Ames



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Stop by our Exhibit at the IAMFES Annual Meeting

DAIRY, FOOD AND ENVIRONMENTAL SANITATION/JULY 1990 443

77th IAMFES Annual Meeting Exhibit Preview

A & B Process Systems Corp.

Process Flow Systems Specialists displaying their broad range of Products and Services which include Process Flow Engineering, Project Management, Process/Mechanical Installation and Custom Stainless Steel Fabrication/Machining. A & B Process Systems vast experience with the Design/Implementation of CIP Units/Systems and Auxiliary Equipment, will be featured. Other items include Tanks, Transfer Panels, Manifolds, Platforms and Hanger Accessories.

Circle Reader Service No. 231

Advanced Instruments, Inc. Needham Heights, MA

Advanced Instruments presents two new products for the dairy laboratory: the Fluorophos Test System[®], an AOAC-approved 3-minute quantitative assay for alkaline phosphatase activity in all fluid dairy products, including cheese; and the 4D3, a microprocessor controlled cryoscope, which requires no cooling bath, runs 45 tests per hour, and automatically displays % added water. Visit our booth or call (617)449-3000 for a demonstration.

Circle Reader Service No. 232

American Type Culture Collection (ATCC)

Microorganisms, Cell Lines, Viruses, and Recombinant Genetic Materials (clones, probes, libraries, oncogenes, vectors, hosts, molecularly cloned viruses) from the *SOURCE* for biological cultures. The ATCC is a nonprofit organization dedicated to the preservation and world-wide distribution of biological cultures for industry, research and education. Free catalogues are available with extensive information on all ATCC cultures. (800)638-6597.

Circle Reader Service No. 233

Atkins Technical, Digital Food Thermometers

3401 SW 40th Blvd., Gainesville, FL 32608 Tel: (800)284-2842. Atkins manufactures a line of digital thermocouple thermometers and 150 thermocouple probes. Kits for the sanitarian, restaurant operator, dairy, food processor, or food safety specialists with accuracy and durability in mind. Featured are O-ring sealed digital thermometers with an accuracy of $\pm 1^\circ\text{F}$, and multiple probe kits.

Circle Reader Service No. 234

AquaTec, Inc.

AquaTec is an equipment/supply and turnkey construction company specializing in industrial water and wastewater treatment. Our registered professional engineers are experienced in most engineering disciplines such that we can offer complete turnkey services. We have built treatment systems for Food, Dairy, Pulp and Paper, Chemical, Plating, Landfill Leachate and other industrial wastes. AquaTec provides innovative solutions to wastewater problems.

Circle Reader Service No. 235

Aquionics Inc. Erlanger, KY

Manufacturer of Ultraviolet Disinfection Equipment for use in Food and Dairy Industries.

Applications include water, air and surface disinfection. Use UV to kill Microorganisms in plant water, sweet water, cottage cheese curd wash water and all captive water systems.

Aquionics have experienced personnel on hand to review your application.

Circle Reader Service No. 236

Becton Dickinson Microbiology Systems

Becton Dickinson Microbiology Systems, Cockeysville, MD (Booth 9) will exhibit products utilized for the cultivation and identification of foodborne pathogens, including *Salmonella* and *Listeria*. In addition, the company will exhibit autoclave controls and complete line of bottled media utilized in sterility testing and environmental monitoring.

Circle Reader Service No. 237

L. J. Bianco and Associates

Consultants in Food Production Controls and Production Operations. We provide QC and QA Audits; Evaluation Programs in Sanitation and QC; Technical and Employee Training. We have GMP (Good Manufacturing Practices) and GSP (Good Sanitation Practices) manuals and training slides, booklets and videos. We have plant and warehouse sanitation and pest control procedures and programs. Expert Witness on Product Quality, Plant Sanitation and Plant QC and QA.

Circle Reader Service No. 238

Capitol Vial, Inc. New Tamper Evident Vials

We will display our All New Tamper Evident and Tamper Proof Vials, produced in a class 10,000 FDA certified clean room. Capitol Vial manufactures one piece, hinged top cap, leak proof, airtight (over 30 psi internal pressure) plastic sterile vials. In addition to various size vials, Capitol has a complete line of accessory items such as: automatic vial opener and closer, styrofoam vial shippers, poly cell rafts and wire racks to transport vials.

Circle Reader Service No. 239

Chem Bio Consultants and Laboratories

Chem Bio is an independent laboratory and consulting organization serving the food, cosmetic, and pharmaceutical industries with expertise in the areas of testing, consulting, education, and research. Microbiological and chemical testing is done according to FDA, USDA, AOAC, and USP methods. Chem Bio is a USDA recognized and IDPH certified laboratory and operates under the direction of Dr. Robert H. Deibel.

Circle Reader Service No. 240

Commercial Testing Laboratory, Inc.

Internationally recognized independent laboratory founded in 1952. We provide chemical and microbiological analyses for the food industry, agribusiness arena, as well as all generators of wastewater. Our staff of 40 pros, 7 of which are degreed biologists or chemists, stands ready to perform tests you need; accurately and quickly. Please let us know how we can help you. (800)962-5227. FAX (715)962-4030. (715)962-3121. Ask for Arlan Henke or Pam Gane.

Circle Reader Service No. 241

Custom Control Products, Inc.

We are an Electrical Process Engineering Group that designs and builds Electrical Automation Control Systems for the Food, Dairy, and Beverage Industries. Custom Control Products seeks to provide our customers with the most cost effective systems, allowing them to grow and serve the needs of their customers. By providing the highest quality Process/CIP Control Design, together with Field/Start Up Service, we offer a complete Engineering package.

Circle Reader Service No. 242

DQCI Services Inc.

DQCI Services, Inc. understands your need for consistent, dependable, accurate component milk samples. After all, we know your profits are hanging in the balance...and there's not much room for error. So, whether you need high-quality control and somatic cell samples for calibrating your testing equipment or custom dairy-related testing, don't take chances. Depend on DQCI Services.

Circle Reader Service No. 243

Diversey Corp.

Featuring Shur-Graph™ for Diagnostic Monitoring and data transmission of your plant's cleaning and sanitation operation. Shuregel™ Spray Gel cleaner that clings to surfaces allowing for extended contact time for better biological cleaning. Water treatment programs. Monitor test strips.

Circle Reader Service No. 244

Educational Testing Services/COPA

Educational Testing Service/Center for Occupational & Professional Assessment (ETS/COPA) provides the Food Protection Certification Program to test the knowledge of food service personnel responsible for prevention, detection and correction of foodborne illness in food service establishments. For more information contact the Program Director, Betsy Willey, (215)750-8427.

Circle Reader Service No. 245

Charles Felix Associates

Charles Felix Associates is a consulting firm specializing in public health promotion, particularly in the area of food safety. The CFA exhibit offers samples of CFA publications: *Food Protection Report* and *Food Talk*; also materials from CFA clients relating to single service (the Foodservice & Packaging Institute) and ice sanitation (the Packaged Ice Association).

Circle Reader Service No. 246

Foss Food Technology Corporation

BactoFoss - Rapid, automatic bacterial count in raw meat and milk. Performs bacterial count in raw milk in just 3 minutes. Auto-Sampler - For inline continuous sampling. Gives truly representative samples of milk and other fluids flowing in pipeline systems. MMA90 - Microwave moisture analyzer gives reliable, accurate microwave moisture/solids testing at a reasonable cost. Complete determination achieved in minutes.

Circle Reader Service No. 247

H B Fuller Company Monarch Division

Monarch will demonstrate the Full-Guard Reporter CIP monitoring system during a simulated wash cycle. The demonstration unit will plot flow rate, temperature, and conductivity versus time to generate a graph printout of the wash cycle.

Monarch will also feature its new non-phosphate cleaning program for food plants, including six new non-phosphate products.

For more information call Monarch at (612)781-8071.

Circle Reader Service No. 248

Glengary Biotech Div. of Flockton Analytical

The Company is dedicated to supplying analytical tests for food safety. These tests are in kit form. Displayed will be Redigel, the Pectin Gel Agar replacement with the featured product Cholichrome II. Also on display will be the BR Test for the detection of Veterinary Drug Residues in Milk, Meat, Fish, Egg and Honey. Phone: (613)936-2722 FAX: (613)936-2716.

Circle Reader Service No. 249

Gustafson Inc., Plano, TX Automatic Sampler Div.

Gustafson will display a new Dairy Sampler for sampling milk powder in gravity chutes and hoppers. The sampler is USDA approved for 3A Dairy applications and is constructed of 304 SS with high polish auger and Tri-Clover connections for quick breakdown and cleaning. The sampler can be used with a special sample viewing chamber for on-line moisture control using NIR type equipment. Contact Joseph Armao for further details at (214)985-8877.

Circle Reader Service No. 250

Hach Company Loveland, CO (800)227-4224

Hach Company produces complete systems for analysis of food and agricultural products, water and wastewater. Products featured include microbiological and chemical testing equipment such as Paddle and Swab Testers, Disinfectant Testing Equipment and Kits, ColiQuik (simultaneous total coliform and *E. coli* testing), Total Bacterial Direct Count Kit (AODC), DR/3000 Spectrophotometer, and Portable and Laboratory pH/ISE meters and electrodes.

Circle Reader Service No. 251

IDETEK
San Bruno, CA
800-IDETEK1
(-IDETEK2 in CA)

IDETEK is the leader in bringing biotechnology, convenience and reliability to food and dairy quality control. The LacTek™ family of milk antibiotic residue tests is the fastest growing product in the industry. All LacTek kits use the exact same procedure and can be run simultaneously. The inexpensive LacStation II™ reduces technician time to 2 minutes and produces printed, objective test results. Residue tests for meat will also be displayed.

Circle Reader Service No. 252

IDEXX Corporation

IDEXX Corp., the world leader in biodetection, manufactures the CITE[®] and CITE[®] Probe[®] lines of advanced dairy and food quality assurance tests. These easy-to-use tests provide accurate answers in minutes -- making them ideal for field or laboratory use. Stop by booth number 51 for information on new antibiotic residue tests.

Circle Reader Service No. 253

**Klenzade, A Service of
Ecolab Inc.**

Klenzade is a full service supplier of sanitation products and systems for the dairy and food processing industries. Featured products will include solid products, promoting ease of handling, safety and economy, the Sentry monitoring system and P3 oxonia active, non-foaming sanitizer.

Circle Reader Service No. 254

Michelson Laboratories, Inc.

A complete independent analytical testing laboratory conducting chemical, microbiological, and microanalytical analysis on foods, dairy products, environmental, pesticides, etc.

Also offering: Milk Calibration samples for Infra-red Milk Analyzer and Electronic Somatic Cell Counter.

Circle Reader Service No. 255

Micro Diagnostics, Inc.

Manufacturer of prepared culture media serving the needs of microbiologists and laboratory technicians. Our reputation for producing at competitive prices and being a dependable supplier are well established. We also provide dehydrated media, microbiological supplies and equipment. Custom services for your specific needs are available (specialty formulations, special packaging requirements, custom quality control procedures).

Circle Reader Service No. 256

**Minnesota Valley Testing
Laboratories**

Independent laboratory which offers confidential microbiological and chemical analyses of food, water, agricultural, and environmental samples. (507)354-8517.

Circle Reader Service No. 257

Nasco

Nasco is featuring their new Stomacher bags with white write-on strips designed for use with Stomacher lab blenders at this year's convention. The Stomacher bags range in size from 4-1/2" x 4-1/2" to 7-1/2" to 11-3/4". Nasco's complete line of Whirl-Pak bags, and other related sampling equipment can also be viewed in the booth.

Circle Reader Service No. 258

**National Automatic
Merchandising Association**

NAMA will show a new video designed for training vending service personnel on cleaning hot beverage, cold cup drink and cold food vending machines. We will also display information on the many food products sold by the vending industry through machines.

Circle Reader Service No. 259

**The National Food
Laboratory**

The National Food Laboratory, Inc. (The NFL) provides reliable, comprehensive and confidential research, development and consulting services to the food industry as follows: Analytical Services; Microbiology/Sanitation; Process Development/Engineering; Product Development; Sensory Evaluation/Market Research. We look forward to meeting you at the IAMFES Annual Meeting and discussing your needs.

Circle Reader Service No. 260

Nelson-Jameson, Inc.

A food and dairy laboratory specialist, Nelson-Jameson stocks a complete line of lab supplies and equipment for the industry. Staff experts are available to help you select and use appropriate products for food & dairy testing. Stocked for immediate shipment are hundreds of products, from scores of manufacturers, such as GARVER, CORNING, KIMBLE, BBL & OHAUS. For a free catalog, call (800)826-8302 or (715)387-1151.

Circle Reader Service No. 261

**Neogen Corporation
Lansing, MI
Phone: 517/372-9200**

Neogen will display its Agri-Screen[®] testing kits for sulfamethazine and aflatoxin M₁ residues. These antibody-based immunoassays are comparable to traditional testing methods with advantages in speed, economy, and ease of use. Presentations will detail how to conduct rapid screening tests in just minutes and how to quantitate in exact ppb for these residues. Agri-Screen tests are also available for aflatoxin, zearalenone, vomitoxin (DON), and T-2 toxin.

Circle Reader Service No. 262

**Northland Food Lab.
Green Bay and Manitowoc,
WI**

41 years in microbiology and consulting services. Microbiological testing for *Salmonella* and *Listeria*. Primary nutrients testing for Proximates, carbohydrates, fats & oils, vitamins, minerals & metals, residues & additives. Milk testing for all components for payment. Consulting services including HACCP Design, Sanitation Audits, Regulatory Compliance, Pathogen control, sampling plans, nutritional information. Call (414)682-7998 or (414)336-7465.

Circle Reader Service No. 263

**Organon Teknika
Durham NC
800-654-0331
800-682-2666**

Organon Teknika offers a complete line of rapid Microbiology Test Kits. Two EIA assays are available: Salmonella-Tek is a 90 minute assay for the detection of *Salmonella*; Listeria-Tek for the detection of *Listeria*. Both systems are complemented by Micro-ID: Micro-ID enteric offers 4 hour identification of Enterobacteriaceae; Micro-ID Listeria provides rapid ID of all listeria species. Pathotec Cytochrome Oxidase aids in screening non-enteric and non-listeria.

Circle Reader Service No. 264

**Penberthy Inc.
P.O. Box 112
Prophetstown, IL 61277**

Penberthy manufactures the Model HSW 750 series of steam/cold water mixing washdown stations. The Models 750L, 750 and 750H are designed for use with low, medium and high pressure steam supplies. Model 750D provides an economical method of injecting detergent into hot water output of the Model HSW 750. Penberthy also manufactures gages, gage valves, 8 flow indicators, jet products and the Levelmark line of electronic level controls. (815)537-2311.

Circle Reader Service No. 265

Penicillin Assays, Inc.

Introducing the Charm Farm Test, a new generation microbial assay that detects beta lactams, sulfonamids (5-15 ppb) gentamicin (40 ppb) tetracycline (250 ppb) etc. in a single assay. Charm receptorgram combines the simplicity of Charm Test II with the specificity of HPLC. New semi-automated Charm Test II system tests up to 100 samples for seven families plus aflatoxin. Used in central laboratories.

Circle Reader Service No. 266

Promega Corporation

Promega, a leading biotechnology company, is introducing a simple, 2-hour test for total viable organisms (bacteria, yeasts, molds) in raw milk. Rapid tests for *Salmonella*, *Staph aureus* and *Campylobacter* will be available soon. Promega also offers expertise and facilities for producing genetically engineered and improved food processing enzymes.

Circle Reader Service No. 267

Q Laboratories, Inc.

Q Laboratories, Inc. is an independent testing and consulting laboratory providing microbiological and analytical chemistry support to the dairy, food, beverage, cosmetic and specialty chemical industries. Services provided include QC/Release Testing, Nutritional Labeling, complete pathogen testing, plant sanitation audits and antimicrobial testing of preservatives and sanitizers. Phone: (513)662-1300.

Circle Reader Service No. 268

**Radiometer America
Malthus Microbiology
Systems**

Newly introduced to the Malthus line of Automated Microbiology Systems: Malthus 1000S Automated Salmonella Analyzer with AOAC approved disposable cells. The fastest, simplest, automated screening technique available. Malthus disposable total count, coliform and yeast, mold cells, pre-filled with appropriate media. Just inoculate and test. Talk with Radiometer to determine which of many Malthus Systems can make your microbiology lab state of the arts!!

Circle Reader Service No. 269

**Rio Linda Chemical Co.,
Inc.**

RLCC is a specialty company dedicated to Chlorine Dioxide products. We have a patented generation system for Water Treatment as well as patented ClO₂ Conveyor Lubricant for conveyors. Literature will be available at our booth. We look forward to meeting you at IAMFES '90.

Circle Reader Service No. 270

**Sani-Matic Systems
Division of DEC International**

Sani-Matic will display material describing major equipment lines of their plant sanitation equipment. Their product line includes: COP Wash Tanks, CIP Systems, Central High Pressure Systems, Continuous Wash Tunnels, In-Line Strainers, CIP Spray Equipment, Rotary Drum Strainers and Parts Handling Equipment. Sani-Matic designs equipment to suit each processor's particular application and budget.

Circle Reader Service No. 271

Serim Research Corporation

Serim Research develops and manufactures "on-site" tests for disinfectants. These include reagent strip tests for chlorine, iodine, bromine, glutaraldehyde, formaldehyde and peroxide. Custom development for specific applications is also available.

Circle Reader Service No. 272

Silikal North America, Inc.

Silikal North America, Inc. manufactures acrylic resins and polymer concrete coatings and restoration. Materials cure to 6,000+ PSI and full chemical resistance in about one hour to reduce down time. Impact, abrasion and chemical resistant, Silikal acrylics are the fast, safe, reliable solution to concrete problems. The materials are manufactured in the USA.

Circle Reader Service No. 273

**Silliker Laboratories Group,
Inc.**

A leading independent testing, consulting and research laboratory providing services to the food industry. Services include: analytical microbiology and chemistry, research, technical services and consulting, video and presentation graphics production, and education and training. Labs are located in CA, IL, OH, GA, NJ, PA and Canada. For more information call (708)756-3210. Or write us at 1304 Halsted Street, Chicago Heights, IL 60411.

Circle Reader Service No. 274

**SmithKline Beecham
Animal Health**

SmithKline Beecham Animal Health simplifies Q.A. with technology to screen food products for aflatoxin and antibiotic residues. The PENZYME III Antibiotic Residue Screen Test for milk detects beta-lactam antibiotics. SIGNAL AccuCup™ Aflatoxin Detection Test screens to 20, 10 and 5 ppb aflatoxin in com, and raw and roasted peanuts. SIGNAL Sulfamethazine, Gentamicin and Neomycin Detection Tests screen milk, tissue, and serum for antibiotic residue.

Circle Reader Service No. 275

Sparta Brush Company, Inc.

Sparta Brush Company has developed a Tri-Zone color-coded brush program which is designed to help food service facilities and food processing plants prevent bacterial cross contamination. The Tri-Zone program will keep brushes in their designated work areas, thus helping to control the transmission of bacteria.

Circle Reader Service No. 276

Spiral System Instruments Bethesda MD 301-657-1620

The Spiral System, used in over 1,500 labs worldwide, automates Micro Labs. The Spiral Plate, AOAC approved and listed in the BAM manual as a semi-automated method, eliminates the need for most serial dilutions; the Laser Bacteria Counter accurately reads bacterial colonies in 4.3 seconds. CASBA Microbiology Software Modules, used with the Laser Counter, include: Bacterial Enumeration, Preservative Effectiveness, Kill Curves and MIC (SGE) testing.

Circle Reader Service No. 277

Taylor Company Rockton, IL

Taylor Company, the leading manufacturer in soft serve and shake dispensing equipment, has recognized product safety as a major concern in the foodservice industry. Taylor has engineered a new, NSF approved Labor Saver (tm) series of freezers, assuring product safety through a timed heat treatment process.

Circle Reader Service No. 278

Tekmar Company Stomacher Lab Blender

Food Microbiology: The Stomacher may be used for bacterial counts in food samples including fruits, grains, meats, and dairy products. Damage to microbial cells and tissues is minimal. A temperature rise in the sampling is reduced during blending.

Features:

- No sample cross contamination;
- No machine clean up;
- Fast operation

Circle Reader Service No. 279

3A Symbol Council

The 3A Sanitary Standards Symbol Administrative Council authorizes equipment manufacturers to display the 3A Symbol on Equipment which complies with existing 3A Sanitary Standards. The 3A Symbol is recognized world wide as a mark of excellence on Dairy and Food Processing equipment. Information on the function of the program, its administration and benefits will be available at the 3A Symbol Council Booth.

Circle Reader Service No. 280

3M Microbiology Products

Featuring quality control made easy. Report immunoassay is the easiest method available for *Salmonella*, *Listeria* and *Staphylococcal Enterotoxin* testing. Petrifilm plates are quick and simple; just inoculate incubate and read. The Petrifilm plate family includes plates for: Aerobic Count, Coliform Count, *E. coli* Count, Yeast and Mold Count. NEW-Petrifilm Test Kit-L for liquid samples and the Petrifilm Test Kit-HEC for hemorrhagic *E. coli* 0157:H7.

Circle Reader Service No. 281

Tuchenhagen North America Milwaukee, WI

Tuchenhagen specializes in Process Integration and CIP. The integration of process equipment in the sanitary industry is accomplished by addressing three essentials: Sanitary Matrix Piping, Cleaning in Place and Process Control. Our single seat and double seat valves together with other Tuchenhagen components and systems are available to end users and OEM's at reasonable prices and are designed to permit completely automated plant operations.

Circle Reader Service No. 282

Unipath Company Oxid Division

We will be exhibiting a range of diagnostic kits including an *E. coli* 0157 latex test, 5 RPLA Kits for bacterial toxins, a *Salmonella* Rapid test, and Aflatoxin test kits for total and M₁ aflatoxins. We have a new *E. coli* Stable Toxin EIA test, and a complete line of dehydrated media, supplements, and peptones.

Circle Reader Service No. 283

Walker Stainless Equipment Company, New Lisbon, WI

Quality manufacturer of Stainless Steel Sanitary Transportation tanks, storage tanks, processing tanks, and custom fabrications for food, dairy, chemical, pharmaceutical, and biotechnical industries.

Circle Reader Service No. 284

Weber Scientific

Weber Scientific distributes Laboratory and Sanitary Supplies to the Dairy, Food, Water and Wastewater Industries. On Display at the Weber booth during the IAMFES Exhibit, you will see items ranging from Gerber and Babcock equipment for butterfat analysis to brushes and antimicrobial cleaners. Included also are equipment and supplies needed for bacteriological testing of water and wastewater. We will look forward to seeing you there.

Circle Reader Service No. 285

Wescor, Inc.

We will demonstrate: 1) OMNISPEC™, a reflectance colorimeter instrument for measuring biological activity in many dairy and food products. OMNISPEC can predict shelf life, estimate total microbial load or specific types, including coliforms or psychrotrophs; it can also measure antibiotics in milk, abnormal milk and enzymes or yeasts in foods; and 2) AEROSPRAY® Microbiology Gram Stainer for automated, reproducible quality staining of various specimens.

Circle Reader Service No. 286

Whitmire Research Labs, Inc.

Whitmire Research Laboratories, Inc. is a researcher and manufacturer of Prescription Treatment® prepressurized pest control products and systems. Whitmire Research Laboratories, Inc., 3568 Tree Court Industrial Blvd., St. Louis, MO 63122, Phone: 314-225-5371.

Circle Reader Service No. 287

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Take action against contamination

The QMI Tru-Test™ aseptic sampling system is a unique, patented aseptic sampling system that, when combined with proper laboratory procedures, can help you:

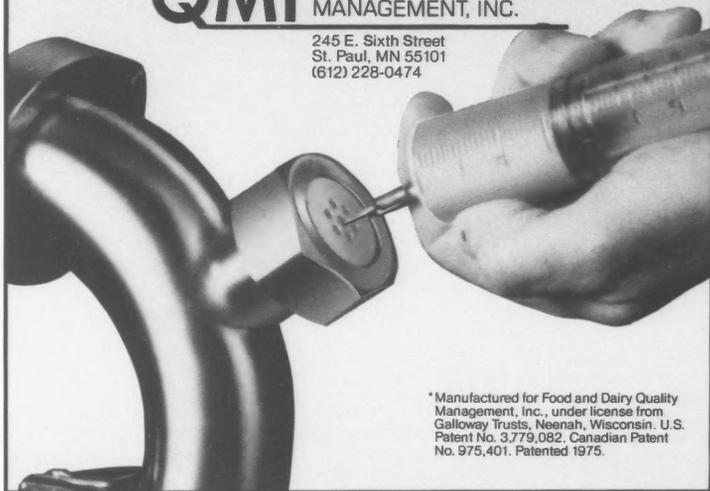
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Please circle No. 144 on your Reader Service Card

Affiliate News

Special Recognition Award

Volunteers are the life blood of any association. "Paying" those people means recognizing their efforts in front of their peers.

Our Missouri Affiliate (Missouri Milk, Food, and Environmental Health Association - MMFEHA) has recently implemented a new "Special Recognition Award" to broaden its recognition base.

President-Elect, Charles W. Sanders, RS, cited four reasons for establishing the award:

1. It would provide a vehicle to recognize members and/or non-members for their special contribution to public health or environmental protection.

2. It would generate positive public relations by demonstrating concerns beyond the association's special interest.

3. It would increase public visibility and credibility.

4. It would provide another opportunity to recognize outstanding efforts!

A unique feature of the award is that it incorporates the reason why the individual is receiving the recognition in the body of the award.

The first three recipients of the award were: Dennis Sievers, Randy Miles and Sam Orr. They were recognized for their work in classifying soils suitable for on-site sewage disposal systems. It happens that none of the recipients are members of MMFEHA.

Affiliates seeking qualifications and nominating procedures should contact Mr. Sanders at the Columbia/Boone County Health Department, P.O. Box N, Columbia, MO 65205 (314)874-7345.

NAMFS Annual Meeting

The Third Annual Meeting of the Nebraska Association of Milk and Food Sanitarians was held April 5 and 6, 1990 at the East Campus Union in Lincoln, Nebraska. This year's meeting had 65 members and guests in attendance.

The meeting started with an introduction by President Nancy Bremer. Vice President Dirk Shoemaker presided over Thursday's meeting.

Thursday's agenda included these individuals and subjects:

1. John Rupno, Ph.D., Associate Professor, Dept. of Food Science, U.N.L., gave a talk on "HACCP."

2. Robert Hutkins, Ph.D., Assistant Professor, Dept. of Food Science, U.N.L., discussed "Food Microbiology in the 21st Century."

Upcoming IAMFES Affiliate Meetings

SEPTEMBER

•**13-14, Minnesota Sanitarians Association, Inc.** Annual Conference will start at 1:00 p.m. on September 13 at the Earle Brown Center, University of Minnesota. Annual meeting will start at 4:30 p.m. on September 13 with the Awards Banquet at 6:00 p.m. at the Holiday Inn, Shoreview. For further information call Roy E. Ginn at (612)785-0484.

•**17-19, New York State Association of Milk and Food Sanitarians Annual Meeting**, at the Sheraton Inn-Syracuse, Liverpool, NY. For more information contact Paul Dersam, 27 Sullivan Rd., Alden, NY 14004, (716)937-3432.

•**19-20, Wisconsin Association of Milk and Food Sanitarians Annual Meeting**, Pioneer Inn, Oshkosh, WI. For more information contact Neil Vassau (608)267-3504.

•**25-26, California Association of Dairy and Milk Sanitarians Annual Meeting**, Ontario Hilton, Ontario, CA. For more information contact Jack Coppes, P.O. Box 9234, Whittier, CA 90608, (213)699-4313

•**26-28, Kansas Association of Sanitarians Annual Meeting**, Red Coach Inn, Salina, KS. For more information contact John Davis, 1900 East 19th, Wichita, KS 67214, (316)268-8351.

OCTOBER

•**9-10, North Dakota Environmental Health Association's 1990 Fall Educational Conference and Meeting** will be held at the Holiday Inn, Grand Forks, ND. For more information please feel free to contact Mel Fischer, Bismarck Fire and Inspections, 1020 East Cental Avenue, Bismarck, ND 58501 (701)258-2070.

NOVEMBER

•**14-15, Alabama Dairy & Food Conference** to be held at the Howard Johnson Motor Lodge in Birmingham. For more information contact Tom McCaskey at (205)844-1518.

•**28, Ontario Food Protection Association Annual Meeting**, will be held at the Airport Hilton Hotel, Toronto, Ontario. The title of the all-day symposium is "FOOD PROTECTION: HOT TOPICS FOR THE '90's". For more information, please contact program convenors: Garth Sundeen (416)239-8411 or FAX (416)239-2416 or Patrick Kwan (416)671-5080 or FAX (416)671-5176.

3. Ethan Rasmussen, General Manager of Western Operations, Mid-America Dairymen, provided an overview entitled "MID-AM The First Twenty Years, Plus The Next"

4. Cathleen Casey-Shaw, Laboratory Director, USDA St. Louis, Missouri, delivered an interesting talk entitled "USDA Overview."

5. George Hanssen, Subprogram Head, State Dept. of Agriculture, Lincoln, addressed the "State Food Program."

6. David Sorrick, Director Research and Development, Con-Agra Research Center, Omaha, presented an interesting slide presentation called "Con-Agra Product Development Center."

7. Sue Sumner, Ph.D., Assistant Professor, Dept. of Food Science, U.N.L., addressed the subject "Control and Prevention of Microbial Spoilage in Refrigerated Foods", which concluded the session for the day.

Friday morning started with the annual NAMFS business meeting. The minutes from the last meeting were read followed by the election of a new Secretary/Treasurer. Lois Clauson was elected and will serve for the coming year. After discussion of remaining business matters, the meeting was adjourned.

The topics for the day were divided into two groups. Section One was chaired by Tom Tieso, and consisted of the following topics:

1. Lloyd Bullerman, Ph.D., Professor, Dept. of Food Science, U.N.L., spoke on "Public Health Aspects of Molds and Mycotoxins in Foods and the Environment."

2. Jack McGrath, Supervisory Investigator, FDA, Kansas City, Missouri, presented "FDA: Activities Update."

3. Tom Tieso, Section Supervisor, Dept. of Agriculture, Lincoln, talked on the subject "Aflatoxin Testing in Producer Milk Samples at the State Dept. of Agriculture."

4. Ricardo Molins, Ph.D., Associate Professor, Animal Science and Food Technology Dept., Iowa State University, Ames, Iowa, detailed some interesting data in his talk "Food Irradiation."

Section Two covered talks on the subject of antibiotics in milk and other products and was chaired by Dan Borer, with the following agenda:

1. Jack McGrath, Supervisory Investigator, FDA, Kansas City, Missouri, outlined FDA's policies in "FDA Antibiotic Testing Program."

2. Dan Borer, Subprogram Head, State Dept. of Agriculture, Lincoln, provided an overview entitled "State Perspective on Antibiotic Residues in Milk."

3. Ron Gilman, Director of Laboratories and Quality Control, Western Operations, Mid-America Dairymen, Omaha, discussed "Antibiotic Residues and Industry Perspective."

4. Gerard Ruth, Technical Sales Manager, Penicillin Assays Inc., Malden, MA, discussed the "Charm II Test."

5. Eugene Martin, Ph.D., Associate Professor, Dept. of Life Science, U.N.L., delivered an interesting talk entitled "Antibiotics in Animal and Poultry Feed and Bacterial Resistance."

Section Two was then capped off with a panel discussion concerning antibiotics.

Both sections ended at 12:15. All present were then encouraged to take a tour of U.N.L. food processing center.

North Dakota Environmental Health Association to Hold Fall Meeting

The North Dakota Environmental Health Association (IAMFES Affiliate) will hold its 1990 Fall Educational Conference and Meeting on October 9 and 10. The location will be the Holiday Inn at Grand Forks.

For more information, contact Mel Fischer, 1020 E. Central Avenue, Bismarck, ND 58501 or phone Mel at (701)258-2070.

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Elmer H. Marth

Symposium on Dairy-Product Safety to Honor E.H. Marth, UW-Madison Microbiologist

The bugs ran, but they couldn't hide from Elmer H. Marth, and the dairy industry owes its outstanding safety record in part to the life work of this University of Wisconsin-Madison food microbiologist. Marth will retire June 30, 1990. "Milk, Microbes and Marth," a symposium to recognize Marth and his research on food safety and milk-associated microorganisms, will be held September 11-12 at the Wisconsin Memorial Union in Madison.

The symposium will be divided into four sessions, each representing one of Marth's research interests. Tuesday afternoon will be devoted to *Listeria monocytogenes*, and dairy fermentation and spoilage. Wednesday morning's sessions will focus on *Salmonella*, pathogenic *Escherichia coli*, *Staphylococcus aureus*, and *Borellia* (Lyme disease); and mycotoxins and molds.

Many of the presentations will be delivered by Marth's former students who are now involved in industrial and academic research.

For more program information, contact Michael Doyle at the Food Research Institute, University of Wisconsin-Madison, 53706; phone (608)263-6936. If you'd like to write a testimonial, send it to Doyle by August 15.

"Milk, Microbes and Marth" will begin at 1 p.m. Tuesday, September 11 and adjourn at noon Wednesday, September 12. Please pre-register by September 4. For information on registration and fees, contact Marsha Landretti at the CALS Conference Office, Jorns Hall, UW-Madison 53706; phone (608)263-2421.

Food Protection Technology in Food Service System: Challenges for the 1990's

This year's Fall Symposium is scheduled for 9:00 a.m. on Friday, September 21, 1990 at the Holiday Inn, Airport North in Atlanta. Al Fain has arranged a program that will be of interest to all those that have a professional interest in food service systems and those that frequent these systems. Plan now to attend.

Topic Summary

"Critical Control Points in Food Service Systems"

Dr. F. Ann Draughon, Department of Food Technology & Science
University of Tennessee, Knoxville

"Challenges in Commissary Type Food Service Systems"

Mr. W. Joel Simpson, Quality Assurance,
Dobbs International Services Inc., Memphis, TN

"Food Safety and Quality Assurance Systems for Restaurant Food Service Systems"

Mr. John Chrisman, General Mills Restaurant, Orlando, FL

"Status of the Food Protection Unicode and FDA's Role in Food Service Systems"

Mr. Chet Morris, U.S. FDA, Atlanta, GA

"Food Safety and Quality Assurance in the Super Market Deli"

Mr. Dan Schineller, Winn Dixie, Inc., Jacksonville, FL

"Food Safety and Quality Assurance Applicable to Automated Food Vending Systems"

Speaker to be arranged.

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Letter to the Editor

Dear Ron:

Your editorial on a name change as published in the March issue of *Dairy, Food and Environmental Sanitation* was of interest and prompts the following response.

At times in the past our Association has had an interest in the non-microbial quality of food. With the possible exception of one, all research reports published in the March issue of *The Journal of Food Protection* are of bacterial nature. If this is the desire of the membership perhaps the Association name should signify such interest.

My hope, however, would be that the Association would have an interest in food composition, food texture, food processing, food distribution, food handling and the development of new and innovative food products. The term *Protection* implies that our only business and our only interest lies in protecting, defending and preserving what we already have. This appears to be a very short sighted view of the food industry. For this reason you may wish to avoid the use of the word *Protection*.

Though our Association may have been started by persons who might define themselves as milk sanitarians, many other professions now are represented. For this reason you may wish to avoid using the term *Sanitarian*.

Of the names listed in the report by Marshall on page 127 of *Dairy, Food and Environmental Sanitation*, the name "Association for Food Safety and Quality" might avoid the objections noted above. It would give some room for and possible recognition of people who are interested in development, persons who should not be neglected or excluded from membership.

Sincerely,
Bob Demott
Department of Food Technology &
Science
Knoxville, TN



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A. CALL SANISAFE

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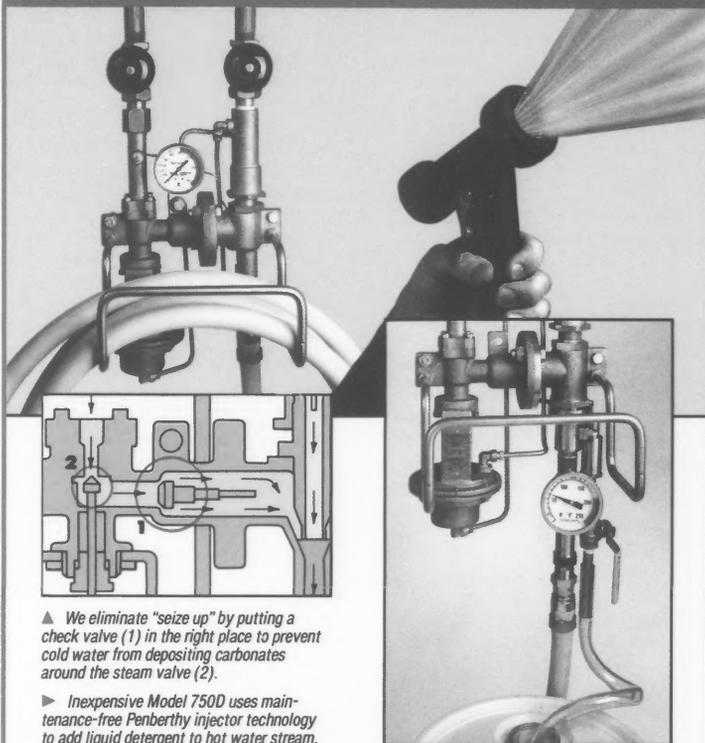
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**Official Minutes of the 76th Annual Business Meeting of IAMFES
Held at Hyatt Regency Crown Center, Kansas City, Missouri, August 15, 1989**

Call to Order

The Annual Business Meeting of IAMFES was called to order at 1:55 p.m. by President Robert Gravani. A moment of silence was observed in memory of departed IAMFES members.

Report of the Secretary

The report of the Secretary and the minutes of the August 2, 1988 Annual Business Meeting were presented by Secretary Gabis. Leon Townsend corrected the minutes to read that the Ivan Parkin Lectureship Honorarium had been increased to \$1,000. Charles Price moved to accept the minutes as amended. Richard Brazis seconded the motion which passed by voice vote.

Report of the Acting Executive Manager

Acting Executive Manager Margie Marble noted the resignation of Kathy Hathaway and complimented her on the contributions she made to IAMFES during the past seven years. The new Executive Manager, Steven Halstead, was welcomed to the Ames staff. President Gravani's term in office was productive for the association. The Affiliates were encouraged to make use of the services of the Ames staff. Preregistration and registration for the 76th Annual Meeting were handled by the Ames office with no problems. Approximately 700 were preregistered with about 65 on-site registrations. The Kansas Affiliate members were thanked for their excellent organization of the Annual Meeting. The Ames supporting staff members were recognized for their cooperation and good work.

Council of Affiliates Report

Affiliate Council Chairman, William Coleman, reported that the Affiliate Council met on Sunday, August 13, 1989. There are 31 Affiliates, including the new Massachusetts Affiliate. Twenty-three Affiliates were represented at this Annual Meeting. A new procedure for electing the Affiliate Council Chairman was decided upon. The new system is similar to the format used by the IAMFES Nominating Committee. The Affiliate Council Nominating Committee will provide candidates whose names will be submitted to the Affiliates for election. The newly elected Chairperson and Secretary will assume their duties at the 1990 Annual Meeting. Dale Marcum of Kentucky is the chairperson for the Affiliate Council Nominating Committee. William Coleman and Lloyd Luedecke were reelected as Chairperson and Secretary, respectively. At the Affiliate Council meeting, each Affiliate Delegate gave a short report on their activities during the last year. The Affiliates were encouraged to submit nominees for the Shogren Award and other awards presented by IAMFES. It was noted that Affiliate activities continue to grow. There was a discussion concerning offering awards for the best papers submitted by Affiliate members to Dairy, Food, and Environmental Sanitation (DFES) magazine. Such awards should be an incentive to submit papers for publication. The Foundation Fund would sponsor such awards.

Foundation Fund Report

Foundation Fund Committee Chairman, Harry Haverland, presented the report. The committee members are Harry Haverland, Robert Marshall, James Reeder, Robert Sanders, and Earl Wright. Dolores Taylor is the Ames staff contact person. As of May 16, 1989, the Foundation Fund account balance is \$41,319.13. Each time a sustaining member pays dues, \$100 of the dues amount is deposited to the Foundation Fund. As of August 1, 1989, IAMFES has 78 sustaining members. The Foundation Fund supports the Ivan Parkin Lectureship, the Developing Scientist Award, and the Lending Library. The IAMFES Lending Library loaned 290 pieces to date. The Foundation Fund Committee recommended to the Executive Board that \$750 be set aside for monetary awards to the three authors who submit the best articles in the areas of dairy, food and environment to

DFES. The three awards would be presented at the Annual Awards Dinner. Other activities of the committee included revision of the sustaining membership brochure at a cost of \$262.44, increasing the Ivan Parkin Lectureship honorarium to \$1,000. The Foundation Fund Committee continues to work with David McSwane of Audio Visual Library Committee.

DFES Management Committee Report

Chairman Harold Bengsch reported that the committee met on Saturday, August 12, 1989. DFES has an average of 60 pages per issue, with four articles. The present format of DFES has received many compliments and no changes are recommended. The committee recommends that an additional article be included in each issue. To achieve this, the committee suggested that articles should be solicited for submission by members. It was suggested that DFES publish FDA Coded memoranda as they are issued. It was suggested that the Ames office develop a DFES cover photo contest. Chairman Bengsch complimented the Ames office staff on the major changes and improvements in the appearance of the magazine.

Journal of Food Protection Publication Committee Report

Chairman Bob Marshall presented the report. The past year saw a major effort to complete the transition period between former editor, Elmer Marth, and the present editor, Lloyd Bulleman. The number of papers in the most recent volume of the journal is less than the previous volume. Editor Bulleman has made the following recommendations to the Committee and the Executive Board in order to improve the editorial function: (1) engage an Associate Editor, with no compensation; (2) hire an editorial assistant to help computerize the editorial process; (3) move the copy editor function to Lincoln, Nebraska; (4) increase page charges to cover the additional costs associated with implementation of the recommendations.

Constitution and By-Laws Committee Report

President-Elect Case and Vice President Sanders presented the changes to the Constitution and By-Laws which were recommended to the Executive Board by Committee Chairman Brazis. The proposed changes were published in the June 1989 DFES and reprints were available at the meeting. Dr. Brazis moved to accept the revisions to the Constitution, and the motion was seconded by Earl Wright. Charles Price had a question on Article IV regarding representation from industry, government, and education on the Executive Board. The article states that new Board members, i.e., Secretary, will be elected on a rotating basis from these three groups of members. There being no further discussion, the question was called and the motion passed unanimously.

Dr. Brazis moved to accept the proposed changes in the By-Laws. Bob Darrah seconded the motion. Roy Ginn proposed that a change be made in Article VI, section 2, part B of the By-Laws. As proposed by the Constitution and By-Laws Committee, the section on the Nominating Committee requires a Past President to chair this committee. Mr. Ginn said that this procedure could prevent new viewpoints being brought to the Executive Board. Mr. Ginn made a motion to amend the Constitution and By-Laws Committee proposal by deleting the following phrase in the By-Laws, Article VI, Section 2, Part B "be a Past President (not on the Board) whose name shall." The section would then read: "The Chairperson of the committee shall be announced at the Annual Meeting, and published in the official publication of IAMFES the month following the Annual Meeting, together with the date by which candidates for nomination(s) for office(s) shall be submitted." The motion was seconded by Austin Olinger. Discussion followed. Some members believed that a Past President should be the chairperson of the Nominating Committee. The question was called, and the motion was passed.

Dr. Bob Marshall asked for clarification of Article II, Section 4, Part A regarding the movement of the Secretary up to the Presidency. Mr. Case provided an explanation.

The question was called on Dr. Brazis' motion to approve the changes in the By-Laws. The motion was passed. Dr. Brazis and the Committee were applauded for their good work by President Gravani and the members.

Old Business

There was no old business.

New Business

There was no new business.

Resolutions

Past President Leon Townsend presented the following resolutions. Copies of the resolutions are attached and made part of these minutes.

Resolution 1: Thanking the Kansas Affiliate for their hospitality and work for the 76th Annual Meeting. Mr. Townsend moved to adopt this resolution which was seconded by Bob Marshall. It passed unanimously.

Resolution 2: Thanking the people at Hyatt Regency Crown Center for their efforts in making the 76th Annual Meeting a success. Mr. Townsend moved to adopt this resolution which was seconded by Ed Zottola. It passed unanimously.

Resolution 3: Mr. Charles Felix presented a resolution regarding single service items. Howard Hutchings made a motion to adopt this resolution. The motion was seconded by Dee Clingman. Mr. Felix then offered an amendment which called for the deletion of two "whereas" clauses, namely, "Whereas, state and local environmental health officials in the U.S. are practically unanimous in their conviction that disposables contribute to proper sanitation levels in public food service operations; and whereas, the majority of these officials in the U.S. consider that the health and sanitation advantages of single service outweigh their disadvantages in contributing to solid waste and litter."

Mr. Felix moved further that an additional resolve be added to instruct the Secretary of IAMFES to send a copy of the resolution to the Environmental Protection Agency's Office of Solid Waste. The amendments were seconded by Robert Harrington. The amendments were accepted by voice vote.

Mr. Felix made a short presentation underscoring the significance of the issues involved in this resolution. States and local governmental bodies are considering enacting legislation to curtail or ban the use of single service items because of the decreasing availability of land fill waste sites. Mr. Felix said that single service items comprise only a small fraction of solid waste in landfills and that the public health benefits resulting from the use of single service items are far greater than the disadvantages. Dick Whitehead, Dee Clingman, and Harold Wainess offered comments on the proposed resolution. President Gravani asked Mr. Felix if other professional associations have taken positions on this issue. Mr. Felix replied that NEHA and APHA have issued policy statements regarding the public health benefits derived from the use of single service items. Robert Harrington said that the National Restaurant Association has passed a resolution similar to the one proposed to IAMFES.

The motion was called to a vote, and was passed by a show of hands.

Resolution 4: Mr. Leon Townsend made a motion to adopt a resolution commending the USPHS Commissioned Corps on their 100th anniversary. It was seconded by Bob Darrah and passed unanimously.

Closing

President Gravani thanked all who attended the Business Meeting.

Dr. Gravani announced that John Meyer is the Chairperson of the Nominating Committee and that the committee will be seeking a person from government to nominate for the position of secretary.

Dr. Gravani again thanked the Kansas Affiliate for their work in hosting a very successful Annual Meeting. He also thanked the Executive Board for their work during the past year.

Ken Kirby made a motion to adjourn. Earl Wright seconded the motion, which passed unanimously. The Annual Business Meeting adjourned at 3:10 p.m.



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Synopsis of Papers for the 77th Annual Meeting

Abstracts of papers to be presented at the 77th Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc. to be held in Arlington Heights, IL, August 5-8, 1990.

Control of *Salmonella Enteritidis* in Poultry, Michael C. Goodnough* and Eric A. Johnson, University of Wisconsin-Madison Food Research Institute, 1925 Willow Drive, Madison, WI 53706

Antimicrobial compounds were screened *in vitro* in trypticase soy broth for activity against a virulent strain of *Salmonella enteritidis*. Of several compounds tested, polymyxins B and E showed the strongest inhibition. The minimum inhibitory concentration of polymyxin B SO₄ was 1-2ppm. Butylparaben (10 ppm) and EDTA (1mM) were also inhibitory *in vitro* to *S. enteritidis*. Polymyxin E (colistin methane sulfonate) was ineffective alone at 10 ppm but had inhibitory activity when combined with 10 ppm butylparaben. Inhibition of *S. enteritidis* was also tested *in vivo* using 24 hour chicks as a model system. The effectiveness of the antimicrobial systems were evaluated by their ability to prevent infections and to remove existing infections. Polymyxin was effective *in vivo* in preventing infection but was relatively ineffective in removing existing infections. Unexpectedly it was found that trimethoprim, which was not active *in vivo*, gave excellent activity in preventing and removing infections when combined with polymyxin B SO₄. Selenite-Cystine and Tetrathionate Broth enrichments showed that chicks that were given a combination of polymyxin B SO₄ and trimethoprim 24 h prior to oral inoculation with 10⁸-10⁹ CFU were *S. enteritidis* negative in seven days. Existing infections (10⁷-10⁸CFU/g feces) were eliminated with the polymyxin/trimethoprim system in 13 days. This antimicrobial system may be useful in preventing colonization or eliminating *S. enteritidis* from infected flocks.

Persistence and Control of *Listeria monocytogenes* in Non-Food Contact Areas in a Food Processing Plant, Alexandria T. Spurlock* and Edmund A. Zottola, Department of Food Science & Nutrition, University of Minnesota, 1334 Eckles Avenue, St. Paul, MN 55108

A model system consisting of a free-standing sewer trap was developed and used to evaluate the growth and persistence of *L. monocytogenes* under simulated conditions that might occur in sewer traps in a food processing plant. Nutrients added to one trap included tryptic soy broth with yeast extract. Milk solids were added to a second trap. *L. monocytogenes* was added to each and growth monitored for up to 16 weeks. The traps were maintained at room temperature (25°C). Population levels in excess of 10⁸ were observed in 7 days. The pH of the material in the sewer trap containing TSBYE was adjusted to 8.5 for several days and then to 5.5 for several days. This change did not affect the numbers of *Listeria* as they continued to persist for the remaining test period. In the trap containing milk solids a nisin producing culture of streptococci was added and allowed to grow. After 4 weeks *Listeria* were not recovered. Addition of nisin-producing streptococci may be a method to control *Listeria* in sewer traps in a food processing plant.

Cheese Ripening Microbiology, Raj Nath, Kraft General Foods, Inc. Glenview, IL

Cheese manufacturing is a process of dehydration of milk where rennet enzymes, acid development by starter cultures and application

of heat aid the expulsion of moisture. Application of rennet enzymes is common to all natural cheeses but, it is in the use of different cultures coupled with different manufacturing steps that yield different cheese types.

Limited, but essential, proteolysis of milk protein by rennet enzymes augments the shift of microbial populations, which in turn, are pressed into summoning those metabolic activities, which must transform the milk components simply to survive. In doing so, the chemical entities generated interact among themselves and the microbial populations to results in a more flavorful and preserved milk.

Lactic starter cultures are added to vat milk to give about 10⁶-10⁷ cfu/ml. The amount and type of starter may vary significantly depending on the type of cheese and characteristics desired. In cheese, the primary culture (lactic cultures) declines with age whereas, secondary cultures such as propionibacteria in Swiss cheese and brevbacteria in Brick cheese and the adventitious lactobacilli thrive. Factors leading to microbial shifts during cheese ripening are discussed.

Role of the Food Protection Professional in Meeting the Challenges of the 90's, C. Dee Clingman, Quality Control, General Mills Restaurants, P.O. Box 593330, Orlando, FL 32859

Many of the food safety issues facing us in the 90's are the same problems public health professionals were faced with in the 40's. One can't image how we failed in the past half century to address these concerns. Tomorrow's food safety professional will need to be more of a change agent as opposed to an inspector. In the past 50 years we have been more concerned with auditing than what to do with the information we are gathering. The consumer will have to re-assess their risks on whether future controls, pesticides, preservatives, etc., are worth sacrificing for the return to daily grocery shopping.

The Trashing of America? An Overview of the Solid Waste Problem, Harvey Alter, U.S. Chamber of Commerce, Washington, DC 20062.

Conventional wisdom is that we are drowning in our solid waste. Data show that the per capita generation of municipal solid waste (MSW) was statistically constant from about 1970-1984, that population increased only about 1% per year, that packaging has been decreasing as a fraction of the MSW, and that certain forms of packaging are decreasing. Packaging helps reduce the amount of MSW as shown by regression relations between the fraction of food residues and the fractions of packaging residues in MSW.

The problem is a shortage of disposal capacity caused by several factors, including NIMBY (Not in My Backyard). Choosing a few components of MSW for restrictions or bans, or setting unrealistic recycling goals, will not compensate for the shortage of capacity.

These factors and others will be reviewed as an introduction to how MSW can be managed.

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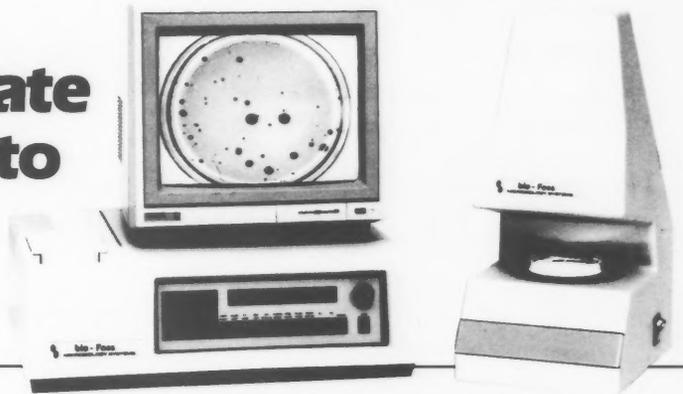
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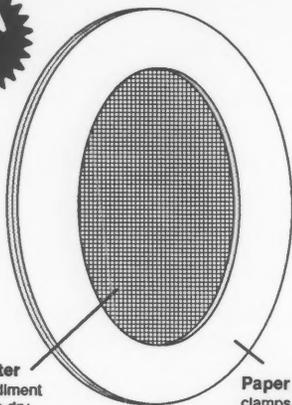
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- Haeger Pottery Tour, Lunch, Shopping (Mon., 8/7)
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Refund/Cancellation

The IAMFES policy on meeting registration fees, minus a \$15.00 written cancellations post-marked start of the meeting. No refunds will be given if cancellations are received less than two (2) weeks prior to the meeting. Registration fees for those who register after the deadline may be transferred with

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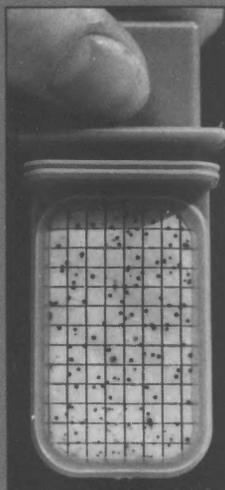
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3-A SANITARY STANDARDS FOR STORAGE TANKS FOR MILK AND MILK PRODUCTS

Number 01-07

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. Storage 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
- A.1 These standards cover the sanitary aspects of storage tanks for milk and milk products.
- A.2 In order to conform with these 3-A Sanitary Standards, storage tanks shall comply with the following design, material, and fabrication criteria.
- B
DEFINITIONS
- B.1 *Product*: Shall mean milk and milk products.
- B.2 *Storage Tank*: Shall mean a cylindrical, rectangular, oval or other equally satisfactorily shaped insulated storage tank, except a vertical tank whose inside height is in excess of 10 feet (3.05 m)*1 and the tank is used for the storage and cooling of milk or milk products.
- B.3 **Surfaces**
- B.3.1 *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.3.2 *Non-Product Contact Surfaces*: Shall mean all other exposed surfaces.
- B.4 *Lining*: Shall mean all surfaces used to contain the product, including ends, sides, bottom and top.
- B.5 *Shell*: Shall mean the material covering the exterior of the insulation and/or heat exchange jacket.
- B.6 *Breast*: Shall mean that portion of the exposed metal used to join the lining to the shell.
- B.7 *Mechanical Cleaning or Mechanically Cleaned*: Shall denote cleaning, solely by circulation and/or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned, by mechanical means.

*1 Vertical tanks in excess of 10 feet (3.05 m) inside height are defined as silo-type tanks. Sanitary criteria for silo-type tanks are covered in 3-A Sanitary Standards for Silo-Type Storage Tanks, Number 22-04, as amended.

C

MATERIALS

C.1

All product contact surfaces, including the breast, shall be of stainless steel of the AISI 300 series*2 or corresponding ACI*3 types (See Appendix, Section E.), or metal which under conditions of intended use is at least as corrosion-resistant as stainless steel of the foregoing types, and is non-toxic and non-absorbent except that:

C.1.1

Rubber and rubber-like materials may be used for umbrellas, slingers and drip shields for vertical agitator assemblies, gaskets, seals, protective caps for sanitary connections, and parts having the same functional purposes.

C.1.2

Rubber and rubber-like materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials, Number 18-00.

C.1.3

Plastic materials may be used in sight and/or light openings and for umbrellas, slingers and drip shields for vertical agitator assemblies, bearings, gaskets, seals, protective caps for sanitary connections, direct reading gauge tubes (See D.22), and parts having the same functional purposes.

C.1.4

Plastic materials when used for the above specified applications shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials, Number 20-15.

C.1.5

Rubber and rubber-like materials and plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformation characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C.1.6

The final bond and residual adhesive, if used, of bonded rubber and rubber-like materials and bonded plastic materials shall be non-toxic.

C.1.7

Where materials having certain inherent functional properties are required for specific applications, such as bearing surfaces and rotary seals, carbon*4 and/or ceramic materials may be used. Carbon and/or ceramic materials shall be inert, non-porous, non-toxic, non-absorbent, insoluble and resistant to scratching, scoring and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

*2 The data for this series are contained in the AISI Steel Products Manual, Stainless & Heat Resisting Steels, December 1974, Table 2-1, pp. 18-20. Available from the Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086 (412-776-9460).

*3 Steel Founders' Society of America, Cast Metals Federation Bldg., 455 State St., Des Plaines, IL 60016 (708-299-9160).

*4 Carbon which is specifically in compliance with the Food, Drug and Cosmetic Act, as amended, is that which is included in "V Fillers" in the food additive regulations for rubber articles intended for repeated use, 177.2600 of Subpart F, Code of Federal Regulations, Title 21--Food and Drugs.

C.1.8

Glass may be used in sight and/or light openings (See D.21) and for direct reading gauge tubes (See D.22), and when used shall be of a clear heat-resistant type.

C.2

Non-product contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion-resistant. If coated, the coating used shall adhere.

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

D.1

All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form. (See Appendix, Section F.)

D.2

Permanent joints in metallic product contact surfaces shall be continuously welded. Welded areas on product contact surfaces shall be at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices. (See Appendix, Section F.)

D.3

Storage tanks that are to be mechanically cleaned shall be designed so that the product contact surfaces of the storage tanks, including the product contact surfaces of the opening for a vertical mechanical agitator, and all non-removable appurtenances thereto can be mechanically cleaned and are accessible for inspection.

D.4

Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for

cleaning and inspection either when in an assembled position or when removed. Removable parts shall be readily demountable.

D.5

Appurtenances having product contact surfaces shall be easily removable for cleaning, or shall be designed and manufactured to insure that they can be cleaned mechanically.

D.6

Storage tanks having an inside height of more than 96 inches (244 cm) shall be provided with means that will facilitate manual cleaning and inspection of all product contact surfaces (See Appendix, Section G.) or means shall be provided for mechanically cleaning the product contact surfaces of the tank and all non-removable appurtenances thereto. (See Appendix, Section H.)

D.7

All product contact surfaces shall be self-draining except for normal clingage. The bottom pitch of a vertical cylindrical storage tank with a flat bottom designed for mechanical cleaning shall be at least 3/4 inch per foot (6.25 cm per m) toward the outlet or if the bottom of the lining is of the reverse dish-type, the portion of the bottom adjacent to the side wall shall have a minimum slope of 3/4 inch per foot (6.25 cm per m) toward the outlet.

Horizontal cylindrical storage tanks designed for mechanical cleaning which have a built-in bottom pitch, shall have a pitch, of at least 1/4 inch per foot (2.0 cm per m) toward the outlet. Horizontal tanks must have complete drainage when the tank has a pitch of not more than 1 inch in 100 inches (10 cm per m). Rectangular storage tanks designed for mechanical cleaning shall have a built-in bottom pitch of 3/4 inch per foot (6.25 cm per m) toward the center line and the center line

shall have a pitch of at least 1/4 inch per foot (2.0 cm per m) toward the outlet.

- D.8 If it is necessary to enter the storage tank to clean any or all of the product contact surfaces, the tank shall have the following minimum dimensions: (1) 36 inches (91 cm) in height by 48 inches (122 cm) in diameter, or 48 inches (122 cm) square; (2) 36 inches (91 cm) in height, 36 inches (91 cm) in width, by 48 inches (122 cm) in length, if oval or rectangular.
- D.9 **Gaskets**
- D.9.1 Bonded rubber and rubber-like gaskets and bonded plastic gaskets shall be bonded in such a manner that the bond is continuous and mechanically sound, and when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.
- D.9.2 Grooves in gaskets shall be no deeper than their width and the minimum radius of any internal angle shall be not less than 1/8 inch (3 mm) unless the gasket is readily removable and reversible for cleaning.
- D.10 Gasket grooves or gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 inch (6mm) in depth and, except those for standard O-Rings smaller than 1/4 inch (6 mm), shall be at least 1/4 inch wide (6 mm).
- D.11 **Radii**
- D.11.1 Internal angles of 135 degrees or less on product contact surfaces shall have radii of not less than 1/2 inch (13 mm), except that:
- D.11.2 Minimum radii for fillets of welds in product contact surfaces may be 1/8 inch (3 mm) where the thickness of one or both parts joined is less than 3/16 inch (5 mm). (See also D.11.6.)
- D.11.3 The radii in agitator shaft bottom supports or guides and in gasket grooves or gasket retaining grooves for removable gaskets, except those for standard 1/4 inch (6 mm) and smaller O-Rings, shall be not less than 1/8 inch (3 mm).
- D.11.4 The radii in grooves for standard 1/4 inch (6 mm) O-Rings shall be not less than 3/32 inch (2 mm) and for standard 1/8 inch (3 mm) O-Rings shall be not less than 1/32 inch (1 mm).
- D.11.5 The radii of covers and agitator assemblies shall be not less than 1/4 inch (6 mm).
- D.11.6 The radius at a juncture of the end(s), side wall(s), top and bottom shall not be less than 1/2 inch (13 mm).
- D.12 The lining shall be constructed so that it will not sag, buckle, or prevent complete drainage in normal use.
- D.13 There shall be no threads on product contact surfaces.
- D.14 All seams and openings in the shell shall be effectively sealed against the entrance of moisture and extraneous material.
- D.15 All sanitary fittings and connections shall conform to the applicable provisions of the 3-A Sanitary Standards for Fittings, Number 08-17 Parts I and II, rev.
- D.16 All sanitary tubing shall conform to the applicable provisions of 3-A Sanitary Standards for Polished

Metal Tubing for Dairy Products, Number 33-00, except that materials conforming to C.1.2 or C.1.4 may be used for caps of sanitary design for the protection of terminal ends of sanitary tubes, fittings, or vents.

D.17

Instrument Fittings

One or more fittings to accommodate indicating and/or recording thermometer temperature sensing devices shall be provided. The thermometer connections and/or openings shall be located so that the thermometer is not influenced by the cooling jacket and shall conform to one of the following types:

D.17.1

Fittings conforming to thermometer well supplements to 3-A Sanitary Standards for Instrument Fittings and Connections, Number 09-07.

D.17.2

Fittings for temperature sensing devices which do not pierce the storage tank lining, either temperature sensing element receptacles securely attached to the exterior of the lining or means to attach temperature sensing elements securely to the exterior of the lining.

D.17.3

The fittings for temperature sensing devices shall be located to permit the registering of the temperature of the product when the storage tank contains no more than 20 percent of its capacity.

D.18

A pressure or level sensor, if provided, shall comply with the applicable provisions of the 3-A Sanitary Standards for Pressure and Level Sensing Devices, Number 37-01. If the storage tank in which it will be used is designed

for mechanical cleaning, the product contact surface of the device shall be relatively flush with the inner surface of the storage tank.

D.19

Agitation

D.19.1

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 storage tank within a variation of plus or minus 0.1 percent as determined by an official AOAC Milk Fat Test. *5

D.19.2

The agitator, if not designed for mechanical cleaning, shall be located and constructed in such a manner that it shall be readily accessible and removable for manual cleaning. Mechanical agitators may be of a vertical or horizontal type.

D.19.3

The opening for a vertical mechanical agitator shall have a minimum diameter of 1 inch (2.5 cm) on storage tanks which require removal of the agitator shaft for cleaning or be of a diameter that will provide a 1 inch (2.5 cm) minimum annular space between the agitator shaft and the inside surface of the opening on storage tanks which do not require removal of the agitator for cleaning. An umbrella or drip shield of sanitary design that can be raised or readily demounted, to permit cleaning of all of its surfaces, shall be provided to protect against the entrance of contaminants into the storage tank through the annular space around the agitator shaft. The agitator

*5 The method of making these tests will be found in the following reference: Official Methods of Analysis: Available from the Association of Official Analytical Chemists, 1111 N 19th St., Suite 210, Arlington, VA 22209 (703-522-3032).

shaft, if removable, shall be provided with an easily accessible, readily demountable coupling of either a sanitary type located within the lining or a coupling located outside the lining provided that it is above the umbrella provided to protect the annular space around the shaft. A bottom support or guide, if used, shall be welded to the lining and shall not interfere with drainage of the storage tank and the internal angles shall have minimum radii of 1/8 inch (3 mm). When the agitator shaft has a bearing cavity, the diameter of the cavity shall be greater than the depth.

D.19.4

The agitator driving mechanism shall be securely mounted in a position that will provide a minimum distance of 4 inches (10 cm) measured from the driving mechanism housing, excluding bearing bosses and mounting bosses, to the nearest surface of the storage tank; and in such a manner that all surfaces of the storage tank under or adjacent to the driving mechanism shall be readily accessible for cleaning and inspection.

D.19.5

A seal for the agitator shaft, if provided, shall be of a packless type, sanitary in design and durable. A seal shall be provided for (1) a horizontal agitator, (2) a vertical agitator when it is specified that the storage tank is to be located so that the portion of the shaft outside the storage tank is not in a processing area and (3) an agitator in a storage tank having means for mechanically cleaning the storage tank.

D.19.6

Equipment and means for applying air under pressure shall conform to the applicable provisions of the 3-A Accepted Practices for Supplying Air Under Pressure, Number 604-03. Tubing and related connections within the storage tank

shall be of a sanitary design and be readily demountable for cleaning outside the storage tank or be designed for mechanical cleaning. If designed for mechanical cleaning, the tubing and all related connections shall be self-draining.

Permanently mounted air tubing shall be constructed and installed so that it will not sag, buckle, vibrate or prevent complete drainage of the storage tank or tubing and shall be located so that the distance from the outside of the tubing to the lining shall be at least 2 inches (5.0 cm), except at the point of entrance.

D.20

A sample cock shall be provided. It shall be of a type that has its sealing surface relatively flush with the product contact surface of the storage tank unless located in the manhole door and have an inside diameter no less than that of 1 inch (2.5 cm) 3-A sanitary tubing.

D.21

Sight and light openings, when provided, shall be of such design and construction that the inner surfaces drain inwardly; and if the storage tank is designed for mechanical cleaning, the inner surface of the glass (or plastic) shall be relatively flush with the inner surface of the lining. The inside diameter of the opening shall be at least 3 3/4 inches (9.5 cm). The external flare of the opening shall be so that liquid cannot accumulate.

D.22

A direct reading gauge of the sight glass or plastic tube type, if provided, shall be sanitary in design and construction and shall be readily accessible for cleaning or shall be designed for mechanical cleaning.

If designed for mechanical cleaning, the inside diameter of the gauge parts shall be

sufficiently uniform that all product contact surfaces will be cleaned.

It shall be designed and constructed so that all product in the gauge will be discarded. Means to accomplish this shall be provided at the lowest point and in such a manner that product in the gauge will not enter the storage tank outlet nor re-enter the storage tank. The valve shall be close coupled. The distance, measured along the passage for the product in the storage tank to the gauge valve, from the nearest point on the shell to the ferrule or flange for the valve shall not be more than the smaller of (1) twice the nominal diameter of the passage or (2) 5 inches (13 cm).

D.23

A hooded air vent of sufficient free open area to prevent back pressure during filling and to prevent vacuum during emptying of the storage tank shall be provided in the front head near the top, or in the top of the storage tank. (See Appendix, Section I.) The vent shall terminate in a processing area and shall drain into the storage tank.

The air vent shall be provided with a cover or be fabricated to protect the vent from overhead drip or drainage. Perforations may be provided on the sides and/or the bottom of the vent. Perforations shall have openings not greater than 1/16 inch (2 mm) diameter, or slots not more than 1/32 inch (1 mm) wide for cleaning and inspection. Woven wire mesh shall not be used for this purpose. It shall be so designed that parts are readily accessible and readily demountable for cleaning and inspection.

D.24

The inside diameter of the outlet passage of storage tanks shall not be less than the nominal inside

diameter of a 1 1/2 inch (3.8 cm) 3-A sanitary fitting. The outlet shall be in a position that will provide complete drainage of the storage tank. The top of the terminal end of the outlet passage shall be lower than the lowest point of the lining.

D.25

Inlet and outlet connections in the storage tank shall be provided with welded stub ends, bolted or clamp-type flanges or 3-A sanitary threaded connections. The face of a bolted or clamp-type flange or a 3-A sanitary threaded connection, below the maximum normal product level, shall be as close as practical but not to exceed the smaller of (1) twice the nominal diameter of the connection or (2) 5 inches (13 cm) to the outer shell of the storage tank.

D.26

Valves, if provided, on inlet and outlet connections into the tank, below the maximum normal product level, shall be close-coupled and free-draining.

D.27

The manhole shall be located at the outlet end or side of the storage tank or the top of the storage tank. The inside dimensions of the manhole opening shall not be less than 15 inches (38 cm) by 20 inches (51 cm) oval, or 18 inches (46 cm) diameter. A top manhole opening shall be not less than 3/8 inch (10 cm) higher than the surrounding area and if the exterior flange is incorporated in it, it shall slope and drain away from the opening. The sleeve or collar of a manhole opening for an inside swing-type manhole cover shall be pitched so that liquids cannot accumulate.

D.28

The cover for a manhole in the end or side wall shall be either of the inside or outside swing-type. If the cover swings inside, it shall also swing outside, away from the opening. Threads or ball joints employed to attach the manhole

cover(s) shall not be located within the lining. The cover for a manhole in the top shall be of the outside swing-type.

D.29

Insulation

D.29.1

The storage tank shall be insulated with insulating material of a nature and amount sufficient to prevent, in 18 hours, an average temperature change of greater than 2 degrees F (1 degree C) in the storage tank full of water when the average difference between the temperature of the atmosphere surrounding the storage tank is 30 degrees F (17 degrees C) above or below that of the water in the storage tank. The insulating value of the insulation over non-refrigerated areas of the storage tank shall be equivalent to not less than:

D.29.1.1

An R-value of at least 8 for

- (a) A storage tank designed to be installed wholly within a building or
- (b) That portion of the storage tank within a building on tanks designed to be installed partially outside a building.

D.29.1.2

An R-value of at least 12 for that portion of the storage tank outside of a building on storage tanks designed to be installed partially outside of a building.

D.29.2

Insulation material shall be installed in such a manner as to prevent shifting or settling.

D.30

Means of Supporting Storage Tanks

D.30.1

The means of supporting storage tanks designed to be installed wholly within a processing area shall be one of the following:

D.30.1.1

With Legs. Adjustable legs shall be provided of sufficient number and strength and so spaced that the filled storage tank will be adequately supported. Legs shall be smooth with rounded ends and have no exposed threads. Legs made of hollow stock shall be sealed. Exterior of legs and leg sockets shall be readily cleanable. Legs shall be such that the product outlet is sufficiently high to allow for adequate cleaning and will provide an 8 inch (20 cm) minimum clearance between the floor and the tank outlet valve or bracing whichever is lower. The legs of cylindrical horizontal storage tanks shall be installed so that the leg will be vertical when the tank lining is pitched 1/4 inch per foot (2 cm per m) toward the outlet.

D.30.1.2

Mounted on a slab or island. The base of the storage tank shall be such that it may be sealed to the mounting surface. (See Appendix, Section J.)

D.30.1.3

Storage tanks may be mounted on load cells. If load cells are provided, they shall meet the material criteria of Section C.2 and the fabrication criteria of Section D.33 herein.

D.30.2

A storage tank to be installed partially outside a processing area shall be provided with a collar, flange, plate or other suitable member to close the opening in the processing room wall and shall be such that it can be sealed to the wall.

D.31

The outer shell shall be smooth and effectively sealed except for a vent or weep hole in the outer shell of the storage tank. The vent or weep hole shall be located in a position that will provide

drainage from the outer shell and shall be vermin proof. Outside welds need not be ground.

D.32

Any guard(s) required by a safety standard(s) that will not permit accessibility for cleaning and inspection shall be designed so that it (they) can be removed without the use of tools.

D.33

Non-product contact surfaces shall be smooth, free of pockets and crevices and be readily cleanable and those to be coated shall be effectively prepared for coating.

D.34

Information Plate

Storage tanks shall have an information plate in juxtaposition to the name plate giving one of the statements in D.34.1 (See D.29.1.1 (a) and D.29.1.2) and if the storage tank has a vertical agitator, one of the statements in D.34.2 (See D.19.3) or the statement(s) shall appear on the name plate. The wording of the statement(s) can be changed but not the intent.

D.34.1

"The insulation of this storage tank complies with the requirements for a storage tank to be installed * _____ a building."

*Insert one of the following:

- (a) "wholly within"
- (b) "partially outside of"

D.34.2

"The agitator of this storage tank is designed so that the portion of agitator shaft outside of the storage tank ** _____ in a processing area."

**Insert one of the following:

- (a) "does not have to be"
- (b) "must be"

APPENDIX

E

STAINLESS STEEL MATERIALS

Stainless steel conforming to the applicable composition ranges established by AISI*2 for wrought products, or by ACI*3 for cast products, should be considered in compliance with the requirements of Section C.1 herein. Where welding is involved the carbon content of the stainless steel should not exceed 0.08 percent. The first reference cited in C.1 sets forth the chemical ranges and limits of stainless steels of the 300 series. Cast grades of stainless steel corresponding to types 303, 304, and 316, are designated CF-16F, CF-8, and CF-8M, respectively. These cast grades are covered by ASTM*6 specifications A351/A351M, A743/A743M, and A744/A744M.

F

PRODUCT CONTACT SURFACE FINISH

Surface finish equivalent to 150 grit or better as obtained with silicon carbide properly applied on stainless steel sheets is considered in compliance with the requirements of Section D.1 herein.

G

MANUAL CLEANING

If the inside height of a storage tank exceeds 96 inches (244 cm), one means for manual cleaning is to weld a stainless steel rung on each end of the tank to support a removable platform at a height which will facilitate cleaning and inspection.

H

MECHANICAL CLEANING

One cleaning method found to be satisfactory is to pump the cleaning solution to the dome of the storage tank or the upper portion of the tank surface, through stainless steel lines with

*6 Available from ASTM, 1916 Race St., Philadelphia, PA 19103-1187 (215-299-5400).

C-I-P fittings or welded joints and distribute it in such a manner as to provide flooding over all interior surfaces. The storage tank should be installed with sufficient pitch to accomplish draining and to have a fast flushing action across the bottom. The pitch should be at least 1/4 inch per foot (2.0 cm per m). Means should be provided for manual cleaning of all surfaces not cleaned satisfactorily by mechanical cleaning procedures.

NOTE: Cleaning and/or sanitizing solutions should be made up in a separate tank - not the storage tank. Halogen based sanitizers (chlorine or iodine) allowed to remain un rinsed on surfaces for longer than necessary may cause corrosion damage.

I

AIR VENTING

To insure adequate venting of the storage 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 storage tank should be at least as large as those shown in the following table:

Minimum Free Vent Opening Size Inches (cm) I.D.	Maximum Filling or Emptying Rate Gallons (Litres) per minute
1 3/4 (4.5)	175 (660)
2 1/4 (5.7)	300 (1140)
2 3/4 (7.0)	400 (1500)
3 3/4 (9.5)	700 (2650)

These Standards are effective on September 8, 1990, at which time the 3-A Sanitary Standards for Storage Tanks for Milk and Milk Products, Number 01-06 are rescinded and become null and void.

The above sizes are based on normal operation and are sized to accommodate air only and not liquid. A perforated vent should have a free opening area equal to at least 1 1/2 times the area of the minimum vent opening in the storage tank. 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, storage 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.*7 Means should be provided to prevent excess loss of cleaning solution through the manhole opening. The use of tempered water of about 95 degrees F (35 degrees C) for both pre-rinsing and post-rinsing is recommended to reduce the effect of flash heating and cooling. Provisions should be made to prevent overflowing with resultant vacuum or pressure damage to the storage tank.

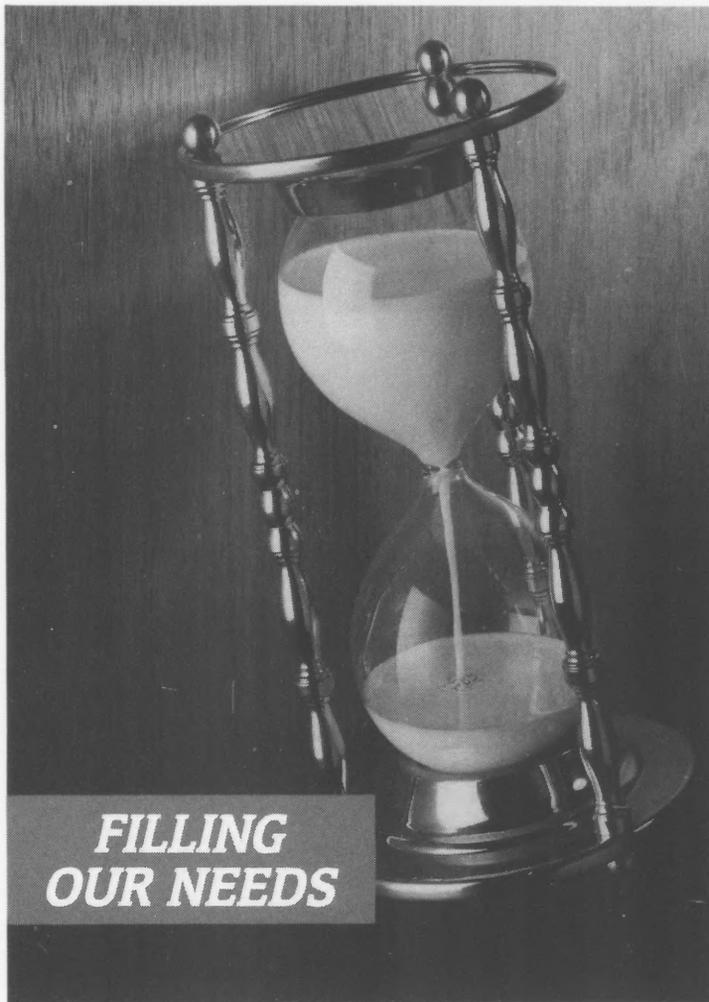
J

SLABS OR ISLANDS

When a storage tank is designed to be installed on a slab or an island, the slab or island should be of sufficient height so that the bottom of the outlet connection is not less than 8 inches (20 cm) above the floor. The surface of the slab or island should be coated with a thick layer of waterproof mastic material, which will harden without cracking. The junction of the outer shell of the storage tank and the slab or island should be sealed.

*7 For example, when a 6,000 gallon tank (with 800 cu. ft. of 135 degrees F hot air after cleaning) is suddenly flash cooled by 50 degrees F water sprayed at 100 gpm the following takes place: Within 1 second, the 800 cu. ft. of hot air shrinks approximately 51 cu. ft in volume. This is the equivalent in occupied space of approximately 382 gallons of product. The 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.

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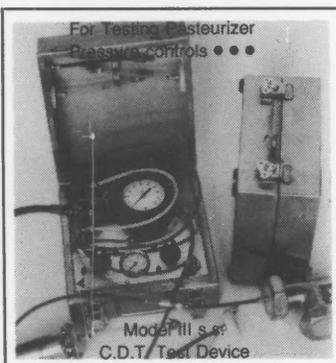
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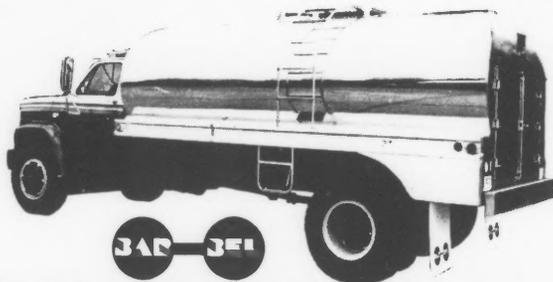
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Coming Events

1990

AUGUST

•**5-8, IAMFES 77th Annual Meeting**, Woodfield Hilton Towers, Arlington Heights, IL. For more information, contact Steven K. Halstead, IAMFES, Inc., 502 E. Lincoln Way, Ames, IA 50010 (800)369-6337.

•**6-7, Pesticide Applicator Certification Seminar**, Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. Contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•**7-8, Dietary Managers Association Meeting** to be held at the Hyatt Orlando, Orlando, Florida. For more information call (708)932-1444 or (800)323-1908.

•**7-11, 2nd Latin-American Congress of Biotechnology** to be held in LaHabana, Havana, Cuba. For more information contact the Organizing Committee, P.O. Box 6162, Havana, Cuba. Telex: 512330 ing gen cu, 511072 cubacib. Telephone: 21-8039, 20-1400, 20-1402, 20-1408, 21-8466, 21-8164, 21-8008. FAX: 53-7-218070.

•**8-9, Advance Pesticide Technology for the Food Industry Seminar**, Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•**15-18, FOOD PACIFIC, 1990** will be held at Vancouver's domed stadium, B.C. Place. Those wishing to attend may obtain further information by contacting: B.C. Food Exhibitions Ltd., 190-10651 Shellbridge Way, Richmond, B.C., Canada V6X 2W8 (604)660-2288.

•**26-31, Eighth International Biodeterioration and Biodegradation Symposium**. University of Windsor, Ontario, Canada. For more information contact Mary M. Hawkins, Corresponding Secretary, 10657 Galaxie, Ferndale, MI 48220-2133, (313)544-0042.

•**27, Pesticide Applicator Certification Seminar**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

SEPTEMBER

•**10-13, 104th Annual AOAC International Meeting & Exposition**, to be held at the Clarion Hotel, New Orleans, Louisiana. For more information contact: Margaret Ridgell, AOAC, Suite 400, 2200 Wilson Blvd., Arlington, VA 22201-3301 (703)522-3032.

•**12-14, Environmental Regulation Course** presented by Executive Enterprises, Inc. will be held at the Hotel Pontchartrain, Two Washington Blvd, Detroit, MI (313)965-0200. For more information call (800)831-8333 or (212)645-7880 (outside the U.S.).

•**13-14, Minnesota Sanitarians Association, Inc. Annual**

Conference will start at 1:00 p.m. on September 13 at the Earle Brown Center, University of Minnesota. Annual meeting will start at 4:30 p.m. on September 13 with the Awards Banquet at 6:00 p.m. at the Holiday Inn, Shoreview. For further information call Roy E. Ginn at (612)785-0484.

•**13-14, Annual Wisconsin Laboratory Association's Educational Conference** will be held in Brookfield, WI. The Conference will be held at the Marriott Convention Center. For more information please contact Mr. Malin Benicek, Sanofi Bio Ingredients, 620 Progress Avenue, Waukesha, WI 53186.

•**13-16, International Symposium on Bovine Mastitis** will be held at the Westin Hotel in Indianapolis, IN. The Symposium is jointly sponsored by the National Mastitis Council (NMC) and the American Association of Bovine Practitioners (AABP) and will be held in conjunction with the AABP 23rd Annual Conference. For additional information contact Ann Saeman, Director of Operations, National Mastitis Council, 1840 Wilson Boulevard, Suite 400, Arlington, VA 22201 USA; (703)243-8268.

•**17-19, New York State Association of Milk and Food Sanitarians Annual Meeting**, at the Sheraton Inn-Syracuse, Liverpool, NY. For more information contact Paul Dersam, 27 Sullivan Rd., Alden, NY 14004, (716)937-3432.

•**17-19, Sanitation and Safety for Food Processors and Warehousemen** sponsored by the American Sanitation Institute will be held at the Embassy Suites Hotel in downtown St. Louis, MO. The program will feature prominent guest speakers in the national food industry, and topics will include FDA and USDA updates, incoming goods and in-house inspections, and insect and rodent control. For more information please contact Nancy Sullivan or Christine Verplank at ASI, 7625 Page Boulevard, St. Louis, MO 63133, or by calling (800)325-3371 (in Missouri (314)725-2555).

•**19-20, Wisconsin Association of Milk and Food Sanitarians Annual Meeting**, Pioneer Inn, Oshkosh, WI. For more information contact Neil Vassau (608)267-3504.

•**25-27, Environmental Regulation Course** presented by Executive Enterprises, Inc. will be held at the Dallas Marriott Park Central, 7750 LBJ Freeway @ Coit Road, Dallas, TX 75251 (214)233-4421. For more information call (800)831-8333 or (212)645-7880 (outside the U.S.).

•**26-27, Joint Annual Convention of the South Dakota State Dairy Association and Dairy Fieldmen's Association** to be held at the Holiday Inn, Brookings, SD. For information contact Dr. John Parsons, Dairy Science Department, SDSU, Box 2104, Brookings, SD 57007 (605)688-4116.

•**26-28, Kansas Association of Sanitarians Annual Meeting**, Red Coach Inn, Salina, KS. For more information contact John Davis, 1900 East 19th, Wichita, KS 67214, (316)268-8351.

OCTOBER

•7-12, **Twenty-Third International Dairy Congress**, sponsored by the International Dairy Federation, and **Exposition 1990**, will be held at the Montreal Convention Centre, Montreal, Canada. For further information, contact: Richard Stern, Executive Director, International Dairy Congress, 1990, P.O. Box 2143, Station D. Ottawa, Ontario, Canada K1P 5W3 (613)238-4116.

•9-10, **North Dakota Environmental Health Association's 1990 Fall Educational Conference and Meeting** will be held at the Holiday Inn, Grand Forks, ND. For more information please feel free to contact Mel Fischer, Bismarck Fire and Inspections, 1020 East Central Avenue, Bismarck, ND 58501, (701)258-2070.

•15-16, **Pests Associated with Food Industry and Environmental Sanitation Seminar**, Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•17-18, **Advanced Course on Pest Recognition and Food Industry Problems**, Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•17-18, **North Central Cheese Industries Association Annual Conference**, will be held at the South Dakota State University, Brookings, SD. For more information contact E.A. Zottola, Executive-Secretary, NCCIA, P. O. Box 8113, St. Paul, MN 55108.

•18-20, **1990 International Dairy Show** will be held in Anaheim, CA. For more information call Tracy Stroud at (202)296-4250.

•22-25, **The Science of Ice Cream Manufacturing** will be held on the Davis campus of the University of California, Davis, CA. Sponsored by University Extension. For more information call Jim Lapsley at (916)757-8692.

NOVEMBER

•4-7, **National Fisheries Institute** will hold its 45th annual convention at the new Marriott Marquis, San Francisco, CA. For more information contact Pat McCoy, convention coordinator (703)524-8881.

•6-8, **International Cheese Technology Exposition** will be held in Milwaukee, Wisconsin. For further information contact: USCMA/WEMA, P.O. Box 2133, Madison, WI 53701 (608)255-2027.

•14-15, **Alabama Dairy & Food Conference** to be held at the Howard Johnson Motor Lodge in Birmingham. For more information contact Tom McCaskey at (205)844-1518.

•27-19, **Biotech USA '90 presents PharmBiotech, AgBiotech, BioLab and BioBusiness** at the Ramada Renaissance Techworld, Washington, DC.

•28, **Ontario Food Protection Association Annual Meeting**, will be held at the Airport Hilton Hotel, Toronto, Ontario. The title of the all-day symposium is "FOOD PROTECTION: HOT TOPICS FOR THE '90's". For more

information, please contact program convenors: Garth Sundeen (416)239-8411 or FAX (416)239-2416 or Patrick Kwan (416)671-5080 or FAX (416)671-5176.

DECEMBER

•3, **Pesticide Applicator Certification Seminar**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•4-5, **Pests Associated with Food Industry and Environmental Sanitation Seminar**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•6-7, **Advanced Course on Pest Recognition and Food Industry Problems**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. For more information contact George Okumura, 6669 14th Street, Sacramento, CA 95831 (916)421-8963.

•12-18, **American Society of Agricultural Engineers** will be sponsoring the **International Symposium on Agricultural and Food Processing Wastes**. For more information contact: Jon Hiler, American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MO 49085 (616)429-0300.



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From the Ames Office . . .

By
Steven K. Halstead
IAMFES
Executive Manager



Last month I shared with you something of the satisfaction I get from my professional organization. I received a response to that column from the Regional Association of Terrorists (RATs) who demanded that I provide equal time to their cause. Since they were holding a bad cold, hostage, I gave into their demands. What choice did I have?

According to the RATs, every association member needs to know (has a right to know!) what he/she can do to destroy his/her professional association. Here's what they suggest:

1. Never attend the **association's meetings**. (They are boring and anything you learn will just confuse you. Besides you know enough now and the information needed to do your job isn't changing).

2. If you must attend **the meetings**, go to just the program part. Never, Never, Never, go to the business meeting. (We all know that they are just an ego trip for the officers and anyway they don't want anyone messing with their association.)

3. If the association sends out a **survey**, don't fill it out. (If they send a postage paid return envelope, put a brick in it and send it back. The postage due will cost a fortune!) Surveys are a pain in the neck and nobody ever pays any attention to the results, anyway.

If the association begins a new program based on the survey results, complain that the results weren't representative of the whole association. Besides, how can the association even think of doing something new at a time like this!

4. If your **opinion is sought**, just tell them what they want to hear. They don't really care and probably aren't listening. Later, be critical of any/all decisions and actions taken. Particularly those that don't impact you in any way. That way, you can't be accused of special interests.

5. Don't **volunteer** for anything! There are plenty of others in the group who are less important than you and who are perfectly happy to help out. As an added bonus, you can complain to them about the way they did the job. They didn't even ask for your ideas about how to do it!

6. Given the **importance of members** to an association, don't do anything that might encourage others to join. Be careful to keep your membership a secret - no wall plaques, no lapel pins, have association mail delivered to your home, and never, ever share association information with others.

7. **Ask not** what you can do for the association, just complain about how little it does for you. Better yet, tell others how much their association does and how little yours does. Pride in your association is a wonderful thing - for others!

8. Volunteer to **chair a committee** - then don't do anything. Don't call meetings. Don't do the work. Don't make reports. Don't attend coordinating sessions. If approached, say a meeting is in the planning stage and it's too early to be specific. Remember the ploy that has made American business what it is today - "the meeting agenda is in the mail."

9. And probably the best way to destroy an association is **to criticize** the group from the perspective of a non-member. It is very important that you not be a member when you do this (if you happen to be a member, you can always quit claiming the dues are too high). Otherwise, you might be tempted to work within the association to improve it.

All volunteers (and to a lesser degree, paid staff) love to hear criticism - especially from non-members. They know that it is offered in the spirit of helpfulness and that it is coming from someone who sincerely cares about the association.

I hope you had as much fun reading this as I had writing it. Be assured, it was done when my tongue was planted firmly in my cheek.

Having been an association manager for the better part of eight years, I can guarantee that RATs is on the right track. If you want to destroy an organization, any one of these ideas can be devastating, but putting two or more together makes it a "done deal."

Come to Arlington Heights for the 77th Annual Meeting. Do your part to thwart the efforts of the RATs.

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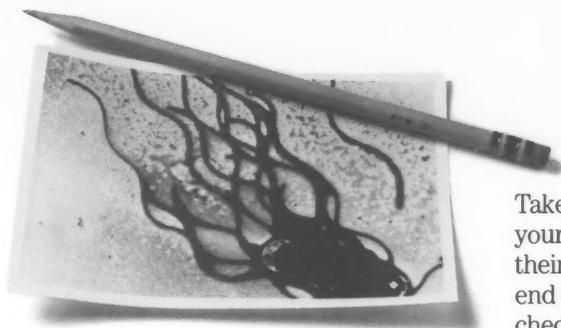
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