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# Dairy and Food Sanitation®

*A Publication of the International Association of Milk, Food and Environmental Sanitarians, Inc.*

Hand Wash Procedures to  
Reduce Foodborne Illness

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Safety of Ethnic  
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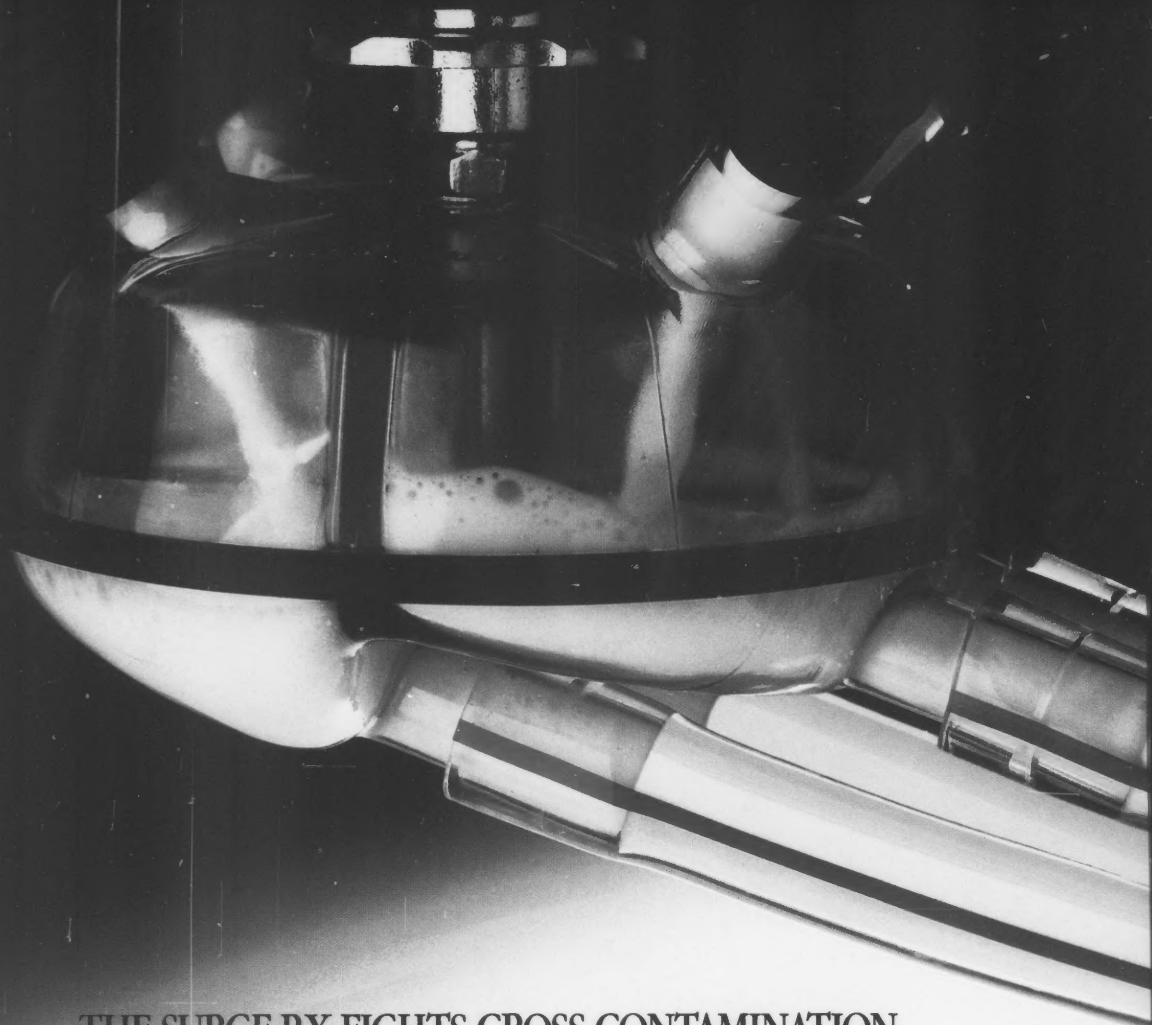


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### ***Purpose***

1. To encourage graduate students to present their original research at the IAMFES annual meeting.
2. To foster professionalism in graduate students through contact with peers and professional members of IAMFES.
3. To encourage participation by graduate students in IAMFES and the annual meeting.

### ***Who Is Eligible***

Graduate students enrolled in M.S. or Ph.D. programs at accredited universities or colleges whose research deals with problems related to environmental, food and/or dairy sanitation, protection and safety. Candidates cannot have graduated more than one (1) year prior to the deadline for submitting abstracts.

### ***Criteria***

1. A short abstract of the paper must be submitted to the IAMFES office by January 1 of each year. (Use the blue abstract forms from the October issue, if possible.)
2. The author must indicate on the abstract form the desire to be considered for the competition.
3. The paper and the student must be recommended and approved for the competition by the major professor or department head.
4. The paper must represent original research done by the student and must be presented by the student.
5. An extended abstract form will be sent to all who enter the competition, and must be completed and returned by the deadline date on that form.
6. Each student may enter only one (1) paper in the competition.
7. Papers are to be presented as oral papers and should be approximately fifteen (15) minutes in length with an additional five (5) minutes allowed for questions, for a total of twenty (20) minutes.
8. The use of slides or other visual aids is encouraged.
9. The papers will be judged by an independent panel of judges.
10. Awards will be presented at the annual IAMFES Awards Banquet.

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# Thoughts From the President . . .

By

Robert B. Gravani, Ph.D.



Our association has grown significantly since it was founded in 1912. Throughout the years, IAMFES leaders have guided the organization through many challenges and opportunities.

To continue to improve and strengthen our association, your executive board has been busy formulating several goals for the year ahead. The IAMFES goals for 1988-89 are as follows;

1. Strive for 3,700 individual members;
2. Strive for 900 professional attendees at our 76th Annual Meeting in Kansas City, on August 13-17, 1989;
3. Continue to strengthen the Annual Meeting program and related activities;
4. Streamline, upgrade and further improve policies, procedures and communications within our association;
5. Improve and strengthen the structure and activities of all IAMFES committees;
6. Continue to improve communications and services to our affiliates and all of our membership;
7. Begin to implement the Long Range Planning Committee's recommendations;
8. Complete an IAMFES policy manual.

These goals are quite broad, but are accomplishable and your board is dedicated to working hard to accomplish them. Hopefully, these goals will encourage more members to become involved in IAMFES committees, their local affiliates, and the annual meeting program. These goals were also formulated as a "blue print" of activities for the next year. I hope that as an interested member of IAMFES, one of your goals is to become more active in our association.

One way to become more involved in our organization is to present a technical paper at our 76th Annual Meeting in Kansas City on August 13-17, 1989. The call for papers and abstracts forms appeared in the October issues of our Journals. This is an excellent opportunity to share current research findings with interested colleagues. Also, if you know any graduate students who are doing research in the area of food protection, encourage them to enter the IAMFES Developing Scientist competition. This will provide a forum for young scientists to compete for recognition and monetary awards.

If you'd like to become more involved in our association, please write to me or any of our board members with how you'd like to be involved or with suggestions for strengthening and improving an already strong and viable organization.

Remember, the largest room in the world...is the room for improvement!

Please help us to strengthen and improve IAMFES. Get involved!

Robert B. Gravani, Ph.D.  
IAMFES President  
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# ***Safety of Ethnic Foods Through Application of the Hazard Analysis Critical Control Point Approach***

by

*Frank L. Bryan, Ph.D., M.P.H.  
Food Safety Consultation and Training  
2022 LaVista Circle  
Tucker, GA 30084*

Ethnic foods are those foods that are frequently prepared and eaten by a group of people classified according to common traits, language, social views and customs who reside, or their ancestors originally resided, in a particular region or country. At one time preparation of these foods was limited to the region of their origin, but tourists were apt to eat them when they visited the region. In countries that attract foreign workers or immigrants, ethnic foods are prepared, sold or sought by the immigrants or their offspring or others who have been introduced to the foods. In developing countries experiencing urbanization, ethnic foods are often sold by some street vendors. Some ethnic foods (e.g., Chinese and Mexican foods) have frequently been implicated as vehicles in outbreaks of foodborne diseases; others (e.g., gyros) are implicated occasionally; while others because of their composition and preparation practices are potential, if not actual but undetected, vehicles of foodborne illness. Yet, others are quite shelf stable and offer a high degree of safety.

Ethnic foods vary considerably in composition and methods of preparation, but they are exposed to similar sources of contamination as other foods served in a community. Whether pathogens reach the item depends on the raw ingredients and handling and processing procedures. Whether they survive, if present, depends on the types (e.g., sporeformers) and number of contaminants and on the severity and effectiveness of the process in removing or inactivating them. Whether survivors or newly-acquired contaminants propagate depends on time-temperature exposures, atmosphere, characteristics and ratio of the contaminating microorganisms, and, of course, the characteristics (e.g., nutrients, pH,  $a_w$ , Eh, and natural or added inhibitory substances) of the food. These matters (hazards and risks), based upon applied research, are reviewed for

a number of ethnic foods that are commonly served (e.g., Chinese and Mexican foods) and for a few foods prepared in homes and on streets in developing countries in different regions of the world. Most of the data comes from personal experience.

Risks of eating ethnic foods, as well as any other food, can be evaluated by the hazard analysis critical control point approach as well as by epidemiologic investigations. Afterwards, preventive and control criteria and measures can be instituted at critical control points which are monitored to assure safety.

## **The HACCP System**

The Hazard Analysis Critical Control Point (HACCP) system consists of five successive elements (29). These are:

1. Identification of hazards (contamination, survival and growth of microorganisms that cause either foodborne illness or spoilage) and assessment of the severity (magnitude) of the hazards and the risks (probability of occurrence) that they pose.
2. Determination of critical control points (operations at which to exercise control) required to prevent or control identified hazard(s).
3. Establishment of effective preventive or control measures and specification (physical, chemical or biological) of criteria that indicate whether an operation is under control at a particular critical control point.
4. Monitoring (systematic observations, measurements, and/or logging) of each critical control point to evaluate whether it is under control.
5. Implementation of appropriate and immediate corrective action whenever results of monitoring indicate that an operation at a critical control point is neither under control nor that the criteria are not met.

Another essential aspect of the concept is verification that the HACCP system is in place, that appropriate critical control points have been designated, that they are being effectively and properly monitored, and that appropriate action is taken whenever criteria are not within specified limits. This is usually done by the use of supplemental tests and/or review of records.

### Chinese Foods

Chinese foods, particularly fried rice, have been implicated as vehicles of foodborne disease in the United States, Canada, England and Wales, Australia, Netherlands, Finland and elsewhere (6, 18). No doubt, they are important vehicles throughout the world where these foods are commonly prepared. On the other hand, several types of Chinese foods provide a high degree of safety.

**Fried, steamed, and boiled foods:** Many Chinese dishes of which their ingredients are cut into small pieces and either cooked over a high flame in woks or deep fat fried and served immediately afterwards are quite safe to eat. Temperatures of foods that were attained during cooking in woks, steamers, and deep-fat fryers were usually high enough to cause rapid destruction of vegetative pathogenic foodborne bacteria. Food temperatures usually increased after cooking to provide an additional lethal effect to any surviving vegetative microorganisms. Cooking and eating promptly afterwards are critical control points. (For more information, see reference 7.)

In Taiwan, and no doubt elsewhere Chinese cooked foods are sometimes held at room temperature (while being displayed in department stores, restaurants, and stands in markets) long enough to permit multiplication of bacteria that might be present. The problem has been confirmed by the finding of large numbers of mesophilic aerobic microorganisms in samples of such foods. Time of such holding must be monitored, and it should not exceed 5 hours, preferably much less.

In studies in the United States, during hot-holding in steam tables, the temperatures of foods were 55°C (131°F) or higher so that multiplication of pathogenic foodborne bacteria would be unlikely and in an appropriate interval of time would cause additional lethality to vegetative forms of these organisms (7). Hence, hot holding is the critical control point and time of holding and temperatures are monitored; verification is by measuring temperatures.

In markets in Taiwan, these foods were not always found to be at this high of temperature, and they were sometimes reheated in hot broth at the time of sale. Hence, reheating becomes a critical control point. Temperature of the broth and time of exposure are monitored.

**Steamed and fried rice:** Rice reached temperatures that exceeded 93°C (200°F) during steaming or boiling. Cooked rice held in steam tables was maintained at temperatures that should preclude growth of *Bacillus cereus*. Whenever cooked rice was kept at room temperature for a few hours, however, the temperatures became such that considerable growth of *B. cereus* could have occurred.

During investigations of outbreaks, counts of *B. cereus* are found in the millions to billions (18). Rice in layers less than 9 cm (3.5 in.) thick cooled rather rapidly; layers thicker than this, however, cooled slower. During frying and re-frying, temperatures exceeded 74°C (165°F). *Bacillus cereus* was frequently isolated from rice at various stages of preparation and storage and from storage pans, but in numbers fewer than 10<sup>3</sup> per gram. The  $a_w$  of cooked rice ranged from 0.91 to 0.98, the lower values were associated with prolonged storage without lids. Critical control points are hot holding and cooling. Temperatures and time of holding during hot holding and depth of the batch during cooling are monitored and verified. (For more information, see reference 6.)

**Peking duck:** To make Peking duck, frozen ducks were usually thawed at room temperature and remained there for several hours afterwards. When fresh ducks were used, they were also held in a similar fashion before cooking. During cooking or the subsequent interval of post-oven temperature rise, the interior of the meat attained temperatures that exceeded 94°C (201°F). Cooked ducks, however, were subjected to cross-contamination when they were chopped or cut up on the cutting boards. Cooked ducks were held for several hours at bacterial-incubation temperatures while they were on display in cabinets, on counters, or hung by windows. Leftover cooked ducks cooled rather rapidly during refrigerated storage. When they were reheated, their internal temperatures often did not rise to levels lethal to vegetative pathogenic bacteria. Water activity values of cooked duck were sometimes found to be below the optimal range to promote rapid bacterial growth; thus, the lag time would be extended but afterwards progressive bacterial growth would occur (25). Preparation (sugars added and frying) in regard to the final  $a_w$ , handling of the cooked product, time of holding, and cooling are critical control points and need to be monitored. (For more information, see reference 8.)

**Char siu:** Marinated strips of baked pork is known as *Char siu*, and sometimes called "Chinese barbecued pork". Temperatures attained at the geometric center during roasting or shortly thereafter were high enough to expect that vegetative forms of pathogenic foodborne bacteria and parasites, if present, would have been killed. This product is often displayed and stored similarly to ducks. Reheating of leftover pork was inadequate to destroy the pathogenic microorganisms that grew or toxins that were produced during storage, and they were subjected to the same type of contamination as they were earlier. Samples were contaminated by low numbers of *Clostridium perfringens*. The  $a_w$  of *char siu* was frequently at a level that would cause the bacterial lag phase to be prolonged and the rate of growth of pathogenic microorganisms to slow from the optimum. After a relatively long lag period, however, foodborne pathogenic and indicator microorganisms can multiply (25). Critical control points are the same as those for peking duck. (For more information, see reference 10.)

**Dim som.** *Dim som* items are filled with a thick, syrupy sauce and other ingredients and they are steamed and then

served (7). They have a rather low  $a_w$ , low enough to increase the lag phase and slow the growth rate of pathogenic bacteria; sometimes the  $a_w$  is low enough to prolong the bacterial lag phase or even prevent growth. Furthermore, these are usually served immediately after cooking. Hence, critical control points are formulation (reduction of water activity) and cooking. Verification is by checking  $a_w$  and time of steaming.

#### Japanese Foods

A number of outbreaks of foodborne diseases are reported in Japan each year (26). These are frequently attributed to seafoods that are frequently eaten raw.

**Sashimi.** Although sashimi is a common vehicle of foodborne pathogens in Japan, it is rarely implicated as a vehicle of foodborne illnesses (vibrios and parasites) in the United States. Cooling is the critical control point for the vibrios, hence cooling rates and temperatures are monitored. Inspection for evidence of parasites is another critical control point. (Thorough cooking can kill the parasites and vibrios, but the result is that the product is no longer sashimi.)

**Sushi.** Sushi is made by adding pieces of fish, vegetables, mushrooms, burdock root, or eggs to rice that has been flavored with dried bonito, salt and large quantities (approximately 25%) of vinegar; it is often rolled tightly and wrapped in black seaweed. The pH of sushi is usually below 4.5; thus, it is quite shelf stable. Hence, the critical control point is formulation (acidification) and quantity of vinegar is monitored; verification is done by checking pH of the product.

**Bento.** In Hawaii, *bento* (box lunches) have been responsible for sporadic outbreaks of foodborne illness. These consist of a variety of foods (e.g., steamed rice, sushi, teriyaki beef, breaded pork, fish, seafoods, chicken, and a custard) prepared in Japanese style. Usually these are cooked to high temperatures which would kill vegetative pathogenic bacteria. Oftentimes, meticulous care (e.g., employees wear disposable gloves, facial masks, and white coats and avoid direct handling of cooked products) is taken to avoid contamination in the catering operation. The various foods are arranged very attractively in boxes. After packaging, the meals are kept at room temperature in the catering establishment and while on display in stores. If these are not sold soon after they reach the store, spores can germinate and the resulting vegetative cells and those that reach the product after cooking (*Staphylococcus aureus* have been isolated) can multiply. The critical control point is holding time for the box lunches at ambient, nonrefrigerated temperatures. Either time at room temperature or the use of refrigerated storage is monitored.

#### Hawaiian- or South-Sea Island-Style Pig

*Kalau puaa* pig has been incriminated as a vehicle in a staphylococcal food poisoning in Hawaii and in a large outbreak of enteritis necroticans (pig-bel) caused by *C. perfringens* type C in New Guinea. It is prepared by putting

heated oval volcanic stones into the visceral cavity and slits along the legs, tying the cavities closed, and putting the pig in an *imu* (earthen pit). The pit is lined with a layer of shredded banana stumps and then with *ti* (*Corbyline*) leaves which were also put around the carcass. Banana leaves are used to cover the *ti* leaves, damp burlap is spread over these, and the pit is covered with earth.

The heat generated during several hours of cooking was that of steam; thus, the temperatures attained at the geometric center of the meat was such that vegetative pathogenic foodborne bacteria (but not spores) and parasites would have been inactivated. Observed procedures of hot-holding and reheating procedures were not hazardous, but holding at outside ambient temperatures contributed to the pig-bel outbreak (22). Leftovers cooled slowly during refrigeration. Critical control points are cooking and cooling. Temperatures of other evidence of doneness (e.g., evidence of no red color in the interior of the meat and cooked meat falling from bones are monitored after cooking. Depth of the batch being cooled is monitored and verified. (For more information, see reference 9.)

#### Greek Gyros

*Gyros* have on rare occasions been implicated as vehicles of small outbreaks of foodborne disease, particularly *C. perfringens* enteritis.

A *gyros* (*doner kebobs*, *donnairs*, *shawarma* or *souvlaki*) is a meat dish or sandwich of beef, lamb, both beef and lamb or chicken, and often seasoned with onions, garlic, and parsley. The meat is either ground or sliced, and molded or stacked, often to form a frustum. The moisture and fat content of the mass causes the particles to cohere, particularly when frozen and upon cooking. The weight varies, usually between 4.5- to 45-kg (10-to 100-lb). The frustum-shaped mass is impaled on a spit inserted along the vertical axis of symmetry. The spit is held vertically in an open broiler and rotates slowly as the *gyros* is heated. As slices of cooked meat are carved from the surface of the *gyros*, less-done surfaces are exposed which are in turn cooked more fully. The slices are usually characterized by a crusty exterior and a moist interior. They are frequently served as sandwiches in *pita* (bread) with a garnish of onions, parsley, lettuce and/or tomato and with a dressing of yogurt, sour cream or mustard.

During cooking, temperatures lethal to vegetative pathogenic bacteria attained on the surface of the meat and in the thin layer just below the surface, but nowhere else. Only meat sliced from the surface, however, was normally put in sandwiches or otherwise served. The temperatures of *gyros* as they cooled were such that bacterial growth could occur, both on the surfaces and within the mass. After *gyros* had been cooked and cooled, as many as 100,000 *C. perfringens* per gram have been recovered from samples taken just under the surface. Temperatures of *gyros* meat during reheating varied with the method of reheating, and they were in safe ranges when slices of meat were reheated in microwave ovens and steam chambers. When

*gyros* were reheated on broilers, however, temperatures lethal to vegetative pathogenic bacteria occurred at and near the surfaces only. Cooking, cooling portions not sold on the day of initial cooking and reheating of these are critical control points. Monitoring is for signs of doneness of portions served and of the size of portions being cooled which should be less than 10 cm (4 inches) unless some extraordinary method of cooling is used. (For more information, see references 1, 5, 19, 28.)

#### Mexican-Style Foods

In the United States, Mexican-style foods are frequently implicated as vehicles in outbreaks of food-borne diseases. No doubt, they serve as vehicles of pathogens elsewhere where similar foods are prepared in a similar manner. Furthermore, diarrhea is commonly acquired by tourists while visiting Mexico.

Foods cooked in Mexican-style restaurants, with few exceptions (e.g., occasionally meats), usually reached temperatures that would have inactivated vegetative forms of foodborne pathogenic bacteria. Foods were usually maintained at satisfactorily-high temperatures during hot holding, except surfaces and regions just below the surface of uncovered foods were frequently below 60°C (140°F). The foods, particularly beans, when put in 5-gallon plastic containers, in pans with lids, or pans stored one on the other in refrigerators cooled slowly. The most rapid cooling was when beans were spread out in a long wide pan (10 x 18 x 4 inch). Cooling without lids, in freezers, or in pans on top of pans which were filled with ice led to more rapid cooling than when stored in pans with lids in refrigerators.

During reheating, products often failed to reach 74°C (165°F). Mexican-style or Spanish rice is sometimes heated in hot oil prior to subsequent cooking. The high temperatures (often 177°C/350°F) of the oil are likely to inactivate more spores than steaming at 100°C (212°F). Furthermore, tomato or tomato sauce is frequently added which lowers pH of the mixture. Cooling and reheating are always critical control points for beans, rice and ground and shredded meat. Monitoring and verification during cooling are observations of the depth of the batch and at the termination of reheating is measuring internal temperatures. Hand contact during preparation and serving is also a hazard and control is to avoid this by using disposable gloves or utensils; monitoring is done by observing these operations. (For more information, see reference 4.)

#### Egyptian Foods

A variety of vegetables, fruits and cereals are grown in the Nile delta. Cattle, buffalos, sheep, goats, and camels and all sorts of poultry and pigeons are eaten. A variety of fish are caught in Nile and the seas. Beans, rice, and white cheese are quite popular with the poorer people.

**Rice:** Although the Egyptian foods were not studied by conducting hazard analysis, some related observations were made. For example, rice that was prepared in Egyptian

hotels, restaurants, and small food shops and by street vendors had lower mesophilic aerobic colony counts and lower level of contamination of *B. cereus* when held at temperatures above 54.4°C (130°F). These counts became higher (often >10<sup>6</sup>) and a higher percentage of samples had elevated *B. cereus* counts when samples were kept at ambient temperature, particularly between 25-35°C/77-95°F) long enough for the product temperatures to fall within this bacterial incubation range. Time of holding was indicated by product temperature which decreased with increased storage time until the rice reached ambient temperature. Counts increased as the temperature dropped and while being held because rice was never refrigerated. An inverse correlation was seen between temperature at the time of sampling that indicated the duration of holding and aerobic mesophilic colony counts. Rice was more frequently stored at safe temperatures (>55°C/>130°F) in four- and five-star hotels, which had and used facilities for hot holding, than in any other type of establishment or that which was sold by street vendors. The critical control point is holding. (For more information, see references 16, 17.)

**Raw vegetables:** Raw vegetables and salads made by them were occasionally (3%) found to be contaminated with either *Salmonella* or *Shigella*. Aerobic mesophilic colony counts did not differ greatly in any type of facility; they were usually >10<sup>6</sup>. Critical control points are washing, freshening and handling. Monitoring is by observation; verification is extremely difficult. (For more information, see reference 24.)

#### Peruvian Foods

Chinese foods are quite popular in Lima, Peru. So are beef hearts and *cebiche*. Beef hearts are usually grilled on a skewer and served promptly afterwards. *Cebiche* consists of a variety of seafoods marinated in lime juice. Acidification and time of marination are critical for safety.

Within Peru there are three major climatic regions, the coastal desert, the Andes mountains and the jungle. Quite different ethnic groups dwell in each of these regions.

**Food preparation in new settlements at the outskirts of Lima:** Lima is in the coastal desert, and the settlements of concrete block or woven-mat houses (with neither running water nor water-carried sewage) were on rocky, dusty hillsides. Cooking was done on either gas or kerosene stoves. All foods (including soya cereal, milk formula, rice, soups, mashed potatoes, cow's foot soup, beans, and a mixture of beans and rice) that were examined were cooked to temperatures exceeding 75°C (167°F); they were usually boiled. The temperatures attained were high enough to inactivate vegetative forms of foodborne pathogens, but not their spores. During the interval between cooking in the morning and serving both for lunch and supper, foods were held either on unheated ranges or in unheated ovens. This interval was long enough to permit some bacterial multiplication, but apparently not to massive quantities. Just prior to the evening meal, foods were reheated to temperatures that usually exceed 70°C (121°F). Rice, however,

was either served cold or if reheated, the center temperature rose a few degrees only. Critical control points are cooking, holding after cooking, and reheating. (For more information, see reference 12.)

**Food Prepared in an Andean Indian pueblo in the Andes:** Potato-cereal soup was the primary food that was prepared in the households surveyed. Cooking was on mud stoves with dried dung as fuel. Soup boiled during cooking, and most of it was eaten promptly afterwards. Vegetative forms or pathogenic bacteria would have been killed during cooking, but heat-resistant spores would have survived. Leftovers, when there were any, remained without heat on the clay stoves on which they had been cooked until either eaten, or on rare occasions, reheated. This interval would have allowed germination of spores but minimal bacterial multiplication; longer holding periods would be hazardous because spores of *B. cereus* would germinate and multiply.

In a nearby city, a housewife also prepared potato-cereal soup and kidney stew. These boiled during cooking on a small kerosene stove. Afterwards, cooked items were moved from the stove to an earthen floor and kept there until reheated. Just prior to serving, these cooled more rapidly than those left on the earthen stoves. Critical control points are cooking, holding and reheating. (For more information, see reference 13.)

**Food prepared in households along the Amazon River and in a River city:** All foods (including rice, plantains, yuca, dried fish, fresh fish, beef and chicken) prepared during the survey attained temperatures of at least 93.9°C (210°F) during cooking: they usually boiled. Such time-temperature exposure would inactivate vegetative forms of foodborne pathogenic bacteria, but not heat-resistant spores. When cooked foods were leftover, they were kept either on tables or on the unheated stoves or grills on which they were cooked. During this interval (at the prevailing ambient temperature and high humidity of the jungle region) conditions were such that considerable microbial growth could occur. Time of exposure, however, limited counts to the 10<sup>5</sup> - 10<sup>6</sup> level. In the evening, foods were only mildly reheated, if reheated at all, so temperatures were not attained in the center regions of the food that would have inactivated microorganisms that had multiplied or toxins that were elaborated during the holding period. Critical control points are cooking, holding, and possibly reheating, if done. (For more information, see reference 20.)

#### Dominican Foods

**Home-prepared foods:** During observations of preparation of foods in homes, all foods (including milk formula, soup, chicken stew, tripe stew, rice, beans and moro -- a mixture of rice and beans) attained internal temperatures of or near to boiling. Cooking was done on either gas or charcoal stoves. Those not eaten promptly were held at ambient room, or occasionally at outside temperatures (seldom any different) until a family member returned home,

until taken to the field and eaten by farmhands, or until a subsequent meal. During these intervals, microorganisms multiplied and mesophilic aerobic organisms increased, often reaching 10<sup>9</sup> before consumption. None of the foods were reheated before eating. Infant formulae or milk and corn starch preparations were prepared in the morning in sufficient quantities to last for all feedings throughout the day. By the last feeding, mesophilic aerobic colony counts were usually around 10<sup>9</sup>. These formulae and milk preparations supplemented breast feeding.

In one household having an infant with salmonellosis, *Salmonella agona* was isolated from stools of the infant, the mother, the grandmother, a knife, a blender, a spice (malagueta) ball, flies that had access to soiled diapers, and a mop which was used throughout the house and entrance where washing was done. In another household, a sample of moro (a mixture of beans and rice) that was leftover and saved until a family returned home had a *B. cereus* count of 1.5x10<sup>6</sup>. In another household, reconstituted milk leftover from the day before had a *Staphylococcus aureus* count of 2.5x10<sup>5</sup> and an *Escherichia coli* count of 1.1x10<sup>6</sup>. Other samples of milk and tea given to babies and an ice cream bar had *E. coli* counts that exceeded 10<sup>6</sup>. Critical control points are cooking, holding after cooking, and washing baby bottles and nipples and other containers and dippers. (For more information, see reference 21.)

**Street vended foods:** Two types of street-vendor prepared foods were evaluated: (a) Cooked foods (e.g., rice, chicken, meat, beans and mixtures of these) prepared for lunch; (b) Deep-oil fried foods (e.g., fish, chicken, yuca) prepared in the early morning and as required depending on sales throughout the day and displayed throughout the day until sold or, if not, kept overnight and reheated the next morning. In the latter category, foods that were not sold were either locked in the bottom of the stand or taken home to be returned in the morning.

Foods that were prepared for serving at lunch were cooked and served promptly afterwards. They usually had a low aerobic mesophilic colony count; time did not permit growth. A sanoke of meat for some undetected reason (perhaps contamination by serving implements) had a high count. So did beans which had been soaked and then cooked the day before in the vendor's home and held overnight at ambient temperature before reheating at the stand.

Foods that were fried were held on display for as long as 18 hours on the day of initial preparation; if they were not sold, they were held for many more hours the day after. Mesophilic aerobic colony counts were low after cooking, but increased with time of display, and microbial counts of many items reached 10<sup>9</sup> by the end of the day or the next morning. The microbial counts were often 10<sup>5</sup> after reheating. Critical control points are cooking and holding after cooking. (For more information, see reference 14.)

#### Foods Prepared in a Rice-Farming Village

Foods were thoroughly cooked, but those that were not eaten promptly were held at ambient room or outside

temperature until the next meal or sometimes overnight. During the interval of holding considerable mesophilic aerobic growth occurred. Usually, the increase was  $10^5$  after a 5-6 hour hold and  $10^7$  or more after a 12 hour or longer hold, unless the foods were acidified (e.g., *nam prik*, which is made of shrimp paste and acidified by either tamarind juice, lime juice or green [sour] mango). If acidified, microbial counts were rather stable. Thus, the resulting microbial counts are a function of temperature, pH and  $a_w$ . Formulation (amount of highly-acid ingredients added) is the critical control point.

Leftover rice which was reheated by putting it on top of a recently cooked batch of rice did not attain a temperature high enough to significantly reduce the microbial count that generated during the interval of holding at room or outside temperature which were usually the same. The critical control point is holding after cooking. (For more information, see reference 11.)

### Measures to Counter the Problem

Upon recollection of the many foods that were the subject of this review, hazards and principles for their prevention and control do not differ greatly whether they are applied to "good ol' home cooking", cuisine from the most exclusive restaurant in town, or so called "ethnic" foods from the small neighborhood cafe or from a street vendor. Hazards vary from the organisms that are likely to reach the foods of concern, facilities for processing and preparing the foods, economic resources, and education and training of the persons processing, preparing, or otherwise handling or storing the foods.

There are several situations along the food chain that subject foods to contamination. In any process or preparation, there are certain operations (critical control points) at which implementation of control measures will ensure a high degree of food safety. (A chart showing typical hazards, severity, critical control points and monitoring are given in reference 3.)

Receiving incoming foods may be a critical control point, but for practical reasons, monitoring is often limited to obtaining foods from safe sources or observing signs of decomposition or state of being frozen. For more foods, however, little can be done at receiving; they are usually accepted and the contaminants that they harbor must be dealt with during subsequent preparation.

Formulation of foods in which sufficient quantity of high-acid ingredients are added is a critical control point for acidified foods. Amount of high-acid ingredients, thorough mixing and time for marination can be "monitored", and "verification" can be done by tasting the characteristic sourness of the product.

Hence, cooking is a critical control point for most of these foods. To be effective in attaining its microbiologic goals -- to kill parasites, viruses and vegetative forms of pathogenic bacteria that are initially present in the foods, that come from ingredients, or that are implanted during preparation -- the food temperature exposures must be

sufficiently high for a sufficiently long interval. For moist foods a temperature of 74°C (165°F) will inactivate large numbers of these microorganisms. Temperatures greater than 55°C (131°F) can produce lethal effects if the exposure is long enough.

Handling foods after cooking is a critical control point. Touching cooked foods is a commonly identified factor that leads to outbreaks of staphylococcal food poisoning, shigellosis, septic sore throat, hepatitis A, and Norwalk gastroenteritis. This is particularly so if the contaminants are bacteria and the foods are to be held subsequently. Handling must be such that pathogens are not acquired from bare hands of workers or from unclean surfaces of equipment that have previously handled raw foods of animal origin.

Hot holding of recently cooked foods is a critical control point. Foods that are not held hot (i.e. above maximum limits for multiplication of pathogenic bacteria) are often near optimal temperatures for microbial growth. Foods should be either not held long or held at temperatures higher than those at which spores of foodborne pathogens germinate or vegetative cells multiply. A temperature greater than 55°C (131°F) should suffice.

Cooling is a critical control point. Allowing foods to remain at either room or outside temperature for several hours is the most frequently occurring factor that contributes to foodborne illness (2, 15, 23, 27). Storing foods in large pots and other large containers in refrigerators is also a major contributory factor. The easiest solution is to eat foods promptly after cooking. If foods must be prepared ahead of serving, they should be cooled rapidly and stored in shallow containers in refrigerators. The latter two solutions, however, are only applicable if cooling facilities are available and within the economic resources of the preparer or recipient of the foods.

Reheating, when done, is another critical control point and often the last line of defense. As with cooking, time-temperature exposures need to be sufficient to inactivate large numbers of infectious microorganisms or heat-labile toxins. If there has been time-temperature abuse during storage, larger quantities of pathogens will often have to be inactivated than will be during the initial cooking. Heat-stable toxins, however, will not be inactivated and prevention rests with preventing their formation by either eating foods before the toxins are formed or by cooling foods or holding them at temperature above or below which they are formed.

A strategy to implement these actions is to first alert and train health officials (e.g., epidemiologists, food microbiologists, sanitarians, and nutritionists) so that they can focus attention on ethnic food-preparation practices that are hazardous. As hazards are identified by either epidemiologic investigations, hazard analyses or scientific studies (or hypothesis of likely hazards confirmed and probability of occurrence determined), preventive measures that are practical under prevailing circumstances must be chosen, if available, or, if not, devised. Food safety activities must concentrate on informing those who handle, prepare, process, and store the ethnic foods of concern and those who

supervise them about the specific hazards and means by which control can be applied at critical control points of processing and preparation operations.

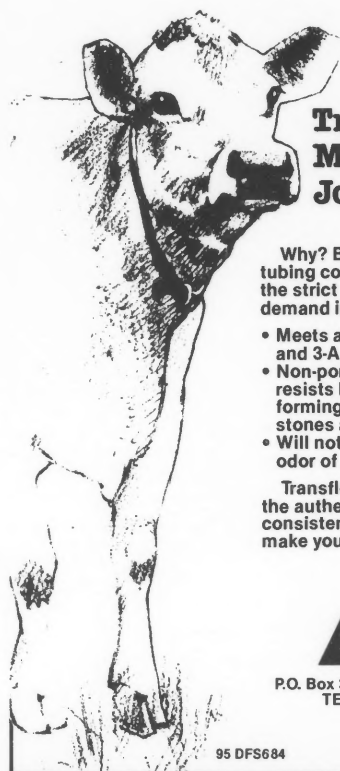
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DAIRY AND FOOD SANITATION/DECEMBER 1988 661

## Invisible Villains

### Tiny Microbes Are Biggest Food Hazard

by  
Marian Segal

**\*Summer 1982:** An outbreak of food poisoning affecting as many as 17,000 people in several states is linked to contaminated milk produced in Memphis. The villain - *Yersinia enterocolitica*.

**\*Spring 1985:** Contaminated milk from a suburban Chicago dairy causes 16,284 confirmed - and possibly as many as 200,000 - cases of food poisoning in six Midwest states. The tainted milk was most likely responsible for two deaths and may have been related to 12 others. The culprit - *Salmonella typhimurium*.

**\*Summer 1985:** In Southern California, the largest number of food poisoning deaths recorded in recent U.S. history is traced to Mexican-style soft cheese. Of the 142 reported cases, there were 47 deaths, including 19 stillbirths and 10 infant deaths. The killer - *Listeria monocytogenes*.

The villains with the long and eminently forgettable names in these food poisoning outbreaks are bacteria; they are but three of the many varieties of microorganisms responsible for tens of millions of cases of food-borne diarrheal disease in the United States each year. The cost to the nation, based on direct medical expenses, lost wages and productivity, and industry loss through recall, embargo and destruction of tainted food products, is estimated at \$1 billion to \$10 billion annually.

The problem of food poisoning has grown in recent years for several reasons. Better detection methods have enabled scientists to identify a host of pathogens (disease-causing microbes) not previously associated with food-borne disease. For example, many bacteria now being seen in the food supply are associated with disease outbreaks that in the past were considered of unknown origin. Also, some viruses associated with intestinal disease are now known to be transmitted through contaminated food.

The centralization of the food industry also has influenced the magnitude of food-borne illness outbreaks. Douglas Archer, Ph.D., director of the division of microbiology in FDA's Center for Food Safety and Applied Nutrition, points to the Chicago *Salmonella* outbreaks as an example: "Years ago, when outbreaks occurred, only the people in the local market area were affected. But small local factories are being replaced by large plants marketing their products to millions of people. When there is a contamination problem in one of these plants,

such as occurred in the Hillfarm Dairy outside Chicago, you can expect to have thousands of cases of food poisoning."

Food poisoning is not always just a brief - albeit harrowing - episode of Montezuma's revenge. In some people - particularly children, the elderly, alcoholics, and people with underlying health problems such as weakened immunity - diarrhea caused by certain food-borne "bugs" can be protracted and lead to rheumatic diseases, food allergies, seizures, chronic diarrhea, blood poisoning, or other ills. And some of these pathogens are much more deadly than others.

For example, although thousands of people became ill in the Chicago *Salmonella* outbreak, very few died, and those who did were people whose health had already been compromised because of advanced age, weakened immunity, or other reasons. *Listeria*, on the other hand, is much more lethal than *Salmonella* - one-fourth of the estimated 1,600 cases of listeriosis each year result in death.

Concerned about the growing number and severity of food-borne disease outbreaks in recent years. Food and Drug Administration Commissioner Frank E. Young, M.D., Ph.D., has placed microbial safety of foods among the agency's highest priorities.

One reason this issue is so critical is the increasing number of ready-to-eat foods imported into the United States each year. In the past, U.S. food imports were mostly raw product that were processed in this country under out strict sanitation standards. Now, however, imports of finished commodities, such as French cheeses and seafood from the Orient - some of them contaminated - are on the rise.

#### Import Monitoring Intensified

FDA's routine food sanitation inspections constitute the cornerstone of the agency's food safety checks. Through this surveillance program, consumer safety officers inspect imports at dockside, examine food processing plants for unsanitary conditions, investigate consumer complaints, and pursue other activities to help protect the safety of the food supply. Sometimes, when a particular commodity is known to be a problem, the agency will initiate a "special assignment" to monitor the product more stringently.

Such was the case following the devastating outbreak

of listeriosis in 1985. FDA intensified surveillance of imported and domestic dairy products, including cheeses, milk and ice cream, and instituted a dairy safety program in April 1986.

Industry and government may collaborate in preventing or correcting food safety problems. A prominent example was in the early 1970s when the private and public sectors joined to develop criteria for processing low-acid canned foods. This was prompted by FDA investigations of botulism illnesses and deaths traced to underprocessing of canned vichyssoise (cold potato soup) manufactured by Bon Vivant, Inc. As a result of the investigations, more than a million cans of food produced by the company under its own and private labels were removed from retailer's shelves. FDA regulations now require, among other things, that all commercial processors of low-acid canned foods (such as peas, corn, mushrooms, and so forth), as well as acidified foods, register their establishments with FDA and submit processing information (cooking times and temperatures, for example) for each product to the agency. They must also comply with the agency's good manufacturing practice regulations.

#### Research Essential

To be better able to prevent food poisoning outbreaks, Richard Ronk, acting director of FDA's Center for Food Safety and Applied Nutrition, emphasizes that more microbiology research is needed. For example, before the recent listeriosis outbreaks, little coordinated research had been done on the *Listeria* organism. Since then, FDA researchers have developed a culture method to detect the pathogen in dairy products. This method is now used in France and Great Britain, as well as in the United States and by the International Dairy Federation. Its use has led to several FDA programs in which commodities known or suspected of containing certain pathogens are singled out for increased sampling and analysis to prevent contaminated products from reaching retailers. FDA scientists have also developed a device called a gene probe that can determine not only the presence, but the amount, of *Listeria monocytogenes* in foods.

The center recently funded a contract to develop a gene probe to detect *Vibrio vulnificus*, a pathogen found in oysters, clams and crabs. Consumption of contaminated raw shellfish can cause diarrhea or worse. Some people with underlying diseases such as diabetes, cirrhosis or leukemia develop blood poisoning from *Vibrio vulnificus* infections, and more than half of these victims die. (See "Fewer Months 'R' Safe for Eating Raw Gulf Oysters" in the June 1988 *FDA Consumer*.)

Gene probes and other new technologies will be used to support disease prevention efforts such as the Pathogen Surveillance Sampling Program, begun in 1983. The program seeks to identify what foods have a high potential for contamination with certain pathogens, and thus a greater likelihood of causing food poisoning outbreaks.

#### Two Kinds of Troublemakers

Bacteria are not the only players in the food poisoning arena; some viruses also cause food-borne illness. In fact, viral gastroenteritis is second only to the common cold in reported causes of illness in the United States, and Norwalk viruses are responsible for about 30 percent to 40 percent of the cases (except among children from 6 to 24 months; human rotavirus is the most common viral cause of diarrhea in these children, accounting for about half the hospitalizations, worldwide, of children in that age group with diarrheal disease).

Norwalk infections usually cause mild illness with nausea, vomiting, diarrhea, malaise, abdominal pain, loss of appetite, headache, and fever. The virus is found in water and foods, with shellfish and salads most often implicated. An outbreak of gastroenteritis caused by a Norwalk-like virus occurred last September in Pennsylvania and Delaware, affecting perhaps as many as 5,000 people. The source of the trouble: contaminated ice. (See "Chill Factor: Floods, Football, and Tainted Ice" in the April 1988 *FDA Consumer*.)

The hepatitis A virus can be transmitted through foods, too, although this route accounts for only a small percentage of the total number of hepatitis A infections. Food-borne hepatitis occurs sporadically, most often due to unsanitary food handling in restaurants or fast food establishments. People have also become ill with hepatitis from eating raw or undercooked shellfish - oysters, clams, mussels and cockles - harvested from contaminated waters. Many hepatitis infections produce only mild, if any, symptoms. These include fever, nausea, abdominal pain, and loss of appetite.

#### Education Needed

The organisms that cause food poisoning occur naturally and are difficult to control. FDA's Archer stresses that sanitation is the key to preventing illness and that this message has to be reinforced continually to the public. "Consumers must be aware that not all the foods coming into their homes are pathogen-free, and they must practice sanitary food handling procedures in preparing these foods to avoid illness," says Archer. (See also "Mother Nature's Regulations on Food Safety" in the April 1988 *FDA Consumer* and "Summer Food Safety Tips" in the June 1987 *FDA Consumer*.) One major problem is cross-contamination of foods, caused, for example, by cutting up salad vegetables on the same cutting board used to prepare chicken. According to Dr. Gregory Parham, chief of the U.S. Department of Agriculture Food Safety and Inspection Service's epidemiology branch, about 35 percent to 40 percent of the marketed raw chickens are contaminated with *Salmonella*.

Improper handling of eggs or eating raw or undercooked eggs from farms in the northeastern United States has been associated with an increase in *Salmonella* illnesses in that region. According to Dr. Daniel Rodrigue

of the U.S. Centers for Disease Control, laboratory-confirmed cases of *Salmonella enteritidis* have increased nearly sixfold in the Northeast since 1976, and the South Atlantic region seems to be following suit, with a 110 percent rise in cases since 1984. Eggs from the Northeast are likely to contain *Salmonella* and therefore should not be eaten raw, either alone or as an ingredient in other foods, such as Caesar salad dressing.

Certainly some *Vibrio* infections could be avoided, too, if consumers were aware of the risks associated with eating raw shellfish. An article in the April 1988 *FDA Drug Bulletin* states that "Recent reports of illness and death attributable to *Vibrio vulnificus* infection following the ingestion of raw oysters again emphasize the importance of warning certain high-risk patients against eating raw or lightly (partially) cooked seafood." High-risk patients are defined as those with liver conditions, people with low gastric (stomach) acid, and people with weakened immune systems. FDA and the Interstate Shellfish Sanitation Conference are planning to study the effects of the seafood industry's handling practices on *Vibrio* infection. However, the *Drug Bulletin* points out that "there are presently no known sanitation or other public health controls that can limit the harvesting of shellfish to those free of

*V. vulnificus* or control the presence of the organism in raw shellfish."

The emergence of modified atmosphere packaging, in which foods are packed with certain gases and then kept refrigerated, has created a need to educate consumers in the safe handling of these products as well. The concern over pathogens that survive refrigeration is justified by some recent surveys of contamination of raw meats. Robert Buchanan, Ph.D., a researcher in USDA's Agriculture Research Services in Philadelphia, reported at a May meeting of the American Society for Microbiology in Miami Beach that 11 of 21 (52 percent) fresh meat products sampled from four Philadelphia supermarkets tested positive for *Listeria*. Although the sample is small, recent surveys of meat in France show similar results.

There is precious little that consumers can do about some incidents of food poisoning, such as the recent large outbreaks of salmonellosis in the Midwest and listeriosis in Southern California. But there is much they can do to protect against these food-borne pathogens once food is in their homes. Proper techniques of food preparation and handling just might prevent a bout with diarrhea, or even save a life.

(Reprinted from *FDA Consumer*/July-August 1988.)

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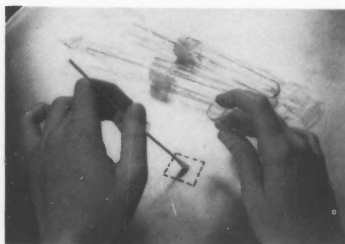
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## A Golden Anniversary of Consumer Protection

by

**Frank E. Young, M.D., Ph.D.**  
*Commissioner of Food and Drugs*

Fifty years ago, President Franklin Roosevelt signed into law the Federal Food, Drug and Cosmetic Act of 1938. Why commemorate the passage of a bill enacted half a century ago? Because I can think of no law with more practical benefits in our daily lives than the "FD&C Act." This law gave FDA the responsibility for ensuring the safety of products commanding a quarter of every dollar we consumers spend. So this is, indeed, an appropriate occasion to reflect on how important the FD&C Act is to all of us.

Today, we take for granted the protections that law provides. Consider how vulnerable consumers were before 1938. Before the FD&C Act, FDA's main legal weapon was the Food and Drugs Act of 1906, also known as the Wiley Act, in honor of the man who was so instrumental in its passage, Dr. Harvey W. Wiley, the "father of FDA." Unfortunately, it had been watered down by compromises, amendments and adverse court rulings, and it could only be weakly enforced by an inadequate staff. Public unawareness of the law's weakness made matters worse. In 1929, Dr. Wiley himself lamented that "no one takes much interest in the Food and Drugs Act...it is regarded as established and in perfect operation. This is a great mistake."

Despite such warnings, consumers in the 1930s, who assumed that they were well protected, were eating apples sprayed with a pesticide that contained high levels of arsenic. They sought to lose weight with Marmola, a product containing enough desiccated thyroid to create serious health problems, but which couldn't be regulated as a medicine; because obesity wasn't considered an illness in the 1930s, the 1906 law didn't apply. They brushed on untested cosmetics, including an eyelash dye that caused one death and at least 18 cases of permanent blindness by corroding users' eyeballs. And they drank radium waters in the futile hope of curing their cancers.

Time had shown the need for consumer protection that really lived up to popular assumptions. Yet to bring forth a law suited to modern conditions it took the Elixir Sulfanilamide tragedy of 1937 - in which a new liquid form of the drug sulfanilamide that had been tested for

flavor, appearance and color, but not for safety, killed over 100 people.

The Food, Drug, and Cosmetic Act had remarkable effects. New drugs could not be marketed until testing had established their safety. False or misleading statements on drug labels were now illegal, and the government no longer had to prove their fraudulent intent to take legal action. Warnings of the potential hazards of drugs were required, while drugs that were dangerous (even when taken according to directions) could be banned outright. The common names of all active ingredients were put on the labels of over-the-counter drugs, as well as the amount of potent, addictive or hypnotic ingredients. Antiseptics had to be strong enough to actually kill germs. And, for the first time, medical devices were included in FDA's authority, as were cosmetics.

Foods, drugs and cosmetics were outlawed if made or stored in unsanitary facilities. To enforce these measures, FDA could seek court injunctions for more timely and efficient responses to public health threats. In addition to seizure of their products, violators risked greater likelihood of criminal penalties.

Yet the most critical advantage in the 1938 law may have been its more positive emphasis, which shifted from mainly punitive measures to hazard prevention. By providing for pre-market approval of new products and other safety measures, the new law sought to prevent injury and deception rather than just punishing purveyors of unsafe products after the damage had been done.

No one could have known in 1938 how important these new protections would turn out to be in dealing with fundamental changes in food and medicine following World War II. The law came just at the advent of sulfa drugs and penicillin, revolutionary products that could actually cure diseases rather than just ease symptoms. After the war, wider marketing of these medicines and other breakthroughs made FDA's new responsibilities more demanding than ever. The two decades after the passage of the law were so productive in medicine, in fact, that they are often characterized as a "therapeutic revolution."

The shift in food distribution from the corner grocery

to the supermarket was accompanied by many changes in food processing and a wealth of new products for FDA to oversee: Where the typical grocery in 1941 stocked 1,500 items, some stores today carry up to 39,000. Medicated animal feeds were appearing on the farm, with clear implications for human health.

The 1938 FD&C Act equipped FDA to meet these challenges. It also served as the basis for later laws and regulations to deal with emerging public health concerns.

In 1955, a special citizen's advisory commission recommended to the Secretary of Health, Education, and Welfare a massive expansion of FDA resources so it could keep up with its growing responsibilities in a time of rapid technological development. In consequence, between 1955 and 1980 FDA increased its staff from under 1,000 to almost 8,000 employees and its budget from \$5 million to \$320 million. It turned out to be money well spent.

The lasting significance of the 1938 act, however, may be as the basis of a new national consensus on the federal government's role in consumer protection. It was not always so. Once, industry invariably fought any attempt to regulate its practices, Dr. Wiley battled for a quarter of a century to secure passage of the 1906 Food and Drugs Act; for years, he recalled, such legislation proposed in Congress had been "killed promptly, usually amid laughter and ridicule." It often took a catastrophe, like the deaths of 10 St. Louis children from contaminated vaccine, to spark needed consumer protection legislation like the Biologics Act of 1902.

Passage of the 1938 FD&C Act took five years of furious conflict and the deaths of over 100 people in the Elixir Sulfanilamide tragedy. A terrible price to pay, but there's no doubt today that the 1938 law has dramatically improved the consumer climate in this country. Although later refinements of food and drug laws were not all free from conflict, their passage did reflect a greater spirit of responsibility and cooperation among government, industry, the health professions, and the people. Far from the pitched battles of 1906 and 1938, more recent legislation has demonstrated constructive bipartisan problem solving. Achievements like the 1976 Medical Device Amendments are among the triumphs of the national consensus to protect the public health that the 1938 law inspired.

Now we are on the crest of a new wave of changes even more basic than those the FD&C Act posed for us in the 1940s and 1950s. Implantable medical devices like pacemakers and drug pumps, artificial hearts and other man-made organs, magnetic resonance imagers - devices few could have dreamed of in 1938 - are just the first generation of increasingly sophisticated wonders before us. Wholly new antibiotics that minimize the risk of bacterial resistance are also being developed.

Perhaps of greatest significance, however, is the advent of genetic engineering - "the new biotechnology" - which has already produced such diverse wonders as synthetic human growth hormone, test kits to detect antibodies to the virus associated with AIDS, and a monoclonal antibody to prevent kidney transplant rejection; more are on the way. Biotechnology also presents magnificent opportunities for the food supply. An FDA advisory panel of experts from industry, government and academia foresees no fewer than 1,208 specific applications of biotechnology to food growth, safety and preparation. Over half are already feasible. FDA must prepare its scientific staff and facilities to evaluate these products as they become ready for the market.

As in 1938, FDA in 1988 is at another watershed of challenge and opportunity. Fortunately, the consensus formed in earlier years makes it possible to move forward with confidence, not goaded by disaster, but beckoned by the great promise of the future.

(Reprinted from June 1988/FDA Consumer.)

## *Authors Wanted*

Dairy and Food Sanitation is looking for individuals interested in writing articles for our journal. If you are interested, please contact IAMFES for more information,  
P.O. Box 701  
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## Hand Wash Procedures to Reduce Foodborne Illnesses

Government statistics show that 25 percent of all foodborne illnesses are due to improper hand washing by foodservice employees. By having all employees use correct hand washing procedures 100 percent of the time an establishment can save much money through avoidance of medical charges, lost wages, lost business, lawyers' fees, and legal claims.

Lower level pathogens, contacted by blowing the nose, handling different raw foods, touching dirty objects, touching the hair on the face or head, or smoking, are found all over the hands. These pathogens require the single wash method to rid the hands of them.

High level pathogens such as are found in feces, vomit, blood, or other body fluids often get onto the fingertips and under the fingernails after using the toilet, picking at pimples or lesions on the skin, or caring for another person. These organisms are dangerous -- more dangerous than the harmful organisms found on chicken. It is necessary to rid the hands and especially the highly contaminated fingertips of these organisms. The double wash method which utilizes a nail brush is used to do this.

In order for employees to learn how to wash their hands properly and to avoid accidentally transferring pathogens into food, HITM has prepared a video tape package called *Safe Hand Washing*. The video tape package is available now for \$44.95 (includes postage and handling).

Included in the *Safe Hand Washing* package is the video tape demonstrating correct hand washing procedure. Also in the package is a laminated hand washing poster depicting the correct procedure step by step and a fingernail brush so that implementation of safe hand washing can take place right away.

This package also includes other information. An Instructor's *Safe Hand Washing Technical Background Booklet* explains the origin of high and low level pathogens, gives specific examples of pathogenic contamination by foodservice employees, and explains the double and single wash methods in great detail.

A *Management Safe Hand Washing Implementation Sheet* gives hints on how to make safe hand washing a part of any organization.

A *Student Safe Hand Washing Lesson Sheet* provides definitions of key terms used in the presentation and a quiz to test employees' mastery of the

concepts explained in the Instructor's *Technical Background Booklet* and the video tape.

If you are concerned about preventing foodborne illnesses from coming out of your establishment, or if you would like to make this package available to members of the hospitality industry in your area, please contact: HITM, 760 Transfer Rd, St. Paul, MN 55114, 612/646-7077.

## New Directory of Nutrient Analysis Software

The latest edition of the *Nutrient Data Bank Directory* was published in June 1988 listing 112 software products. The monograph is a project of the Data Base Committee of the National Nutrient Data Bank Conference and was edited by Loretta W. Hoover, Ph.D., R.D. The Directory was prepared to facilitate communication between developers and users of nutrient data base systems. The information listed about each system includes the name and address of the system, the number of foods and number of nutrients included, the type of computer and program languages used, the source and characteristics of the data base, the characteristics of the software, and the availability of the system. The Directory also lists the specific proteins, fats, carbohydrates, vitamins, and minerals available on each system. The information included in the Directory reflects the responses of data base developers to a standardized questionnaire. The *Nutrient Data Bank Directory* (7th Edition, 1988) is available for \$15.00 (U.S.) from: Department of Human Nutrition, Foods and Food Systems Management; College of Home Economics; 217 Gwynn Hall, University of Missouri-Columbia, Columbia, MO 65211. Checks should be made payable to the University of Missouri.

## SAY WHAT? . . .

There are collective names for all sorts of things,  
A flock of birds on feathery wings,  
A pack of dogs, a gaggle of geese,  
A flock of sheep with coats of fleece.  
A throng of people, a flurry of snow,  
A whelp of foxes; all these things we know.  
But the question has risen; it's out in the light,  
What do we call roaches that crawl in the night?

A herd of roaches is not the right thing,  
And a welter of them lacks the proper type ring.  
A bouquet of roaches would never be right,  
And a bevy of them would be quite a sight.  
Now, I contend that roaches break out,  
In unsightly sightings until there's no doubt,  
They're all over the place, from cracks where they've  
crawled,  
So a "Rash of Roaches" is what they'll be called!

By Steve Stevenson  
Pest Controller and Poet Extraordinaire  
Presto-X, Ames, Iowa

### *Avoid Taking Food-Borne Illness To Work or School*

Along with a sandwich you could be packing the potential for food-borne illness in your brown bag lunch.

According to Marilyn Haggard, a food safety expert with the Texas Agricultural Extension Service, people often have a cavalier attitude about sack lunches.

"When they're at home, most people wouldn't eat a sandwich out of lunch meat that had been out on the kitchen counter for four hours, yet they'll take a meat sandwich to work in the morning and let it sit unrefrigerated until lunch time," she said.

Lack of refrigeration that allows bacteria to multiply rapidly in protein foods is the culprit in causing countless cases of upset stomach, diarrhea and other flu-like symptoms associated with food-borne illnesses.

Of the typical brown bag lunch fare, tuna, egg and chicken salads, lunch meats and leftovers are most likely to cause problems, according to the specialist.

"Contrary to popular opinion, it's not the mayonnaise in sandwiches that spoils. In fact, mayonnaise offers some protection against bacteria because it contains vinegar," she said. "It's the meat, poultry, fish or eggs in which bacteria multiply rapidly at room temperature.

"Leftovers like a meatloaf sandwich or macaroni and cheese can also be a problem because they consist of food that has previously been handled, so more bacteria have been introduced," she said.

When no refrigeration is available at school or work, Haggard suggests freezing sandwiches. Use a coarse-textured bread and lightly spread it with margarine so the sandwich won't get soggy. Pack the lettuce, tomato or other add-ons separately then add them at lunch.

If you don't freeze the sandwich, add an ice-pack to the lunch. They're available in stores or you can make one by freezing water in a small margarine tub.

Or you can freeze a foil pouch or wax-paper carton of fruit juice to serve as both a cold drink and an ice pack.

Adult brown-baggers usually have more options since offices frequently contain vending machines, refrigerators and microwave ovens.

"Beef stew, chicken soup, spaghetti and other canned foods from vending machines will be safe to eat, as long as the cans aren't rusted, dented or bulging," Haggard said.

"Cold perishables from machines, however, require more judgment. Refrigerated sandwiches should feel cold. The use-by date will tell you if it's stale and you should always throw away any food that has an off-odor."

"The no-refrigeration retort packages for food are just as safe as cans. They're vacuum packed and cooked like canned goods," she said. "But don't even taste food from a leaky or bulging pouch."

"If you bring leftovers from home, keep them refrigerated and then thoroughly heat in the office microwave," said the specialist.

For more information, contact: Marilyn Haggard, 409/845-0863.

### *Shellfish Institute Annual Convention Announced*

In a joint announcement Ted Blount and Jack Amason, Presidents of the Shellfish Institute of North America (SINA) and the National Blue Crab Industry Association (NBCIA) respectively, have set the dates and location for their next combined convention. The convention is scheduled for February 26-March 1, 1989 at the Inter-Continental Hilton Head Hotel, Hilton Head, SC. The convention will open with Board of Director meetings and a President's Reception on Sunday, February 26. Combined and concurrent sessions will be held Monday, February 27 through Noon, Wednesday, March 1. Agenda topics will cover the latest developments in research, regulation and business.

Both the NBCIA and SINA are subdivisions of the National Fisheries Institute.

For additional information about the program, contact SINA headquarters at 202/296-5170.



## *Over 300 Enrolled in Seafood Industry Self-Study Guide*

More than 300 individuals have enrolled in the seafood industry correspondence course entitled "The Seafood Industry - A Self Study Guide," sponsored cooperatively by NFI and Virginia Tech. The program is designed to educate seafood industry marketers, buyers, sellers, administrative personnel, as well as educators and the interested consumers. The multi-faceted correspondence course is divided into 25 different chapters covering such areas as the History of the Seafood Industry, Harvesting Techniques, Shellfish, Finfish, Processing, Packaging, Freezing, Aquaculture, Labeling, Selling, Transportation and several other areas.

The course was developed under the direction of Roy Martin, Vice President of Science and Technology at the National Fisheries Institute and Dr. George Flick, Professor of Food Science and Technology, Virginia Tech. The correspondence course is being administered by the Continuing Education Division at Virginia Tech. Continuing education credits (7.0 CEU's) will be awarded upon completion of the course.

Anyone involved in the distributing, buying, selling, processing, retailing and the food service sector would be interested in the materials. Administrative personnel should find the study guide a unique and valuable source of information. Experts from every major fisheries field have authored the sections to bring to the reader the most up-to-date seafood industry information available.

Upon receipt of a participants application and payment, the first two chapters will be sent to students. Each chapter has an accompanying test that must be satisfactorily completed before the next two chapters are sent. After the first three sets of chapters and accompanying tests are satisfactorily completed, the student will receive a three ring binder in which to organize the materials. The balance of the chapters will be sent to the student in sets of two.

The correspondence format of the course allows the student the opportunity to learn about the seafood industry at his/her own place. The cost of the complete program, which includes 25 chapters, three ring binder, continuing education units, and a "Certificate of Completion" after the course is satisfactorily completed, is \$125.00/\$150.00 for out of country airmail. The Donaldson Brown Center for Continuing Education at Virginia Tech will be the primary distribution center for the course.

The study guide provides an excellent opportunity for professionals and other interested persons to learn about the seafood industry.

For all information regarding the course contact: Adult Registrar, Donald Brown Center for Continuing Education, Virginia Tech, Blacksburg, VA 24061-0104.

## *D'Antoni Named President of Ashland Chemical Company; Senior Vice President of Ashland Oil*

David J. D'Antoni has been appointed president of Ashland Chemical Company and elected senior vice president of Ashland Oil, Inc., according to Charles J. Luellen, president of Ashland Oil.

D'Antoni succeeds Dr. J. A. "Fred" Brothers as Ashland Chemical president. Dr. Brothers was elected senior vice president and group operating officer of Ashland Oil in January with responsibility for Ashland Oil's chemical operations. D'Antoni will continue to report to Dr. Brothers.

He will remain at the Ashland Chemical headquarters in Dublin, Ohio, in his new position.

Ashland Chemical is one of the nation's leading distributors of industrial chemical products and is the largest distributor of thermoplastic resins. It also manufactures and markets a variety of specialty chemicals for use in a broad range of industries.

For further information contact: Roger Schrum, Ashland Oil, Inc. Comm. Dept., Ashland, KY 41114, 616/329-3333.

## *High Protein, Low Fat Poultry Products Fit Today's Diet*

Poultry products are nutritious, yet low in calories, fat and saturated fat when compared to other animal products.

"Poultry fits well into today's dietary needs and the emphasis on reduced consumption of total fat, saturated fat and caloric intake," said Dr. James H. Denton, poultry marketing specialist with the Texas Agricultural Extension Service. "At the same time, poultry offers appropriate levels of essential nutrients. By providing high protein levels with low caloric content, poultry products are excellent choices as nutrient dense foods."

Denton said that 1987 data from the USDA's Human Nutrition Information Service showed that poultry products provide a more desirable ratio of nutrients to fats than other animal products.

Each day the average person consumes 3,560 calories, of which animal products account for almost 36 percent, said Denton. Poultry products provide only 3.5 percent of these calories. Red meat provides 15.5 percent; milk and milk products, 10 percent; eggs, 1.6 percent; and fish and shellfish, 0.9 percent.

At the same time, animal products provide almost 57 percent of the total fat in daily diets. Poultry products account for only 5 percent of this total, with red meat accounting for 32.8 percent; milk and milk products, 20.5 percent, eggs, 2 percent; and fish and shellfish, 0.5 percent.

More than 75 percent of all saturated fatty acids consumed daily come from animal products. Poultry products contribute only 4 percent of this total while red meat accounts for about 33 percent; milk and milk products, 20.5 percent; eggs, 2 percent; and fish and shellfish, 0.5 percent.

"Despite much publicity to the contrary, poultry products continue to provide a greater share of many of the desirable nutrients than other animal products," said Denton.

According to the USDA data, poultry provided more than 11 percent of the 68.5 percent protein provided by animal products in daily diets, with red meat providing 27.6 percent; milk and milk products, 20.9 percent; eggs, 4 percent; and fish and shellfish, 4.6 percent.

"Poultry meat products account for about 25 percent of the total meat protein consumed per capita daily while providing only 17 percent of the calories, 14 percent of the fat and 11 percent of the saturated fat in animal products," Denton said.

"Not only are poultry products nutrient-dense dietary choices," he said, "but they are good tasting, versatile and inexpensive."

For more information, contact: Dr. James Denton 409/845-4319.

### *Future Food Labeling Gets Mixed Reviews From Experts*

Response is mixed to FDA's proposed ruling to allow health claims on food labels. While some experts argue that health claims will improve nutrition awareness, others argue it will cause consumer confusion.

Five prominent experts from government, academia and industry presented their perspectives on this controversial issue during the symposium "Health Claims: Concerns and Potential Impact on the Consumer and Food Industry," recently at the 1988 IFT (Institute of Food Technologists) Annual Meeting in New Orleans. The symposium was designed and sponsored by National Dairy Council's (NDC) Division of Nutrition Research.

Speaking from the government perspective on this issue was F. Edward Scarbrough, Ph.D., of the Food and Drug Administration (FDA). According to Scarbrough, the FDA received more than 600 responses to their invitation to comment on the FDA's proposed ruling to allow the use of explicit health claims on food labels. This proposal has generated more responses, addressing a number of fundamental health issues, than almost any other FDA proposed ruling, noted Scarbrough.

He summarized the reaction of each of the concerned groups to FDA's proposal as follows:

- Food Industry -- general support of proposal, but some reservations expressed;

- Consumer Advocacy Groups -- support the concept of health messages on food labels but believed the proposal needed more "enforcement teeth";

- Biomedical Professional Groups -- strongly oppose the use of food labels for health messages;

- Dietary Supplement Manufacturers -- strongly in favor of using food labels for such messages, but thought that FDA's proposal was too restrictive.

Based on an analysis of all comments received, FDA is drafting a final rule targeted for September, but said Scarbrough, "the timetable is difficult to predict."

For more information, contact: Lisa A. Coe, National Dairy Council, 6300 North River Rd., Rosemont, IL 60018, 312/696-1020.

### *Diet, Nutrition and Cancer Video Now Available*

No one claims that turning on your TV set can prevent cancer, but a new video from the American Institute for Cancer Research may help you learn some facts about diet and cancer which could mean reduced cancer risk for you and your family.

"Diet, Nutrition and Cancer" is an entertaining and informative half-hour video, now available for home viewing, which explains the relationship between our daily diets and cancer risk. Scientists now estimate that 40 to 60 percent of all cancers may be related to our diets, and that as many as one-third of cancer deaths could be prevented through simple dietary changes.

This video also provides basic information on the Dietary Guidelines to Lower Cancer Risk, recommended by the Institute, and includes tips on how to make easy-to-accomplish nutritional changes for lower cancer risk.

Copies of the video are now available directly from the Institute. The cost is \$10, which includes postage and handling. All proceeds benefit the Institute's national programs in cancer research and education.

To order a copy of this informative tape, available only in VHS format, send your name, address and a check for \$10, payable to "AICR," to the American Institute for Cancer Research, Health Video, Washington, D.C. 20069.

## **3-A Standards Provide Product Safety**

Americans can consume milk and other dairy products with the certainty that they are the safest and healthiest in the world.

That's because America's dairy industry, led by Dairy and Food Industries Supply Association, has taken the responsibility of coordinating the development of 3-A Sanitary Standards for equipment and 3-A Accepted Practices for systems used in processing dairy foods.

For more than half a century, this voluntary and self-regulated program, conducted in concert with state and federal regulators, has been helping to provide equipment manufacturers with clear standards for their products; processors with a means of assuring sanitary conditions; sanitarians with tools to make more sophisticated and consistent inspections; and consumers with priceless peace of mind.

The 3-A Sanitary Standards Committees are encouraging requests for new standards development for all dairy processing equipment including equipment for processing and handling non-Grade A dairy products - butter, cheese and frozen dessert equipment. Requests for new standards activity may be directed by letter to the 3-A Secretary. For more information contact: Dairy and Food Industries Supplies Association, Inc., 6245 Executive Blvd., Rockville, MD 20852-3938, 301/984-1444, FAX: 301/881-7832. To purchase a set of 3-A Sanitary Standards, contact the IAMFES office at PO Box 701, Ames, IA 50010, 515/232-6699, 800-525-5223, FAX: 515-232-4736. Attn: Scott.

## **Sulfamethazine Test Kit Introduced by SmithKline**

SmithKline Animal Health Products, manufacturer of the popular Penzyme Antibiotic Test, introduced its new SIGNAL test for Sulfamethazine to participants in this year's International Association of Milk, Food and Environmental Sanitarians (IAMFES) annual meeting, in Tampa. Nelson-Jameson, Inc., a leading supplier to the dairy industry, will distribute the test kit.

The kit was developed to address growing concern among regulators, food service organizations and consumers over recent detection of sulfamethazine in milk. The drug can cause an allergic reaction among a small, but undefined, portion of the population.

Tests were demonstrated by Nelson-Jameson at the Marschall Italian Cheese Seminar in Madison on Sep-

tember 14-15, the Wisconsin Laboratory Association Convention in Appleton on September 15-16, and the Wisconsin Cheesemaker's Convention in Milwaukee on November 2-3.

For more information about the SIGNAL Test for Sulfamethazine contact Nelson-Jameson, Inc., 2400 East Fifth St., Marshfield, WI 54449-0647, 1-800-472-8339 (Wisconsin), 1-800-826-8302 (Outside Wisconsin).

## **Emerging Issues in Food Science and Technology**

The second annual Southern California Food Industry Conference will be held on the campus of Chapman College in Orange, California on January 24-25, 1989. The theme for this year's conference will be "Emerging Issues in Food Science and Technology." Topics to be covered during this two-day conference include: Emerging Issues in Food Service, Seafood, Nutrition, New Ingredients, Food Engineering (microwave), Dairy Developments and Food Safety.

The registration fees are \$65 for the two-day attendance, and \$50 for one-day attendance if registration is prior to January 5, 1989. Registration for students and retirees is \$30 for two-day attendance. This fee includes lunches. A dinner has been scheduled for Tuesday evening and will be ticketed separately.

Reservations must be made in person or by mail. Phone-in reservations cannot be accepted.

If you are interested in receiving further information, please contact the committee at the following addresses: Southern California Food Industry Conference, Walt Clark, Chapman College, Food Science & Nutrition Dept., Orange, CA 92666, 714/997-6869 or Roger Clemens, Calreco, Inc., 8015 Van Nuys Blvd., Van Nuys, CA 91412, 818/376-4266. A detailed program, including specific topics and speakers, will be mailed to you within the next month.

## **In Memory of Art Knight**

The Ames Office has been notified of the following member who passed away in 1988. He will be greatly missed both in industry and the association. Art Knight of Indianapolis, IN.

## Finding and Preventing Listeria In Your Dairy Plant

Train the employees in your fluid milk, frozen dessert, or cheese plant how and why to prevent contamination of products with Listeria and other food poisoning bacteria. The 137 slide set, script, and 40 minute tape were developed by Sidney E. Barnard of Penn State University. More than 15 industry, regulatory and educational institution representatives reviewed the script. Photography was by professionals of the College of Agriculture, Agriculture Information Services. You will receive a cassette tape with 1,000 HZ for automatic slide changing, a written script and the 2" x 2" color slides of graphics and pictures. The slide set is directed to workers in dairy plants and has been shown at meetings in Pennsylvania, where participants found the how and why of great practical help. Use the slide/cassette tape at training meetings or on an individual basis. The information will help you train your plant personnel to meet federal and state regulations and avoid recalls or spoilage problems. Slides, cassette tape and script are available by sending a check or purchase order for \$150.00 payable to Sidney E. Barnard, 8 Borland Laboratory, University Park, PA 16802, 814/8630-3915.

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# Kansas City Class

(IAMFES Annual Meeting in 1989)

If you think of Kansas City as the classic American cowtown, it's time for a second look. That's the pleasant surprise that awaits newcomers every time a national convention or sporting event hits town (and many do). Expecting stockyards and grain elevators, visitors return to New York or San Francisco marveling that down-home Kansas City has a decidedly sophisticated air.

True enough, K.C. claims a rich frontier past populated with drovers and rustlers, cardsharps and madams. But long ago, outdoor cafes and misty fountains deposed the cattle pens; museums, theaters, and boutiques supplanted trading posts provisioning pioneers.

Around the turn of the century, a surge of civic pride sparked Kansas City's transformation. Colonel Tom Swope donated 2 square miles of winding woodlands for huge Swope Park, first of 125 green swaths that decorate the city. In 1911, Mary Atkins left a fortune for the Nelson-Atkins Museum of Art. Ten years later, businessman J. C. Nichols launched what became the nation's first shopping center, Spanish-style Country Club Plaza.

Straddling the Missouri River and spanning wooded hills in two states, sprawling Kansas City has blossomed with grace and style. Shimmering new downtown office towers nudge a classic 1930s art-deco skyline. South of downtown, not far from Hallmark Cards' innovative Crown Center development and Country Club Plaza, treelined boulevards meander past stately homes set in grand, old neighborhoods.

Not bad for a town that was almost christened Possum Trot.

## Thriving Cultural Scene

Once shunned, downtown Kansas City is making a cultural as well as commercial comeback, with several theaters located in a five-block district that's bounded by Main and Broadway.

These days, the Lyric Theatre, home of the symphony, opera, and ballet, pulses with as much energy as the city's legendary barbecue and blues shrines. Only five years ago, K.C.'s symphony orchestra had disbanded. Then, R. Crosby Kemper stepped in with a \$10-million endowment. Today, the symphony, led by the deft baton of conductor William McGlaughlin, draws crowds and raves. So does the opera, featuring classics like Mozart's *Don Giovanni* in English.

Folly Theater, a restored turn-of-the-century burlesque

house where Al Jolson strutted his stuff, hosts everything from theatrical shows to chamber-music concerts. National touring companies book dates at The Midland Center for Performing Arts, housed in a '20s movie palace sparkling with gold leaf.

"There's a real sense of excitement. The performing arts community is on a wave," observes James Assad, veteran stage actor and director of the city's intimate American Heartland Theatre.

The Heartland stars at the sprawling, \$500-million Crown Center complex of hotels and shops, halfway between downtown and Country Club Plaza. Crown Center's renowned American Restaurant is the perfect place to spend an evening over delicacies such as smoked quail and poached lobster.

A few miles south, the Nelson-Atkins Museum of Art rises like a massive Greek temple. This internationally known museum of the visual arts is the largest between Chicago and Tokyo.

Muraled walls tell the stories of pioneers who followed the Santa Fe, Oregon, and California trails west. Works from Monets to Warhols fill the museum's cool, granite halls and high-ceilinged chambers. The Oriental collection is acclaimed as one of the world's finest.

## A Spree at the Plaza

Nearby, life's little luxuries take the spotlight at Country Club Plaza, a 14-block enclave that's a Midwest version of Beverly Hills' Rodeo Drive. Spanish architecture--complete with filigree ironwork and red-tile rooftops--sets an elegant tone for 150 shops and stores, including Halls and Saks.

Plaza fountains, with their spewing gargoyles and rearing stallions, are the most celebrated in a city that boasts more fountains than Rome.

Dining in more than 30 restaurants matches the shopping diversity. Couples shed sports coats and high heels to join beer-garden chain dances at Emile's, while the Fedora's brass trim glitters like a beacon to the fine-dining set.

Browsing among restored buildings in the adjacent Westport shopping/dining district is as close as you'll get to the city's untamed past. Of course, a wagon-master monument still overlooks Country Club Plaza and a huge hereford bull statue tops a pedestal on 11th Street. But, for the most part, Kansas City has shed its beefsteak image and, culturally, has more than made up for lost time.

(Reprinted from October 1988 Midwest Living.)

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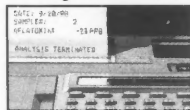
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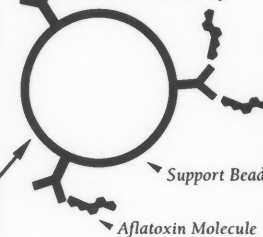
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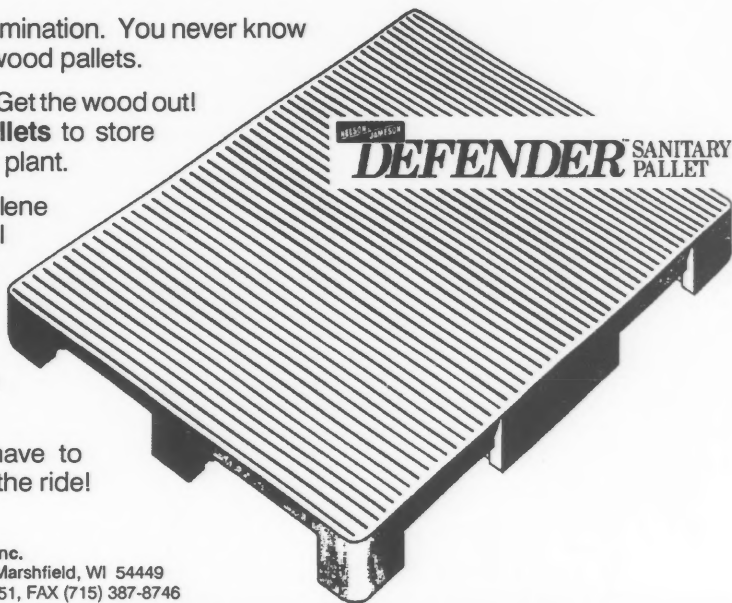
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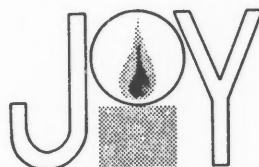
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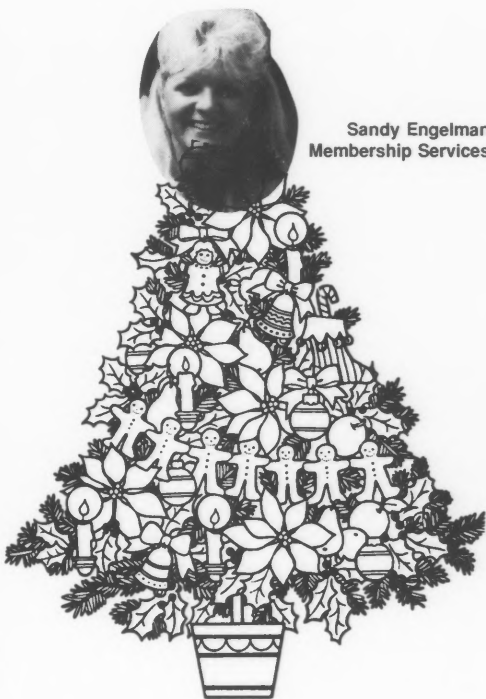
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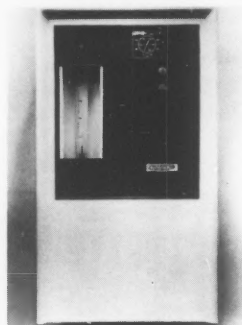
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## Industry's First Wall Mounted 10,000 lb. Capacity Chlorinator Cuts in Half the Space Required by Floor Units

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The 70C6600 and 70C7700 Series are available with Chloromatic™ automatic control valves, or they can be manually operated. The units are available with a variety of alarm contacts to warn operating personnel about non-standard conditions. Included are valve limit switches, low gas temperature, and high and low vacuum. They simplify monitoring and controlling of the chlorination process, even in the most complex operations. Several control module units may be linked for multipoint application of chlorine.

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\*Chloromatic™ valve which is step motor driven insures positive response to electric signals from water flow and/or chlorine residual measurement.

\*Integrated circuitry and single corrosion resistant electrical enclosure for increased life expectancy and reliability.

\*Vacuum operation provides additional protection for plant operators and equipment.

Fischer & Porter is a leading manufacturer of process control systems and instrumentation, flow measurement devices and chlorination equipment.

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## The New Compact HUMITEMP Indicating Instrument

• Monitor Relative Humidity (RH) and Temperature with the new, compact HUMITEMP, manufactured by Phys-Chem Scientific Corp., New York.

The instrument has been human engineered to provide highly visible RH and Temperature readouts over the units operating range of -5 to +75°C in an attractive package, combining light weight and durable, dependable electronics. Two large LED front panel meters provide accurate, "at a glance" RH and Temperature readings over the full scale of 10-100% RH and 0-100°C.

Users can service many plant locations where continuous monitoring is required or troubleshoot process problems with this portable, line powered, precision indicating instrument.

The compact HUMITEMP is compatible with the new series of quick-response sensing probes. The probes are available with varying cable lengths facilitating remote sensor placement in hard to reach locations or in duct, wall or chamber mounting configurations. Instrument calibration is not affected by probe cable length.

Back panel record output jacks provide on-line, linear signals of 0-10 V or 4-20 mA DC for interfacing with recording devices, dataloggers or computer systems. Each unit receives a full four-point chamber calibration using standards traceable to the National Bureau of Standards

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## Sanitary Process RTD's Meet 3-A Standards

• Weed Instrument Company, a Texas-based manufacturer of temperature instrumentation, introduces their Series 451 Sanitary RTD's (Resistance Temperature Detectors). Fully certified by the 3-A Sanitary Standards Council for dairy equipment, these sensing probes are designed to accurately measure temperature in food, beverage, pharmaceutical, cosmetic and biochemical products where sensor corrosion and product contamination are critical factors.

These sensors and integral epoxy coated connection heads are ideal for clean-in-place operation allowing for convenient washdown with steam or hot water. Weed offers the Series 451 assemblies with sanitary fittings manufactured by Ladish-Tri Clover, Cherry-Burrell and Alloy Products Corporation. For fast time response, a reduced tip option is available. To accommodate user instrumentation a wide range of ice point resistances and tolerances is offered.

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• Featuring the non-fouling Microgage probe, the WDM-1 Flow/Level Monitor provides reliable, accurate measurement of flow in open channels, and level in tanks, reservoirs, and wells.

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### ***New Larger Size All-Plastic True Union Solenoid Valve Introduced***

• Hayward Industrial Products, Inc. has added 3/4" and 1" all-plastic true union solenoid valves to their existing line of 1/4" and 1/2" plastic valves.

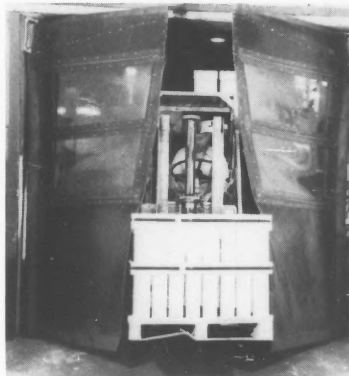
These new solenoid valves are designed for process systems requiring instant on-off actuated valves. Additionally, the valves are fail-safe - providing bubble-tight shutoff in case of electrical failure.

Constructed of CPVC (chlorinated polyvinyl chloride) which can handle corrosive fluids up to 200°F, these valves are less expensive, and often more reliable, than metal valves which can corrode and contaminate fluids.

The solenoid valves feature a 19 watt D.C. coil to provide both substantially cooler operating temperatures and higher pulling forces than an equivalent A.C. coil used on solenoid valves. This ensures 100% continuous-duty service.

The need for valves of this type is in plastic piping systems or where a corrosion-resistant or noncontaminating material is needed. Examples of industries which will benefit from this new plastic solenoid valve are chemical processing, metal finishing, waste treatment, photographic, food processing and ultra-pure water treatment.

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### ***New Catalog Features EPA-Accepted Testing Products***



• LaMotte Chemical introduces a new full color catalog for the water and wastewater analyst. Featured are products recently accepted by the USEPA for use in compliance monitoring programs. Test kits and instrumentation are presented which can be utilized to comply with NPDWR and NPDES permits. New products include a portable turbidity meter, pH and conductivity meters with automatic temperature compensation, colorimeters and several new water test kits. Combination outfits are offered which include several EPA-Accepted tests in a single convenient package.

**Please circle No. 281  
on your Reader Service Card**

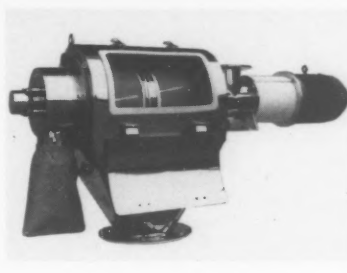
### ***Chase-Durus Offers Flexible RUGGEDoor For Rugged Food Processing Services***

• Chase-Durus Industries, Cincinnati, Ohio, has developed a comprehensive line of traffic doors for food processing and warehousing applications where thermal or visual separation is required, and where a tough USDA accepted door is mandatory.

Called the Chase Model 300 Flexible Airgard RUGGEDoor, the new design is well-suited to both heavy motorized traffic and extreme low temperature environments.

The Flexible RUGGEDoor is top-mounted only using the unique Chase gravity hinging system, so there are no bottom hinges to maintain or be damaged. The door panels open easily and close automatically. The doors are so flexible that it is both safe and easy for trucks or personnel to pass through. Wiper seals are provided at top, bottom and on the jamb sides of each door panel.

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### ***Centrifugal Sifters Now Offer Optional Variable Speed Drive***

• All centrifugal sifter models in the Kemutec line now can be provided with variable speed controls, a feature heretofore not available to processors of food, dairy, and pharmaceutical, and metallurgical formulations. Models range from the laboratory size, through to the high volume twin-A-800 unit. This now extends the range and flexibility of applications enabling the processor to control the scalping, separation and sifting operations in accordance with the type of material being handled, and the volume necessary to maintain a required flow of product through the system.

All models also feature the internal paddle assembly which adds positive and de-blinding action, greater throughput, yet reduces cleaning downtime. Several models also offer interchangeable screen diameters and mesh sizes, extending further the versatility of the centrifugal sifter design to a broader range of materials and additional control of volume.

These sturdy sifters operate quietly, with no vibration, require relatively little floor space, and are completely closed to eliminate dust, product loss, and improve housekeeping in the processing area.

Models are available in carbon or stainless steel, with some in cast aluminum. Safety features such as interlocked and sealed inspection doors, unimpeded access for cleaning, hosing down, locations of motor, bearings and other mechanical parts away from the processing area, are standard.

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### ***Vizcoclean Paneling System***

• Allied Resinous Products is proud to present its Vizcoclean Paneling System. From construction to performance, the Vizcoclean Paneling System is the system preferred by contractors and dairymen the world over.

The Vizcoclean Paneling System is a cost-effective paneling system designed for ease of installation in a variety of uses. With the large 4' x 8' panels, "H" and "L" moldings, and special fasteners, the Vizcoclean panels are easily installed with woodworking tools. Typical applications include: dairy milking parlors,

wall dividers, clean rooms, food processing plants, kitchens, refrigeration room walls, barns, and many others. The panels are sanitary, crack-resistant, and can be cleaned easily with hot water, high pressure flushing. The Vizcoclean Paneling System is competitively priced, and consistently outperforms the competition.

The Vizcoclean Paneling System also meets Government standards, and yours! The Vizcoclean Paneling System fully complies with all FDA and USDA standards. There are no backup boards to rot, and the paneling system does not harbor mold and bacteria. Snug joints prevent dirt buildup between panels. Truly, the Vizcoclean Paneling System is a superior product.

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### **Micro Maint Adds Bar Coding for Inventory and Work Orders**

• Diagonal Data Corporation has introduced bar code software and hardware for its MICRO MAINT maintenance management software package. The ability to electronically scan inventory and work order data helps streamline maintenance operations while significantly reducing the possibility of errors from manual entries.

The Bar Code software interfaces with MICRO MAINT's inventory and work order files. The software automatically generates bar codes corresponding to the numbers assigned to parts, equipment and work orders in the system.

Utilizing Intermec's bar code scanner and hand-held collection device, inventory data is updated by electronically scanning information on issues, receipts or physical counts. Similarly, emergency, preventive and scheduled work orders are printed with bar codes. As each work order is scanned, a clock in the hand held device records the order number, employee code, parts used and start and finish time.

The transactions are stored in the memory of the hand-held collection device to be electronically transferred back into the computer. Inventory and work order data is accurately updated while minimizing clerical labor costs.

Diagonal Data's Bar Code turnkey uses industry standard Code 39, which allows both numbers and letters to be used in the coding system.

MICRO MAINT is a software package designed by Diagonal Data Corporation to track and schedule the maintenance of fixed equipment in plants and facilities. It can be used with IBM PC's and compatibles, IBM System 36 and on popular Local Area Networks.

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### **New Catalog Describes Flow-Through Water Quality System That Simultaneously Measures Temperature, Conductivity, pH & ORP**

• A new catalog describes the YSI 3560 Water Quality Monitoring System, which simultaneously measures temperature, conductivity, pH and oxidation reduction potential (ORP) in groundwater as it's pumped from a well.

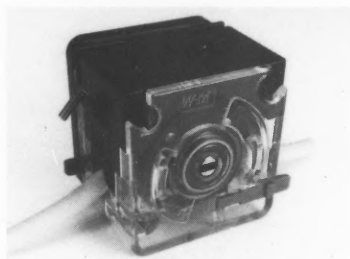
It's the only system that simultaneously measures all four on-site, which the U.S. Environmental Protection Agency (EPA) recommends to assure accuracy.

As the water flows through the sample chamber, the portable system simultaneously measures temperature (-5.0 to +50.0°C), conductivity or temperature-compensated conductivity (0.00 to 100.0 millimhos/cm), pH or temperature-compensated pH (0.00 to 14.00 pH), or ORP (-1500 to +1500 mV).

Results are displayed on 3 1/2-digit readouts. A single port transmits the results of all four measurements to a data logger or chart recorder. Alkaline cells provide 1,400 hours operation (minimum), and the low battery indicator tells when to replace them. The optional case holds the monitor, sample chamber, probes and supplies for easy handling in the field.

The YSI 3560 also may be used with a bailer, surface water pump or in the lab.

**Please circle No. 241  
on your Reader Service Card**



### **New Absorbent Sock Saves Time and Money, Keeps Industrial Plants Clean and Safe**

• To help industrial plant safety managers and plant maintenance supervisors prevent accidents caused by slippery floors, the New PIG Corporation has developed a tubular sock absorbent, called a PIG, that contains and absorbs industrial fluid spills before they become a hazard to employees.

The PIG is a 46-inch-long polyester sock filled with super-absorbent fibers that soak up substantially more fluid than traditional loose clay adsorbents. On average, PIGs consume four-to-five times their weight, while loose clay is typically discarded after absorbing only 10 - 15 percent of capacity. Based on 10 - 15 percent absorbency, it takes 50 lbs. of loose clay to soak up the same amount of liquid that two PIGs absorb.

In addition to providing superior absorbency characteristics, PIGs are also less expensive and easier to use than loose clay. Unlike clay, PIGs can be put down and picked up by one person, eliminating substantial time and labor costs.

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### **Watson Marlow's 303 Tube Pump Offers Advantages for OEM Users**

• If you use pumps or manufacture systems that incorporate pumps, the Watson Marlow Model 303 can improve your product and save you money. With flow rates of up to 3 liters/minute (nearly 2 oz./second), the 303 is versatile, simple, unusually hygienic, and economical.

This advanced pump unit operates by means of a roller that traps a pocket of fluid and drives it through a tube. Behind the roller, the tube recovers to its normal diameter, drawing in more fluid to repeat the cycle. Flow rates can be precisely controlled. And the fluid is contained within the tube so it never comes into contact with the pump mechanism. Nothing to clog or clean.

The 303 has no seals or valves to wear out. This means easy maintenance and long life. It is self priming and can run dry safely.

Up to six pumps can run from one motor, so different fluids can be simultaneously pumped.

Using long-lasting Marprene tubing, the 303 keeps on working and providing superior performance and economy.

Watson Marlow offers the greatest range of tube pumps of any company. Their experience and attention to quality workmanship has made them the quality and technical leader in peristaltic pumps.

**Please circle No. 243  
on your Reader Service Card**

## **INTEREX™ Added to Dairyland Food Laboratories Line of Culture Media**

• Dairyland Food Laboratories, a division of Sanofi Bio Ingredients, has introduced INTEREX™, a new internal pH control culture medium.

INTEREX™ Internal pH Culture Medium is a highly buffered media, internally controlling fermentation pH as starter culture grows. The culture pH buffering properties allow for increased starter concentration. This results in the reduction of starter usage, up to one-half the level typically used with conventional bulk starter.

The buffer system also inhibits bacteriophage replication by binding ionic calcium required for phage infection. These features help ensure maximum activity and consistent growth of the starter.

INTEREX™ culture medium is a complete whey-based medium. No additional solids are required with its use. It can be used with all mesophilic, commercially available, freeze-dried or frozen concentrate cultures. It is suitable for the production of Cheddar, Colby, Brick, Muenster, Cottage and similar American-type cheese varieties. It is packaged in 70-pound poly-lined bags. The poly-liner is an effective preventive against moisture caking and lumping.

Dairyland Food Laboratories is the leading supplier of ingredients to the cheese and dairy industry. The total product line includes cultures, culture media, animal and microbial rennet, calcium chloride, cheese color, sorbic acid, and potassium sorbate.

**Please circle No. 244  
on your Reader Service Card**

## **New Low-Humidity Test Chambers Offer 500-Hour Operation, Precise Control - Special Sensors in Espec Chambers for Guaranteed Low Humidity**

• Four new Platinous G series temperature and low humidity environmental test chambers from Espec Corporation incorporate a specially developed dehumidification system that makes test conditions such as 15% relative humidity (R.H.) at 10°C and 105 R.H. at 20°C both attainable and controllable.

The honeycombed dehumidifying system and refrigeration unit for cooling air provide precise control throughout the entire temperature and humidity range of the chamber. Special humidity sensors are employed to attain 500-hour continuous operation within the low humidity range.

"Before this low humidity design was developed, laborious pre-conditioning measures were necessary to achieve this performance," commented Layton Snover, Espec sales engineer. "Espec's low humidity system provides smooth, trouble free transitions between normal and low humidity operation. This eliminates time-consuming chamber pre-conditioning."

Snover said that Espec guarantees the performance of these chambers with ambient conditions up to 32°C and 75% R.H. This allows the use of a chamber throughout the year in most laboratories.

One switch on the chamber's control panel initiates low humidity operation, which is automatically controlled by the chamber's microprocessor controller.

The Platinous G series chambers are especially suited to testing static reliability perform-

ance in consumer and industrial electronic equipment such as printers and computers. These chambers are also used for color stay-fast testing of paper and wood products and for static testing of fabrics, plastics and films.

"The new Platinous G series chambers were designed to help manufacturers test products to ensure they meet today's demanding performance standards," Snover noted.

Espec is a subsidiary of Tabai Espec, the world's largest manufacturer of environmental test chambers.

The new Platinous G series temperature and low humidity test chambers are available with a one-year guarantee on parts and labor.

**Please circle No. 245  
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**Put MVTL to the test**

Put Minnesota Valley Testing Laboratories to the test. You'll find a conscientious group of professionals whose first concern is helping you achieve quality control for all your food products.

MVTL offers competitive prices on simple and complex procedures - micro-biological, organic and inorganic chemical testing.

Put us to the test. We guarantee fast turn-around and accurate testing. You'll see why hundreds of food and dairy processors rely on MVTL. They've put us to the test time and time again. And we passed with flying colors.

For more information about how MVTL can handle all your testing requirements, call Vicki Scheller collect at 507/354-8517.

**MVTL**

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# Food and Environmental Hazards To Health

## Paralytic Shellfish Poisoning British Columbia

On 20 April 1987, a resident of Westholme dug clams on Porter's Beach north of Chemainus, British Columbia. This man and his wife cooked and ate some of the clams that evening with no ill effects.

The following day, the shells were removed from 25-30 more clams and the black siphon tips were fed to the couple's 2 cats; the husband ate 1 raw clam himself. Two hours later he became alarmed because his lips and tongue started to be numb and both cats had become sick. One subsequently died.

This man went to his family physician who notified the Central Vancouver Island Health Unit in Nanaimo. No treatment or medication was necessary and his symptoms had subsided by the following day.

Samples of the suspected shellfish were submitted to Fisheries and Oceans Canada. Results indicated a paralytic shellfish toxin level between 64-68  $\mu\text{g}/100\text{g}$  of raw meat. This level is 12  $\mu\text{g}$  below the maximum of 80  $\mu\text{g}/100\text{g}$  of edible tissue recommended by Fisheries and Oceans Canada and the Health Protection Branch of Health and Welfare Canada.

Fisheries and Oceans Canada informed the Health Unit that this was the first case of confirmed paralytic shellfish poisoning at low toxin levels. The fact that this man had consumed the clam raw and that he was on medication prescribed by his physician for a previous condition may have contributed to the manifestation of symptoms.

There is also an explanation for the severe illness and 1 death in the 2 cats that had eaten the tips of the clam siphons. The black color of the siphon tip is due to the pigment melanin. The toxin binds to this pigment, resulting in a higher concentration in this part of the clam compared to other segments. Because the cats had eaten 25-30 of these siphons, they had received a highly toxic dose.

The low levels of toxin found in the shellfish so early in the year was probably due to a carry-over from extremely high algal blooms in 1986.

**Comments:** The above incident is interesting because as pointed out in the article, a mild form of paralytic shellfish poisoning occurred following consumption of a raw clam with an apparent toxicity of  $<80 \mu\text{g}/100\text{g}$  meat. Should this give concern to regulators controlling the safe harvesting limit? Not necessarily. Both little neck and butter clams were picked by the case but only butter clams remain toxic for long periods of time, and it is not unexpected that some toxin should have been present during the spring months. Little neck clams in the general area where the clams were harvested are not known to be toxic in winter and spring months, but butter clam samples from beaches several km to the north and south in March contained up to 350  $\mu\text{g}/100\text{g}$  (R. Chiang, Fish Inspection Branch, Fish-

eries and Oceans Canada, Burnaby, B.C.: personal communications, 1987). Siphons are the most toxic part of butter clams, and it is not surprising that the cats became very sick. It was claimed by Price and Lee that melanin in the black tips of siphons bind the saxitoxins, but the authors' method of measuring toxicity was not the standard mouse test and their studies have not yet been confirmed. In addition, it is not just the black tip that retains the toxin but the middle portion as well. In fact, most researchers today do not claim to know the binding mechanism except that some saxitoxins bind better than others. For the cooked meal, steamed little neck clams and chowder made from the butter clams were consumed. Much of the toxin present in the butter clams was probably removed during preparation, since only the main body, mantle and adductor muscles were used. The 64-68  $\mu\text{g}/100\text{g}$  toxin findings were based on extractions of 2 whole raw butter clams left over from the batch harvested (all the little neck clams had been eaten). The 1 or 2 raw clams consumed, believed to be butter clams, that led to the illness could have been much more toxic than the 2 tested because of considerable variation in toxicity in clams. Quayle describes an experiment where 41 butter clams, taken from the same few square yards of a northern British Columbia beach in late spring and analyzed individually, contained between 50 and 1568  $\mu\text{g}/100\text{g}$ .

There is one other factor to consider: the possible presence of cryptic toxin. Six of the 12 known saxitoxins are sulfamates with low toxicity, but can easily be hydrolyzed to more toxic carbamates, possibly by enzymes in the shellfish, cooking or digestion. Unfortunately the extraction for the mouse test does not use sufficiently strong acid to make this conversion and the human oral potency may be underestimated by this method.

In conclusion, the most likely cause of the illness was levels of toxin in the raw clam or clams eaten that were higher than those found in the raw clams tested, i.e.,  $>80 \mu\text{g}/100\text{g}$ . In addition, the medication the case was taking for his arthritis may have reduced his tolerance. Cryptic toxins may have been present, as they are in shellfish harvested from several North American east and west coast locations, but there is little evidence yet to show that toxin levels have been seriously underestimated by the mouse test.

Because butter clams are notorious for remaining toxic long after *Protogonyaulax* dinoflagellate blooms have disappeared, some actions will reduce the risk of illness. Harvesting in closed areas should be avoided even in spring months. Raw shucking with rejection of siphon and gills helps remove most of any toxin present. Although cooking, such as frying or making a chowder, may destroy very little toxin, steaming may partially extract it from the shellfish. However, the residual clam juice (nectar) can

retain 50-75% of the toxin and should be discarded.  
Can Dis Weekly Report 4/2/88

### Illness Due to Molluscan Shellfish - England and Wales

Between 1941-1986 there have been 138 outbreaks of foodborne illness associated with molluscan shellfish recorded in England and Wales. Twenty-seven of these were outbreaks of viral gastroenteritis and a further 92 of gastroenteritis of unknown cause in which the clinical features and incubation period were compatible with a viral etiology. Six outbreaks of hepatitis A infection were also recorded during this period. Bivalve molluscs were implicated in nearly all outbreaks. Between 1971-80 most outbreaks were associated with eating cockles, whereas since 1981 oysters have been increasingly implicated. In most outbreaks attributed to mixed shellfish, cockles were usually included in the menu.

Standard criteria for the acceptance of an association between outbreaks and particular foods were introduced in 1981. Sixty-one outbreaks fulfilling these criteria in the period 1981-1986 were recorded for molluscan shellfish; 5 were due to cockles alone, 43 to oysters alone and of 13 attributed to mixed shellfish, most included cockles. In 21 outbreaks a small round virus (SRV), either a small round structured virus (SRSV) or parvovirus-like particles, was identified in affected persons. Most reported outbreaks followed meals at hotels (13), restaurants (15), public houses (5) or receptions (16) and 67% of the outbreaks occurred in the winter months (October-March).

An additional 72 incidents not fulfilling the standard criteria were also recorded. Of these, 22 were associated with eating oysters, 16 with cockles, 13 with mussels and 21 with mixed shellfish. In 53 of these incidents a virus was identified in the feces of affected persons, the remainder were recorded as gastroenteritis of unknown cause, presumed viral.

As of October 1987, 19 outbreaks affecting at least 900 persons and fulfilling the criteria for acceptance had been recorded provisionally for the year. SRSV and parvovirus-like particles were identified in the feces of cases from one outbreak. Eleven outbreaks were associated with eating oysters, 5, including 24 separate incidents, with eating cockles and mussels. Gastroenteritis was the main symptom in 18 of these outbreaks. In one outbreak 2 persons developed hepatitis after eating mussels from the same shellfish stall. In a further 16 incidents not fulfilling the criteria for acceptance 3 were associated with eating oysters, 4 with cockles, 3 with mussels and 6 with "seafood" including shellfish.

**Comment:** Four major outbreaks associated with eating cockles from a single source, including 3 comprising 109 incidents, have been recorded since the first known major episode in the winter of 1976/77. Altogether, more than 2000 cases of gastroenteritis attributed to eating cockles

have been reported. The increasing number of outbreaks reported, especially since 1981, probably reflects both better surveillance and awareness and the growing popularity of shellfish as a food. Nevertheless, these figures are probably a serious underestimate of shellfish-associated gastroenteritis and hepatitis A. Widespread but non-explosive outbreaks of hepatitis may occur, and it has been suggested that as many as 18000 notifications of infectious jaundice during the period 1979 to 1983 may have been hepatitis A caused by shellfish or other foods.

The association of gastroenteritis viruses with bivalve molluscs suggests unacceptable levels of sewage contamination of the estuarine waters from which these shellfish were harvested. Laboratory and epidemiological studies show that these viruses are not eliminated from bivalve molluscs by normal purification methods and they may survive heat treatment if the procedures laid down for cooking are not strictly followed. In the light of recent reports it is clear that bivalve molluscan shellfish, particularly cockles and oysters, cannot be supplied with a guarantee that they are free to virus contamination and, therefore, continue to pose a risk to public health if eaten raw or without adequate cooking.

Can. Dis Weekly Report 4/2/88

### Hot Breath

A hospital in LaJolla, Calif., complained last November to FDA's San Diego resident post that an inhalation unit it was testing was producing dangerously hot air. It was so hot, in fact, that it was actually smoking.

Inhalation units are intended to provide air warmed to no more than 98.6 degrees Fahrenheit to patients getting inhalation therapy. Instead, this unit was heating the air to nearly 200°F, hot enough to sear a patient's lungs.

The FDA investigator who visited the hospital found that the two wicks that humidify the heated air using a sterile water drip were singed and completely dry. Since the units had been imported from Japan by Travenol Labs of Deerfield, Ill., the complaint went to the FDA's Chicago office, which asked the firm to look into it.

Checking into the six units at the LaJolla hospital, the Travenol representative discovered that the problem was caused by neglect. The machines require a certain amount of routine maintenance, but these had not been serviced for at least three years. Travenol removed the units from the hospital, gave them their overdue attention, and then returned them ready for use.

FDA Consumer April 1988

# New IAMFES Members

## Alabama

**Tukaram Chawan**  
Albertville Quality Foods  
ALbertville

## Arkansas

**Gail A. Marshall**  
ConAgra Poultry Co.  
El Dorado

**Gary L. Phillips**  
Cargill, Inc.  
Springdale

## California

**Sherilyn Decker**  
Santa Maria Chili  
Santa Maria

**Karen M. Hansen**  
Rod's Food Products, Inc.  
City of Industry

**Tim Mulhern**  
California Foods Corp.  
Rialto

**Richard J. Ramirez**  
County of San Diego  
San Diego

**Tamara Thompson**  
Knudsen/Kraft  
Los Angeles

## Colorado

**D. Paul Ochs**  
Industrial Laboratories  
Denver

## District of Columbia

**G.J. Jackson**  
FDA  
Washington

## Georgia

**Dong K. Jeong**  
Univ. of Georgia  
Athens

## Florida

**Nicola Dronoff-Guthrie**  
Lykes Bros., Inc.  
Plant City

## Idaho

**Alan Reed**  
Reed's Dairy, Inc.  
Idaho Falls

## Illinois

**Richard Benson**  
Dove International  
Burr Ridge

**Brenda Daugherty**  
L.S. Heath & Sons, Inc.  
Robinson

## Indiana

**Dr. Arvind R. Patel**  
Maple Hurst Farms  
Indianapolis

## Louisiana

**Shia S. Kuan**  
USDA  
New Orleans

## Massachusetts

**Gary Smith**  
Kraft Dairy Group  
Framingham

## Michigan

**Pete Friedman**  
Sara Lee Bakery  
Traverse City

## Minnesota

**Mary Anderson**  
AnaCon Foods Co.  
Roseville

**John Paulmann**  
Gaylord

**Elaine H. Santi**  
Grand Rapids

**Ken Schamberger**  
Land O'Lakes, Inc.  
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**Kirk Embrey**  
Dist. I Hlth Office  
Batesville

**Maurice G. Herrington**  
MS State Dept. of Hlth  
Jackson

**Ravinder Reddy**  
MS State Univ.  
Jackson

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Mid America Dairymen, Inc.  
St. Louis

**Donald J. Kory**  
Ralston Purina Co.  
St. Louis

## Nebraska

**Marilyn B. Weyer**  
University of NE-Lincoln  
Lincoln

## New Jersey

**Michelle Martin**  
Hi-Tek Polymers  
Clifton



## **New York**

**Marilin Chou**  
Food Advisory Board  
Yorktown Heights

## **North Carolina**

**Trenton G. Davis**  
East Carolina Univ.  
Greenville

**Darlene Kelley**  
OXOID, USA  
Weaverville

**Ann Garner Riddle**  
T.W. Garner Food Co.  
Winston-Salem

## **Ohio**

**Marion Roper**  
USDA  
Cleveland

## **South Dakota**

**Gary T. Doucette**  
Big Stone City

## **Tennessee**

**David Hall**  
Dean Foods  
Memphis

**Lloyd Hill**  
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**Feli Propes**  
Metro Hlth Dept.  
Nashville

## **Texas**

**Sandi Evans**  
Meadowland Creamery  
Conroe

**Betty Ritchley**  
USAF  
San Antonio

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**Jim Tate**  
Dairymen, Inc.  
Richmond

**Charlie Mattox**  
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## **Washington**

**John Madson**  
Carnation Co.  
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## **Wisconsin**

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LaCrosse

**Bruce Anderson**  
Anderson Custom Processing  
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Madison

**Duane Sellner**  
Babson Bros. Co.  
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**Stephen Thome**  
Chr. Hansen's Laboratory, Inc.  
Milwaukee

**James Tillison**  
WI Cheese Makers Assoc.  
Madison

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**John B. Atkinson**  
Maple Lane Dairy  
Kitchener, Ontario

**A. Campbell**  
Thunder Bay Dis. Hlth  
Thunder Bay, Ontario

**Carla Farr**  
Cobi Foods, Inc.  
Whitby, Ontario

**Roger Lefebvre**  
Les Aliments Hygrade  
Montreal, Quebec

**Kathleen Roberts**  
Vancouver, BC

**Teik-Mien Tye**  
U.B.C.  
Vancouver, BC

## **South Africa**

**Anil Chuturgoon**  
Univ. of Natal  
Pietermaritzburg

# Dairy, Food and Environmental Sanitation Instructions for Authors

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## Nature of the Magazine

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*Dairy, Food and Environmental Sanitation* is a monthly publication of the International Association of Milk, Food and Environmental Sanitarians, Inc. (IAMFES). It is targeted for persons working in industry, regulatory agencies, or teaching in milk, food and environmental protection.

The major emphases include: 1) practical articles in milk, food and environmental protection, 2) new product information, 3) news of activities and individuals in the field, 4) news of IAMFES affiliate groups and their members, 5) 3-A and E-3-A Sanitary Standards, amendments, and lists of symbol holders, 6) excerpts of articles and information from other publications of interest to the readership.

Anyone with questions about the suitability of material for publication should contact the editor.

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## Submitting Articles

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All manuscripts and letters should be submitted to the Editor, Kathy R. Hathaway, IAMFES, P.O. Box 701, Ames, Iowa 50010.

Articles are reviewed by two members of the editorial board. After review, the article is generally returned to the author for revision in accordance with reviewer's suggestions. Authors can hasten publication of their articles by revising and returning them promptly. With authors' cooperation articles are usually published within three to six months after they are received and may appear sooner.

Membership in IAMFES is not a prerequisite for acceptance of an article.

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## Reprints

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Reprints of an article may be ordered by the author. An order form for reprints will be sent to you. Reprints may be ordered with or without covers, in multiples of 100. Reprint costs vary according to the number of printed pages in the article. Reprints cannot be provided free of charge.

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## Types of Articles

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*Dairy, Food and Environmental Sanitation* readers include persons working as sanitarians, fieldmen or quality control persons for industry, regulatory agencies, or in education. *Dairy, Food and Environmental Sanitation* serves this readership by publishing a variety of papers of interest and usefulness to these persons. The following types of articles and information are acceptable for publication in *Dairy, Food and Environmental Sanitation*.

### General Interest

*Dairy, Food and Environmental Sanitation* regularly publishes non-technical articles as a service to those readers who are not involved in the technical aspects of milk, food and environmental protection. These articles deal with such topics as the organization and application of a milk or food control program or quality control program, ways of solving a

particular problem in the field, organization and application of an educational program, management skills, use of visual aids, and similar subjects. Often talks and presentations given at meetings of affiliate groups and other gatherings can be modified sufficiently to make them appropriate for publication. Authors planning to prepare general interest nontechnical articles are invited to correspond with the editor if they have questions about the suitability of their material.

## Book Reviews

Authors and publishers of books in the fields covered by *Dairy, Food and Environmental Sanitation* are invited to submit their books to the editor. Books will then be reviewed and published in an issue of *Dairy, Food and Environmental Sanitation*.

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## Preparation of Articles

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All manuscripts should be typed, double-spaced, on 8-1/2 by 11 inch paper. Side margins should be one inch wide.

The title of the article should appear at the top of the first page. It should be as brief as possible and contain no abbreviations.

Names of authors and their professions should follow under the title. If an author has changed location since the article was completed, his new address should be given in a footnote.

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## Illustrations, Photographs, Figures

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Wherever possible, submission of photos, graphics, or drawings to illustrate the article will help the article. The nature of *Dairy, Food and Environmental Sanitation* allows liberal use of such illustrations, and interesting photographs or drawings often increase the number of persons who are attracted to and read the article.

Photographs which are submitted should have sharp images, with good contrast.

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## Examples of Proper Bibliographic Citations

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### Paper in a journal

Alderman, G. G. and E. H. Marth. 1974. Experimental production of aflatoxin in citrus juice and peel. *J. Milk Food Technol.* 37:308-313.

### Paper in a book

Marth, E. H. 1974. Fermentations. pp. 771-882. In B. H. Webb, A. H. Johnson, and J. A. Alford (eds.), *Fundamentals of dairy chemistry* (2nd ed.), AVI Publishing Co., Westport, CT.

### Book

Fennema, O. R., W. D. Powrie, and E. H. Marth. 1973. *Low-temperature preservation of foods and living matter*. Marcel Dekker, Inc., New York. 598 p.

### Patent

Hussong, R. V., E. H. Marth, and D. G. Vakaleris. 1964. Manufacture of cottage cheese. U. S. Pat. 3,117,870. Jan. 14.

# Affiliate News

## *Pennsylvania Association of Dairy Sanitarians and Dairy Laboratory Analysts Hold Meeting in State College, PA*

Over 240 registered for the May 16-18, 1988 Conference of Dairy Sanitarians and Laboratory Analysts. It was one of the most outstanding programs at any annual conference. More than 40 topics were presented. New officers elected were: Linda Knotwell, President; C. Lewis Terrill, President Elect; and Jim DeTolla, Vice President. Audrey Throne continues as Secretary and Marie Goff will serve as Treasurer. The highlight of the banquet was the awarding of three plaques to members, and seven certificates of service to retired members. Craig Weaver, Milk Marketing, Inc., received the Sanitarians Award; Louis Herrman, Eastern Milk Producers Association, the Honorary Laboratory Directors Award; and Stephen B. Spencer from Penn State, the Distinguished Service Award. The 1989 meeting will be held in University Park, May 15-17.



Steve Spencer (right) receiving the Distinguished Service Award from Gerry Shick, President (left-white jacket).



Craig Weaver (right) receiving the Dairy Sanitarians Award of Merit from Gerry Shick, President (left).

## **Upcoming IAMFES Affiliate Meetings**

1989

### MARCH

22-24, Michigan Environmental Health Association, to be held at the Holiday Inn, Holidome & Conference Center, Ann Arbor, MI. For more information, contact: Ike Volkers, MDPH, 3500 N. Logan, Lansing, MI 48909 517/335-8268.

### APRIL

5-7, Missouri Milk, Food and Environmental Health Association, to be held at the Ramada Inn, 1100 Vandiver Drive, Columbia, Missouri. For more information, contact: Gregg Fast, Mo. DOH, NE District, 250 E. Patton, Macon, MO 63552, 816/385-3125.

### SEPTEMBER

19-21, New York State Association of Milk and Food Sanitarians, to be held in Buffalo, New York, at the Sheraton-Buffalo Airport Hotel. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004, 716/937-3432.



Louis Herrman receiving the Honorary Life Membership from Carol Wallace PDA.

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# Book Review

*Food-Biochemistry and Nutritional Value*; Editor: David S. Robinson, Longman Scientific & Technical. London, UK, 1987. 554 pages.

A condensed but critical and comprehensive text devoted to the biochemistry and nutritional value of food. The author has produced a book which provides knowledge of the chemical structures of the main food components and insight into how the action of enzymes change the composition, texture, nutritive values and acceptability of food.

While this text is suitable for either undergraduate or graduate students of Food Science, Nutrition, Agriculture or Medicine it can be used readily by scientists and food industrialists as a handbook.

The book anticipates a basic knowledge of biochemistry and it is sectionalized into chapters covering food carbohydrates, proteins, fats and oils, the chemical elements and vitamins as nutrients. The last section deals with enzymatic action in post harvest and post-mortem food.

To public health workers or sanitarians specializing in food manufacturing surveillance, it should provide a better understanding of food behavior, although to the generalist it is a rather specialized text.

*Food Structure and Behavior*; Editor: J. M. Blanshard and P. Lilford, Academic Press. London, New York, 1987. 291 pages.

Based on a Post-Experience Course held at the Nottingham University of Agricultural Science at Sutton, England, this book explores certain critical areas of importance to the food industry. Chapters are constructed didactically so any chapter can be read in isolation but the major benefit will come when gradually the different chapters are read.

Each chapter has an extensive associated bibliography which will permit the reader to pursue each subject to a greater depth. A previous background in biochemistry is needed to fully comprehend its contents.

It is divided into 13 independent sections ranging from gels, network theory applied to food systems, principles of crystallization and its control in frozen food systems. Kinetic aspects of emulsions, fracture behavior of meat and finally rheology structure and food processing.

A very good reference material for food scientists or chemists.

Oswaldo Cuevas MS RS/Reviewed both books  
USAEHA

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## A Free IAMFES Members' Benefit

- **BISSC - A Sign of Our Times** - (50 slides-script-tape). The presentation was prepared by the Baking Industry Standards Committee. The purpose of BISSC, formed in 1949 by six of the national organizations serving the baking industry, is to develop and publish voluntary standards for the design and construction of bakery equipment. Those Standards are now recognized as the definitive sanitation standards for equipment used in the baking industry
- **Causes of Milkfat Test Variations and Depressions** - (140 slides-tape-script-30 minutes). This set illustrates the many factors involved in causing milkfat test variations or depressions in your herd, including feeding, management, stage of lactation, age of samples, handling of samples, and testing procedures. The script was reviewed by field staff, nutritionists, laboratory personnel and county extension staff. It is directed to farmers, youth and allied industry. (Penn State-1982)
- **Controlling Volumes and Fat Losses** - (110 slides-tape-script-30 minutes). Keeping milk volume and product loss from farm to supermarket of fluid dairy products is discussed. This set was done with the cooperation of the dairy industry who reviewed the script and provided opportunities to take pictures. It is designed to be used by milk plants for their processing personnel, regulatory representatives, field staff and milk haulers. (Penn State-1982)
- **The Farm Bulk Milk Hauler** - (135 slides-tape-script-30 minutes). This set covers the complete procedure for sampling and collecting milk from farms. Each step is shown as it starts with the hauler entering the farm lane and ends when he leaves the milk house. Emphasis is on universal sampling and automated testing. Funds to develop this set were provided by The Federal Order #36 Milk Market Administrator. (Penn State-1982)
- **Food Safety Is No Mystery** - This 34 minutes videotape is an excellent training visual for food service workers. It shows the proper ways to prepare, handle, serve and store food in actual restaurant, school and hospital situations. A policeman sick from food poisoning, a health department sanitarian, and a food service worker with all the bad habits are featured. The latest recommendations on personal hygiene, temperatures, cross contamination, and storage of foods are included. (USDA-1987)
- **Frozen Dairy Products** - (27 minute videotape). Developed by the California Department of Food and Agriculture. Although it mentions the importance of frozen desserts, safety and checking ingredients; emphasis is on what to look for in a plant inspection. Everything from receiving, through processing and cleaning and sanitizing is outlined, concluded with a quality control program. Directed to plant workers and supervisors, it shows you what should be done. (CA-1987)
- **High-Temperature, Short-Time Pasteurizer** - This 59 minute videotape was provided to IAMFES by the Dairy Division of Borden, Inc. It was developed to train pasteurizer operators and is well done. There are seven sections with the first covering the twelve components of a pasteurizer and the purpose and operation of each. The tape provides the opportunity for discussion after each section or continuous running of the videotape. Flow diagrams, processing and cleaning are covered. (Borden, Inc., 59-min.-1986)
- **The How and Why of Dairy Farm Inspections** - (110 slides-tape-script-15 minutes). This was developed at the request of seven northeast dairy cooperatives and with their financial support. Emphasis is on clean cows, facilities and equipment and following proper procedures. Regulatory agencies cooperated in reviewing the script and taking pictures. This was developed for farmers, youth and allied industry. (Penn State-1984)
- **Kentucky Public Swimming Pool and Bathing Facilities** - (38 minute videotape). It was developed by the Lincoln Trail District Health Department in Kentucky and includes all of their state regulations which may be different from other states, provinces and countries. It was very well done and could be used to train those responsible for operating pools and waterfront bath facilities. All aspects are included of which we are aware, including checking water conditions and filtration methods. (1987)
- **Legal Aspects of the Tampering Case** - (about a 25-minute, 1/2" videocassette). This was presented by Mr. James T. O'Reilly, University of Cincinnati School of Law at the fall 1986 Central States Association of Food and Drug Officials Conference. He emphasizes three factors from his police and legal experience - know your case, nail your case on the perpetrator, and spread the word. He outlines specifics under each factor. This should be of the greatest interest to regulatory sanitarians, in federal, state and local agencies. (1987)
- **Milk Processing Plant Inspection Procedures** - (15 minute videotape). Developed by the California Department of Food and Agriculture. It covers pre and post inspection meeting with management, but emphasis is on inspection of all manual and cleaned in place equipment in the receiving, processing and filling rooms. CIP systems are checked along with recording charts and employee locker and restrooms. Recommended for showing to plant workers and supervisors. (CA-1986)
- **On the Line** - (30 minute VHS videocassette). This was developed by the Food Processors Institute for training food processing plant employees. It creates an awareness of quality control and regulations. Emphasis is on personal hygiene, equipment cleanliness and good housekeeping in a food plant. It is recommended for showing to both new and experience workers.

**Processing Fluid Milk** - (140 slides-script-tape-30 minutes). It was developed to train processing plant personnel on preventing food poisoning and spoilage bacteria in fluid dairy products. Emphasis is on processing procedures to meet federal regulations and standards. Processing procedures, pasteurization times and temperatures, purposes of equipment, composition standards, and cleaning and sanitizing are covered. Primary emphasis is on facilities such as drains and floors, and filling equipment to prevent post-pasteurization contamination with spoilage or food poisoning bacteria. It was reviewed by many industry plant operators and regulatory agents and is directed to plant workers and management. (Penn State-1987)

**Producing Milk of Good Quality and Flavor** - (114 slides-tape-script-25 minutes). The steps and corrective measures necessary to produce quality milk with good flavor are outlined. It is directed at dairy farmers, field staff, milk haulers and youth. (Penn State-1982)

**Product Safety and Shelf Life** (40 minute videotape). Developed by Borden Inc., this videotape was done in three sections with opportunity for review. Emphasis is on providing consumers with good products. One section covers off-flavors, another product problems caused by plant conditions, and a third the need to keep products cold and fresh. Procedures to assure this are outlined, as shown in a plant. Well done and directed to plant workers and supervisors. (Borden-1987)

**Psychiatric Aspects of Product Tampering** - (about a 25 minute, 1/2" videocassette). This was presented by Emanuel Tanay, M.D. from Detroit, at the fall 1986 conference of CSAFDA. He reviewed a few cases and then indicated that abnormal behavior is like a contagious disease. Media stories lead to up to 1,000 similar alleged cases, nearly all of which are false. Tamper proof packaging and recalls are essential. Tampering and poisoning are characterized by variable motivation, fraud and greed. Law enforcement agencies have the final responsibilities. Tamper proof containers are not the ultimate answer. (1987)

**Tampering: The Issue Examined** - (37 minutes videotape). Developed by Culbro Machine Systems, this videotape is well done. It is directed to food processors and not regulatory sanitarians or consumers. A number of industry and regulatory agency management explain why food and drug containers should be made tamper evident. (Culbro-1987)

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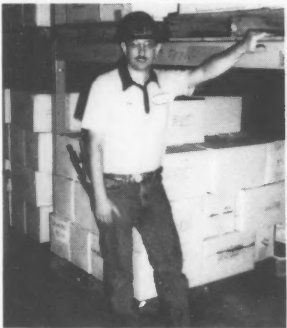
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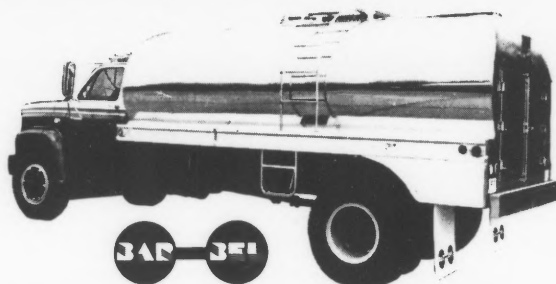
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# Coming Events

1989

## JANUARY

- **9-18, 39th Annual University of Maryland Ice Cream Short Course.** For more information, contact: Dr. James T. Marshall, Dept. of Animal Sciences, University of Maryland, College Park, MD 20742 301/454-7843.
- **23-27, Insect Fragment Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 (916) 421-8963.
- **24-25, Second Annual South California Food Industry Conference** will be held on the campus of Chapman College in Orange, CA. For more information, contact: Walt Clark, Chapman College, Food Science and Nutrition Dept., Orange, CA 92666 714/997-6869.

## FEBRUARY

- **1-3, Southeastern Poultry & Egg Association** to be held in Atlanta, GA. For more information, contact: Larry Singleton, 404/377-6465.
- **20-22, ABC Research 15th Annual Technical Seminar,** Hilton Hotel, Gainesville, FL 32608. For additional information, contact: Sara Jo Atwell, 904/372-0436.
- **26-Mar. 1, Shellfish Institute Annual Convention** to be held at the Inter-Continental Hilton Head Hotel, Hilton Head, SC. For additional information, contact: SINA headquarters at 202/296-5170.

## MARCH

- **12-15, American Cultured Dairy Products Institute Annual Meeting and Conference/Cultures and Curds Clinic/International Cultured Dairy Products Evaluation Session,** Marriott River Center, San Antonio, Texas. For more information, contact Dr. C. Bronson Lane, ACDPI, PO Box 547813, Orlando, FL 32854-7813 407/628-1266.
- **22-24, Michigan Environmental Health Association,** Holiday Inn, Holidome & Conference Center, Ann Arbor, MI. For more information, contact: Ike Volkers, MDPH, 3500 N. Logan, Lansing, MI 48908 517/335-8268.

- **28-30, Western Food Industry Conference** to be held at the University of California, Davis, CA. For more information, contact: Robert Pearl 916/752-0981 or Shirley Rexroat 916/752-2191.
- **29-30, The Center for Dairy Research at the University of Wisconsin-Madison Annual Cheese Research and Technology Conference** to be held at the Holiday Inn East, Madison, WI. For more information, contact: Sarah Quinones 608/262-2217.

## APRIL

- **12, 38th Annual University of Maryland Ice Cream Conference.** For more information, contact: Dr. James T. Marshall, Dept. of Animal Sciences, University of Maryland, College Park, MD 20742 301/454-7843.

## JUNE

- **13-15, Hazardous Materials Management International Conference and Exhibition '89** will be held at the Atlantic City Convention Center, Atlantic City, New Jersey. For additional information, contact: Mary Jo McGuire, Group Show Director, Tower Conference Management Co., 800 Roosevelt Rd., Bldg E -- Suite 408, Glen Ellyn, IL 60137-5835 312/469-3373.

## SEPTEMBER

- **19-21, New York Association of Milk and Food Sanitarians Annual Meeting** will be held in Buffalo at the Sheraton-Buffalo Airport Hotel. For information concerning the meeting, contact: Paul Dersam, 27 Sullivan Rd., Alden, NY 14004, 716/937-3432.
- **27-29, Liquitec Expo '89.** For more information contact: Carolyn Mesce, Marketing Manager, Liquitec Expo Inc., PO Box 630, West Paterson, New Jersey 07424 201/256-0011.

## NOVEMBER

• 11-15, Dairy and Food Industries Supply Assoc., Inc.  
McCormick Place, Chicago, Illinois.

1990

## DECEMBER

• 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  
Kathy R.  
Hathaway

At the time of this writing (October) renewals for 1989 are coming in at full strength! In order to stay on the calendar year for 1989, your renewal must be received by mid December. Master Card, Visa and American Express are now accepted.

Your Executive Board met in October in Ames to discuss association business as well as the program for the 1989 Annual Meeting. A Program Advisory Committee, chaired by Ed Zottola is in place and will be meeting in January to finalize the preliminary program. Abstract forms are in the October issue of both journals. Note the abstract deadline of January 1, 1989!

This month you will receive information on nominating deserving colleagues for the IAMFES Awards which will be presented at the IAMFES Awards Banquet in Kansas City in August 1989. Take the time to complete materials, which are being revised to make nominating and completing materials, less time consuming.

ON HOLD...when you call the IAMFES office in Ames your call is answered normally before the 3rd ring and we try to keep you on hold for only a brief few seconds. Now when you are on hold, you will learn more about the services IAMFES has to offer you, with upbeat classical music in the background. Although our Texas members enjoyed the Country Western music "on hold", we hope you'll like this as well. Give us a call and let us know what you think!

Total membership in October is at 3321, with subscribers at 1383. Our goal is a gain of 1000 members this year. Through extensive promotion, exhibiting at conventions across the country and additional distribution, we are confident we will obtain this goal.

In the October 7, 1988 issue of *Association Trends*, the following was submitted by Roderick L. Geer, CEA, Million Dollar Roundtable, Des Plaines, IL. It conveys to you what your IAMFES Ames Staff feels:

- \* Our members are IAMFES
- \* Our members are not dependent on us. We are dependent on them.
- \* Our members do not interrupt our work. They are our work.
- \* Our members look to us for expertise. They should.
- \* Our members look to us for guidance. They should.
- \* Our members look to us to help them fulfill their objectives. They should.
- \* We are here because of our members.

At this time of year, the entire staff of IAMFES in Ames wishes all of you a very Merry Christmas and a most blessed, happy and prosperous New Year.

K. R. Hathaway  
Executive Manager  
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and infected the cow  
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that my father bought  
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and drank the milk  
that contained the tet,  
that killed the bug  
that infected the cow  
that my father bought  
for two zuzim.

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to save the child  
that drank the milk  
that contained the tet,  
that killed the bug  
that infected the cow  
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that drank the milk  
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