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Dairy and Food Sanitation®

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

Using Irradiation
to Preserve Food

1986 IAMFES
Annual Meeting
Report

12th Annual AOAC
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for the 80's

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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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CONTENTS Vol. 6 No. 11 November, 1986

DEVELOPING SCIENTIST AWARD PROGRAM 485

ARTICLES:

- **The Growing Use of Irradiation to Preserve Food** 488
Chris W. Lecos
- **Food Safety Issues for the Eighties: Their Implications for Agriculture** 491
Clark R. Burbee and Carol S. Kramer

NEWS AND EVENTS 499

- 1987 Harold Macy Award Candidates Sought
- ACDPI Student Essay Contest
- Agricultural Research Hurt by Budget Cuts

**** and more ****

NEW PRODUCTS NEWS 503

BOOK REVIEWS 506

MEMBERSHIP APPLICATION FORM 508

FOOD SCIENCE FACTS 509

- *Campylobacter jejuni*

FOOD AND ENVIRONMENTAL HAZARDS TO HEALTH 511

NEW MEMBERS 514

PRESIDENTIAL ADDRESS 516

73rd ANNUAL MEETING REPORT 518

BUSINESS EXCHANGE 534

JFP ABSTRACT 540

CALENDAR 544

The Growing Use of Irradiation to Preserve Food

By Chris W. Lecos

Food and Drug Administration
Washington, D.C.

Reprinted from the July-August 1986 issue of the *FDA Consumer*.

After more than two years of deliberation and the review of thousands of written comments from proponents and opponents, the Food and Drug Administration has given the green light for the expanded uses of irradiation in the U.S. food supply. Food irradiation, at the levels approved, will provide industry with another way to extend the shelf life of food and to protect it against insects without creating any health hazards to consumers, the agency stressed.

A regulation published by FDA in the *Federal Register* April 18, 1986, allows for the first time the use of radiation on fruits and vegetables and increases the level of radiation allowed for dried herbs, spices, and vegetable seasonings. The regulation is the result of a proposal published in 1984 that elicited more than 5,000 public comments, and follows a July 22, 1985, approval by the agency for the use of radiation on pork.

Besides setting maximum radiation levels, the regulation also spells out labeling requirements for irradiated food for the next two years. Labels of packaged foods sold at the retail level will have to clearly state that the products have been treated with radiation. They also must have a logo, or symbol, to inform shoppers that the products have been irradiated. Also, supermarkets and grocery stores will have to identify fresh fruits and vegetables that have been treated with radiation. FDA said this can be done in various ways, such as counter signs, cards and other displays near the produce bins. Irradiated foods sold on the wholesale market that might be reprocessed must have labeling that advises not to irradiate the product again.

FDA's regulation makes it clear that it expects the food industry to use only as much radiation as is needed to accomplish the "intended technical effect" on a particular food product. A manufacturer is expected to use a dosage lower than the allowable maximum if that is all that is needed to kill insects or microbial contaminants, or retard the ripening of fruit.

Although the idea of food irradiation is new to most consumers, the latest regulation is the result of more than

40 years of research into the process, much of it by the federal government. America's astronauts have been eating irradiated foods almost from the beginning of the space program. (And FDA long ago authorized the use of radiation to sterilize hospital equipment; the use of X-rays and gamma rays to inspect food; and the use of ultraviolet radiation to control the growth of surface microorganisms and to sterilize water used in food production.)

The first approved use of radiation on food occurred when FDA permitted it to kill insects in wheat and wheat products in 1963 and to slow the development of sprouts in potatoes in 1964. However, the process was never adopted by industry for these foods because cheaper methods of preservation were available.

Earlier this year, the U.S. Department of Agriculture approved irradiation of fresh pork at limits set last year by FDA to control the parasite that can cause trichinosis. (The permitted levels of radiation—between 300 gray and 1 kilogray—will eliminate the risk of trichinosis, but will not necessarily kill bacteria that can cause food poisoning. Careful handling—with clean hands and utensils—and thorough cooking of pork are still necessary. For a discussion of radiation terms, see the boxed insert.)

Expanding the uses of irradiation to include fruits and vegetables and increasing the radiation levels for dried herbs and spices were proposed by FDA on February 14, 1984 (see "Irradiation Proposed to Treat Food," May 1984 issue of *FDA Consumer*). The regulation published April 18 is the result of that proposal. Specifically, the regulation:

- Permits manufacturers to use up to 1 kilogray of radiation on fresh fruits and vegetables to inhibit ripening and kill insects, spiders, mites and other pests that commonly infest these foods. One kilogray is considered a low level for irradiating foods.
- Increases the previously permitted irradiation level for spices, herbs and other dried or dehydrated aromatic foods from plants from 10 kilogray to 30 kilogray. This is regarded as a high dosage level.
- Requires that labels of irradiated foods sold at the retail level state that they were "treated with radiation" or "treated by irradiation." This is the wording that will be

in effect for two years. Similar language would have to be used on packaged wholesale foods, along with the warning that the product should not be irradiated again. A special logo also must be on the label of irradiated foods sold at retail but is optional for wholesale foods.

- Establishes record-keeping and other general requirements for manufacturers.

Also, facilities that are used for food irradiation must comply with plant and worker safety requirements of the Nuclear Regulatory Commission and the Occupational Safety and Health Administration.

FDA started paving the way for its recent regulation in 1981, when it announced that it was considering how to ensure the safety of irradiated foods. Under provisions of the federal Food, Drug, and Cosmetic Act, a food additive-including a source of radiation used to process food-must be shown to be safe "under the proposed conditions of use" before FDA can approve it.

Any safety assessments of irradiated foods, a committee of FDA scientists said, should be based on projected levels of human consumption of those foods; estimates of the "identity, amount, and potential toxicity of new chemical constituents generated in the food" by the irradiation process; and use of the most up-to-date methods of toxicity testing. The committee estimated that "as much as 40 percent of the total diet" theoretically could consist of irradiated foods. However, it estimated that actual consumption probably would not exceed 10 percent of the diet.

The committee reported that food irradiated at doses up to 1 kilogray "is wholesome and safe for human consumption, even where the food that is irradiated may constitute a substantial portion of the diet." The committee added that foods "comprising no more than .01 percent of the daily diet [such as spices] and irradiated at 50 kilogray or less also can be considered safe for human consumption without toxicological testing." In effect, the FDA committee stated, there was such an "adequate margin of safety" that toxicological testing wasn't necessary

to establish the safety of irradiated foods. In its April regulation, FDA concurs that the irradiation levels it is allowing are safe.

When food is irradiated, most of the radiation passes through the food without being absorbed. The small amount that is absorbed is what kills any insects, extends shelf life, and prevents fruits or vegetables from ripening too fast.

Unlike chemical pesticides, irradiation leaves no residue in food. Exposing food to gamma rays, electron beams, or X-rays--the common irradiation methods--does not make the food radioactive, nor does it pose any radioactivity danger to consumers. Consumers are not exposed to radiation.

Like other methods of processing, the agency said in the April *Federal Register* notice, irradiation does cause small chemical changes in the food. These changes produce new substances called radiolytic products. The agency noted that experiments have shown that "very few of these radiolytic products are unique to irradiated foods; approximately 90 percent of the radiolytic products...are known to be natural components of food." The remaining 10 percent are chemically similar to natural food components.

Responding to contentions that radiolytic products are toxic, FDA said that it disagreed that toxic substances would be produced in food in unsafe amounts under the radiation levels approved. "The agency has no evidence to cause it to change its position that the chemical differences between foods irradiated at the doses allowed by this regulation and non-irradiated foods are too small to cause concern about the safety of the irradiated foods."

Irradiation also can affect the flavor, texture and, to some extent, even the nutrient content of food. But these changes also occur when food is cooked, canned or frozen. The scientific literature, FDA said, indicates that there are no nutritional differences between food that is not irradiated and food irradiated at levels below 1 kilogray. Although higher levels of radiation are allowed for

Food	Purpose	Dose Limit	Date Approved
Fruits and vegetables	To slow growth and ripening and to control insects	Up to 1 kilogray (kGy)	April 18, 1986
Dry or dehydrated herbs, spices, seeds, teas, vegetable seasonings	To kill insects and control microorganisms	Up to 30 kGy	April 18, 1986
Pork	To control <i>Trichinella spiralis</i> (the parasite that causes trichinosis)	Minimum 0.3 kGy to maximum of 1 kGy	July 22, 1985
White potatoes	To inhibit sprout development	50 to 150 gray	Aug. 8, 1964
Wheat, wheat flour	To control insects	200 to 500 gray	Aug. 21, 1963

spices and herbs, these minor ingredients are not sources of nutrients. FDA concluded that the "destruction of nutrients [from irradiation] is not an issue in this rulemaking."

Half of the comments that FDA received focused on the retail labeling issue, and more than 80 percent of them urged that retail labeling be mandatory to prevent consumer deception. Further support also was given to labeling of wholesale packages of food.

FDA's labeling requirements are almost the same as those for foods it had approved in the past for irradiation. The logo to identify irradiated foods, however, is a new feature. FDA hopes that consumers will become so familiar with it that eventually it can be used by itself, without any text about irradiation on the label. Under the regulation adopted in April, the present labeling language will be dropped in two years unless FDA issues a new proposal to extend the present language requirement. If not extended, only the logo will be required.

In addition to requiring a label statement that a food has been "treated with radiation" or "treated by irradiation," FDA is encouraging manufacturers to state, on the labels of wholesale and retail products, the purpose and the type of the irradiation. For example, the label might say "treated with radiation to control spoilage," "treated with radiation to extend shelf life," or "treated with radiation to inhibit maturation." A label also could state that a product was treated with X-rays, gamma radiation or electron beams.

As FDA put it: "The agency recognizes that, because this is a new technology, manufacturers may want to use additional labeling statements as part of a consumer education effort. For example, in addition to the required language, the firm may wish to state that 'this treatment does not induce radioactivity.' The agency will permit

such educational statements if they are truthful and not misleading to consumers."

Some food processors opposed the use of such words as irradiation and radiation because of potential consumer sensitivity to any mention of radiation. Some favored substitute language—such as "picowave treatment" and "ionizing energy." FDA rejected these because consumers might misunderstand and be confused by such language. FDA said it gave careful consideration to the term "picowave treatment," but rejected the suggestion because it was "not in common use in the industry nor in the scientific community and would be neither more informative to the consumers than the label statement [approved in the new regulation] nor more understood by those in the food-processing industry.

"The agency does recognize that some population groups may harbor a prejudice against anything treated with radiation," the notice added, "but is of the opinion that with the labeling flexibilities provided in this regulation, manufacturers will be able to overcome these prejudices as consumers become more educated about the process and the advantages this technology has over alternatives existing in the industry."

In responding to some of irradiation's critics, FDA agreed that other methods were available for insect control (such as pesticides) and for inhibiting the ripening of fresh fruits and vegetables.

"However," the agency said, "the existence of such methods is not a reason to prohibit equally safe alternatives, nor does the [Food, Drug, and Cosmetic Act] authorize FDA to arbitrarily limit the safe alternatives that are to be allowed. The agency believes that the marketplace should determine which alternative method is used when safety is not an issue."

Food Safety Issues for the Eighties: Their Implications for Agriculture

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As consumers, farmers, food processors, and food technology innovators try to modify food system rules to reflect their own particular interests, the performance record of the U.S. food safety system is once again under scrutiny.

What are the current criticisms of the food safety system? Who are the major players in the game and what are their interests? Where are the current winds of change likely to lead? What legislation or policies being considered could lead to differences in the safety, nutritional value, availability, or cost of our food? What will be the future impact of the "food safety system" on consumer satisfaction, food industry well-being, and on the progressiveness and competitiveness of the food system?

CONSUMERS

Consumers make up the largest group of participants in the food market and they are concerned about food safety. Today's consumers are better educated than previous ones and more aware of many diverse health hazards associated with the way foods are produced, processed, and marketed as well as hazards from mishandling in the home. They increasingly associate diet and nutrition with personal health status. Yet lifestyles have changed. Smaller households are now common as well as working mothers and singles, and people have higher incomes to spend on food. This has increased the demand for more convenient-to-prepare foods with greater sensory appeal. At the same time these foods may be the source of additional health risks, exposing consumers to chemical additives needed to enhance preservation and increase appeal and to other contaminants added unintentionally.

Major Concerns

Over the years, attitudinal surveys about food safety have revealed that consumers are concerned primarily about: (1) obtaining more protection from food hazards, (2) information about food safety hazards, (3) education and training on safe food handling and choice, (4) who should provide food safety protection and information, and (5) who should pay additional costs.

Protection from Hazards

Consumers' desires for *more protection* relate directly to their reluctance to be exposed to food-borne hazards. Individuals differ sharply in their attitudes - some show virtually no concern over food safety while some exhibit extreme concern. A 1984 national survey of 1,008 American consumers by the Food Marketing Institute (FMI) indicates that a large cross-section of them fears that some of the chemicals used in the production, processing, and preservation of foods are not safe. Approximately half of all respondents to the FMI survey said they believe some additives to processed foods may be unsafe to eat. What is more, they said they avoid buying products they believe to be risky. Substances specifically mentioned where chemical flavorings (by 25 percent of respondents), preservatives (17 percent), sugar (22 percent), and salt (17 percent). The presence of microorganisms known to spoil foods was indicated as a concern by 12 percent of the respondents and harmful disease-causing agents by 6 percent. However, 77 percent of the respondents said that pesticide and herbicide residues in food are a serious health hazard compared to 32 percent who mentioned food additives and preservatives and 26 percent who named coloring agents.

The FMI survey results also suggest that some consumers want foods offering more protection from possible hazards than is provided by current law. Consequently there may be an extensive market for foods produced and processed by what many may regard as unconventional technologies. Examples found in the marketplace include "natural" foods: foods produced without the use of pesticides, animal drugs, or chemical fertilizers, or foods processed without preservatives or other food additives. Other markets exist for new formulations of foods with

reduced or extremely low amounts of specific additives such as sugar, salt, or other ingredients suspected of contributing to certain diseases. On the other hand, some consumers appear to want foods enriched with nutrients believed to have beneficial properties. Finally, some consumers want more stringent sanitation standards and increased use of tamperproof packaging.

While these consumers appear to be willing to pay for increased food protection services, others would rather sacrifice some safety if it means lower prices. In recent years, the return of bulk product merchandising has catered to those consumers who are willing to sacrifice a little safety and product information for the opportunity to pay lower unit prices and reduce their expenditures for food. While these consumers probably don't equate bulk merchandise products with safety problems, they do sacrifice specific product information.

Information

Directly related to the concern about more protection services is a desire for *more food safety information*. The recent FMI survey showed a sharp increase in consumer self-reliance to determine the safety of food. However, for a consumer to really make valid food safety judgments, he or she must have considerable information about potential problems and their seriousness. In practice, the provision of sufficient information is very problematic. Oftentimes those reporting food safety news don't have the scientific expertise to put issues or problems in perspective.

Consumers seem to want two major types of food safety information. One type is purely *descriptive generic information* about the food product itself. Consumers already have decided, correctly or incorrectly, that some product characteristics are either good or bad. They simply want to base their purchase decisions upon the presence or absence of some component or processing technology in a product. Examples include: macro and micro-nutrient composition, chemical substances used to produce the food commodity, processing technology used, and type of packaging material.

The second type of information requested is for a *professional safety judgement*. An example is a warning statement on the label stating that consumption of the item could cause some illness or disease. Currently soft drinks sweetened with saccharin must carry the warning: "Use of this product may be hazardous to your health. This product contains saccharin which has been determined to cause cancer in laboratory animals." The consumers are confronted with an unquantified probability of this hazard and left to choose whether or not to purchase the product depending upon their perception of the risk involved. No other label information is given to consumers about this or other possible hazards associated with the many other substances that might be legally contained in this food product or others that would be consumed with it. Concentrating attention on one important risk eliminates an information overload problem which may

occur when many ingredients and nutrients with their respective warnings of use are listed on labels. However, it is important to realize that the selective use of warning labels relies upon a regulatory process of some type to identify and quantify important hazards and make professional judgements about them.

If consumers are to make beneficial use of more information, a major *continuing consumer information program* will be required. Consumers must not only be informed of new knowledge about food hazards, but also of how to assess the risk involved and to keep it in proper perspective. At the same time, the food safety program must be able to respond quickly to major consumer concerns as they develop.

Providing and Paying for Services

As to *who should provide for added protection or more information and who should pay for it*, consumers appear to be willing to pay some increased prices for these services. But no research results demonstrate that consumer willingness to pay would be commensurate with the costs of providing them through the marketplace. Nor are there any studies that show that consumers can select priorities in their preferences for safety services according to the realizable benefits. Consequently, consumers' uncertainty about the benefits and costs of additional services results in different opinions about who should provide more food safety services. Some strongly feel that the federal government should be the chief guarantor of consumer protection and information, but others feel that the food industry should take more responsibility and provide more safety services and information. In sum, the marketplace offers an advantage of determining which services will be purchased in quantities sufficient to cover private costs. However, government will continue to have a legitimate vote in ensuring an equitable distribution of essential safety services to consumers as well as in providing additional protection when it appears the additional benefits to society outweigh the costs involved. Redistributing these services or costs and providing new services will probably require the enactment of new legislation.

THE FOOD INDUSTRY

The structure of the U.S. food system has changed dramatically during the past 30 years. The number of farms and marketing firms has shrunk, while those remaining have grown in size and sometimes in market share. Firms have focused on goals of growth, profits, efficiency, and market control. New production, processing, and marketing techniques that enhance product appeal to consumers or reduce costs have been readily adopted. Yet food producers and processors have found that many of the technologies used to produce the products that consumers want to buy are the same tech-

nologies that draw safety-conscious consumers' fire, namely the use of chemical processes and additives, animal drugs and stimulants.

Although growth, profits, and efficiency have been food industry priorities, food firms have also become more conscious of the need to produce safe products. Most firms have developed, promoted, and built their reputations and future profit potentials on lines of branded products which consumers can readily identify and with which they feel comfortable. Adverse publicity about the safety or quality of a product or a firm's unwillingness to comply with safety rules and regulations can bring instant losses in good will, sales, and profits that could take years of advertising and promotion expenses to recoup. In addition, product liability lawsuits can result in mammoth legal bills.

Safety Standards

Numerous government safety standards apply to these firms. Some specify the processes used to produce a food product (process standards); others specify the purity or composition of the final product (performance standards). Examples of the former include good manufacturing practices and the use of approved equipment or packaging materials. Examples of the latter include product standards of identity and composition and tolerance levels for pesticide and animal drug residues and environmental contaminants.

Enacting food safety laws, promulgating rules, and establishing public agencies to inspect food and plants and enforce rules have removed much of the opportunity, risk, and uncertainty that firms would encounter in the marketplace if they were left on their own to develop acceptable safety standards and compliance procedures by which to compete with one another. Food safety regulations establish a floor below which food safety performance cannot fall, even performance by unscrupulous, inefficient, or low resource firms. These regulations protect unaware or uneducated consumers when they are properly enforced. However, food safety regulators' tendency to rely on process rules rather than performance standards discourages competition on product safety or innovation in the area of safety-producing technology.

Regulatory Issues

The food industry has alleged that the regulatory environment imposes unnecessary and costly burdens and that it is too inflexible to achieve the progress demanded in the domestic food market. Specific issues frequently cited include: (1) the need for legislative relaxation of the anticancer Delaney clause, (2) the need for a new legislative definition of safety that incorporates a recognition of risk, (3) use of risk/benefit or cost/benefit concepts in determining whether to approve or deny use of regulated substances and processes, (4) more reliance on outside experts in the food safety process, (5) setting strict time periods in which food safety regulators have to render decisions on petitions, (6) reducing paperwork require-

ments, and (7) relaxing continuous inspection procedures for federally inspected meat and poultry product processing establishments.

Costs

The food industry has not been an ardent supporter of consumers' demands for more food safety services for several reasons. First, there is little incentive for a firm to adopt cost increasing measures except to differentiate a product and obtain either higher prices or greater sales than the competition. In many cases, the benefits of cost-increasing services cannot be appropriated by any one firm. Competitors cannot be prohibited from emulating these services, and there is little opportunity to recover development costs. This is especially true for presenting public information about food in brochures or label formats and quality measures derived at considerable expense to the originating firm - for example, shelf life or freshness dates printed on packages. Competitors can easily read and interpret this information and copy it with no fear of reprisal and at no cost for the experimentation leading to the information. The initiator cannot expect to recover the investment needed to produce the service. Today, in addition, the high cost of capital acts as a further deterrent to any firm that might wish to provide the information as a means of promoting good will.

Secondly, no comprehensive market research results available from the public or the private sectors indicate the extent of the market for many of the new food safety services proposed by consumers. Firms will have to engage in expensive and time consuming experimentation to determine what the demand is for new services.

Marketing Problems

Food firms remain concerned about an age old marketing problem: the absence of safety standards upon which to establish commodity prices that would reflect the expected processing cost to make the commodity safe for a food use. When it comes to safety, imperfect information affects all participants in the food system. All too frequently, potential hazards such as chemical residues and microbial pathogens are neither visible nor readily detectable and are sold to unsuspecting buyers. Ownership identity is frequently lost during marketing as commodities and ingredients are assembled or blended into new lots for resale. Once the hazard is discovered, the owner may attempt to minimize his loss by spreading it over future sales transactions through small offsetting price adjustments. The party responsible for the loss may remain undetermined and may never pay any more than a small fraction of the loss.

Lack of assurance about the safety of commodities sold in the marketplace encourages food firms to vertically coordinate production and marketing stages. Then a firm can impose safety performance and process standards upon its departments as well as monitor for compliance at each step in the process. Furthermore, larger firms can capture any compliance scale and pecuniary economies

that might result from applying new, more efficient hazard detection techniques applicable to large volume operations. High investment and operating costs might prevent smaller firms from owning or leasing such systems, thus leaving them exposed to the potential economic losses from the use and sale of less safe inputs and products.

Potential Misuse of Drugs and Chemicals

Major economic losses can result when producers do not know the characteristics of, and remedial measures for, misuse of potentially hazardous substances. Once a problem is recognized, finding the information on corrective measures may be too time consuming to prevent catastrophic losses. Some producers, at considerable risk to their business reputations, might be tempted to market contaminated commodities and ingredients in order to transfer any expected economic losses to an unsuspecting buyer.

An example of this dilemma is the use of available but unapproved drugs to promote livestock growth or treat animals. There are no assurances that drugs used for nonapproved purposes are safe or effective. Potentially serious losses to producers, processors, or consumers could result. Yet for many of these substances, detection methods have not been developed. Preventing the introduction and sales of these potentially hazardous substances, developing simple, inexpensive detection methods, and educating farmers, processors, and food handlers about the possible consequences is a new dimension of an ongoing problem. At the same time, producers throughout the food system must become increasingly convinced of the need for good management systems for handling potentially hazardous chemical technology and capable of implementing them. As a first step, the Federal Extension Service, in cooperation with state extension specialists, is conducting a national program to educate livestock and poultry producers and handlers about chemical and drug residues and their prevention.

INNOVATORS

Technological innovations increase productivity, output, and progress in the food delivery system. Innovation may occur at any level: input supply, farm, processing, transportation, or distribution. In the same way, innovations at any level may have food safety implications. Some of the most important cost reducing innovations of the last several decades include the development of a number of pesticides, food additives, animal drugs, and packaging materials. Also important or promising for the future are: vacuum packing, ultra-high temperature processing, mechanical deboning, irradiation, microwave cookery, and genetically engineered drugs, additives, and stimulants, to name only a few of the new processes.

The innovators of many of these substances and processes, chemical and pharmaceutical firms, are concerned that too many costly licensing and registration approval

procedures discourage the rapid development of new innovations. In the past, these innovations have helped the United States maintain its present technological lead in food production and marketing, a lead being challenged by Japan and other countries which are pursuing advancements in biotechnology. Cumbersome regulatory procedures are also viewed as impeding the introduction of safer substances that could replace more hazardous, less efficacious substances now in use.

Regulations

Food innovators have three major concerns about the U.S. regulatory environment. (1) Animal drug, food additive, and pesticide registration procedures are too complex and unnecessarily time consuming for industry and for regulators. (2) Too much time and money must be spent on defensive research to reconfirm the safety of previously approved substances. Scarce research and development funds must be redirected away from developing new products. (3) The patent protection term of 17 years is too short to provide firms the necessary incentives to invest in the costly development and approval of many needed substances.

These arguments can be supported with evidence. Rates of approval for new substances dropped rapidly during the past decade: from 4.2 new animal drugs per year during the 1967-1971 period to an average of 1 per year during the 1976-1979 period. Approval times increased. The average time required for the approval of a food additive increased from 2 to 4 years and up to 10 years. The average time for pesticide approval was 2 to 3 years, ranging up to 6 years.

The Reagan administration took steps to cut time requirements by introducing "fast-track" approval procedures. However, innovating firms had already started to relocate research and development operations overseas. A U.S. pharmaceutical manufacturers survey showed that 20 percent of the research was done abroad in 1979 compared to 10 percent a decade before. Other companies are getting out of the research area altogether because of the unfavorable outlook. Furthermore, food industries in many foreign countries can obtain nationally approved substances far in advance of their approval by U.S. regulatory agencies. For example, between 1970 and 1980, the European Economic Community (EEC) approved 24 new animal drugs that were not made available in the United States during the same period. Furthermore, EEC approval times for some substances are only half those of the U.S. Molecularbiologists are expected to produce many new substances for expanding food output and lowering production costs during the next decade. Continued faster approval of the use of such substances by foreign countries could seriously erode the United States' ability to produce efficiently at home and to compete effectively in international markets. The bottom line could be a smaller share of world markets for U.S. food products.

The registration process can evoke many time consuming, if not insurmountable, problems. Insufficient techni-

cal information to assure safety may be provided by the petitioner, or the regulator may be uncertain about what information to request. Sometimes the scientific issues are so complex that professional differences in the opinions of petitioner and reviewer require additional technical information or withdrawal of the petition altogether. The lack of specific procedures to follow for testing and analyzing substances for safety is a frequent source of difficulties. Yet there is no single set of procedures that apply, or possibly could apply, to safety testing for all pesticides, animal drugs, additives, or other substances such as packaging materials.

New Testing Procedures

Advancements in bioassay procedures to test for safety have been as dramatic as developments in food production technology. It is now possible to detect the presence of some contaminants at concentrations of parts per billion or trillion. Many substances still in use were approved years ago by far less sophisticated assay techniques. In 1979, the Food and Drug Administration proposed procedures to test all new and old animal drugs for carcinogenicity. However, the proposal was judged excessively costly. The carcinogenicity tests for some old drugs might exceed their total annual revenue by one or more times, probably forcing their withdrawal from the market. Producers relying on the use of these compounds might need to make cost increasing production adjustments to compensate for the loss of withdrawn substances. And committing scarce research funds to keep products without any evident adverse effects on the market might slow the development of new products. Recently, the FDA offered a revised proposal that substantially modifies the earlier one. This new proposal, entitled "Human Food Safety," omits any mention of testing old drugs for carcinogenicity but does revise requirements for testing new drugs. This new version might extend the market life of some old compounds not currently suspected of being cancer-causing agents.

The capability to detect infinitesimal concentrations of potentially hazardous substances in food has stimulated interest in amending the anti-cancer Delaney clause of the Food, Drug and Cosmetic Act. In 1958, the year of enactment, the zero tolerance feature of the Delaney clause was defensible because the best assay method lacked the sophistication to detect small amounts of cancer-causing substances. But advancements in assay technology that enable laboratory technicians to detect minute, and what many consider harmless, quantities of these substances support the adoption of a non-zero tolerance. Such a tolerance would enable the approval of foods and additives currently prohibited by Delaney. The policy problem is trying to determine a socially acceptable and scientifically supportable risk level. However, little of the evidence which has been presented on the socioeconomic benefits and opportunities for agriculture would support amending Delaney.

Many of these issues have been addressed recently in proposed legislation to amend the Food, Drug and Cosmetic Act. But the controversy over how to effectively increase efficiency without sacrificing safety has stalled enactment.

Patent Protection

Controversy over the inadequate length of the patent protection term originates with the protracted delays experienced by petitioners who try to obtain registration approval for pesticides, animal drugs, and food additives from regulatory agencies. An innovator sometimes obtains a patent only to find that he or she may not be granted a registration petition to sell the product for several years. The innovator is not granted any adjustment for the portion of the 17 year protection term used for obtaining registration approval. Recovery of a usually substantial investment must be made in whatever time is left. The Congress recently enacted legislation to extend patent terms for certain additives and pharmaceuticals but failed to enact companion legislation for animal drugs and chemicals.

Extending the patent protection term for substances that might need to be reviewed periodically with up-to-date procedures to verify their safety could provide the private sector with one incentive to test a product instead of withdrawing it from the market. A guarantee of an extended protection term would improve a firm's ability to recover its testing costs without fear of early competition from price-cutting competitors. Once the patent expires, these competitors can replicate the product without bearing any of the research and development costs.

REGULATORS

Concerns about the need to improve the performance of the federal food safety regulatory system have been well publicized. Registration procedures need to be simplified and the petition review process made more efficient. Duplication of effort among federal food safety regulators and between federal-state agencies needs to be eliminated and any gaps and omissions filled. The safety criteria need to be made explicit and consistent with knowledge about present day problems and up-to-date state-of-the-art production techniques. There is little interest in grouping responsibility for food safety, currently spread over several agencies, under a super agency that would regulate all aspects of food safety at the federal level.

Many current procedural matters can be corrected by promulgating amendments to existing regulations. However, other safety issues would require congressional attention. One is the future role of the federal government in food safety regulations.

Self-Regulation

Should industry representatives be entrusted to develop

codes of conduct and enforce those codes among themselves with government guidance in determining the goals and defining acceptable conduct limits? If so, the private sector might display considerable imagination and initiative in modernizing methods and procedures to protect consumers from unsafe foods, and at the same time offer consumers greater choice in food safety services. If the supply and demand for safety services were determined in the marketplace, a large part of the economic cost now borne by the public sector could be shifted to the private one. Industry trade associations could establish quality control and compliance procedures to ensure safety, conduct ongoing research to develop new and more cost effective bioassay and toxicological testing procedures, and develop informational programs and materials for industry use as well as that of consumers and producers.

An economic advantage of trade group sponsorship is the realization of research and development scale economies that are not available to the individual member firms. Results would be made available to all members at a relatively low cost compared to that of each firm conducting its own research program. Cost could be allocated to members by any one of several methods including fixed fee or on a dollar sales volume basis. Enforcing codes might require nothing more than an industry trade group denying a violator access to services and publicizing the name of the violators and the violations. In other cases, such as establishing food safety standards and punishing criminals for other serious violations, the public will likely continue to want the federal government strongly committed and involved. It does seem increasingly desirable, however, to foster, whenever productive, a cooperative, progressive relationship between government and industry. Antagonistic, litigation-prone interactions are time consuming, expensive, and in the end non-productive. Modifying the safety regulatory system to encourage the industry to do the things it does well, such as developing a consensus and acting rapidly when it is motivated, might resolve many of the industry's complaints that a bureaucracy does not provide service as quickly or effectively as a private organization. The key to success of a policy based on industry self-regulation is convincing the food industry that acting in the "public" interest is in the industry's interest. However, previously enacted antitrust legislation will need to be amended to allow more cooperation between firms in a given food industry. Such firms can then conduct research jointly and set up self-policing programs.

Inspection - Benefits and Costs

Who should pay the cost of daily food inspection, especially the \$325 million a year for federal meat and poultry inspection? This concern is another controversial issue. The taxpayers now bear most of this expense. Legislative and regulatory proposals to transfer cost to regulated firms in the form of user fees have met with strong opposition, although the cost burden does not appear excessive. Arguments against the proposals include the in-

ability to establish a system equitable to both small and large processors in terms of its availability, quality, and the cost of such a service. Furthermore, part of the cost would be shifted to commodity producers who are not necessarily able to pay. Shifting the cost to firms might induce some to cheat or otherwise cut corners to cut the cost of the service. This then raises new enforcement problems.

Policymakers and regulatory agencies are concerned about determining the optimum level of enforcement. Too little enforcement can result in numerous violations and huge losses to society. But too much enforcement can result in the last dollar spent on protection producing only a fraction of a dollar of safety protection benefits. Unfortunately, virtually no empirical evidence about the losses associated with different levels of enforcement expenditure is available. It is not technically or economically possible to eliminate all forms of food safety risk. Society needs to establish some reasonable goals and let the regulatory agencies develop cost effective measures that would bring marginal costs in line with marginal social benefits.

Need for International Coordination

The increased internationalization of the food market reveals dramatic inconsistencies in food safety standards and enforcement between countries. Differences in public attitudes about food safety needs and about protecting national agricultural economies from imports form the bases for the variations in policies. Countries are understandably reluctant to give up jurisdiction over food safety to an international organization which may or may not adequately reflect national interests. Such an organization could be very useful, however, providing uniform rules and compliance and enforcement procedures; generating and disseminating information worldwide on how to produce, process, and assay foods for safety; educating inspection personnel about accepted techniques; and sponsoring or conducting research on cost effective inspection methods. An organization of this sort could establish a system that would monitor the occurrence of hazardous incidents involving food; provide assistance, especially to developing countries; and alert countries to problems needing immediate attention. Organization costs could be borne by member countries based on ability to pay or on the value of their commercial food sales. Such an organization would offer member countries substantial savings on large scale research on food safety problems and on developing compliance and enforcement methods. It would also facilitate international trade and assist many developing countries in establishing their own organization to promote food safety.

At present, the Codex Alimentarius Commission of the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) develops international standards and safety practices for foods through negotiations with 122 member countries. The Codex standards include minimum safety and hygiene levels that countries may

apply voluntarily as well as ingredient and label information. Although the Commission has existed since 1962 and has developed numerous standards, member countries, especially developed countries, have been slow to adopt these standards. Until they are more widely adopted, international trade is likely to remain impeded by inconsistent standards. Because safety standards are a convenient form of non-tariff barrier for countries wishing to protect markets, commitment to free trade as well as a consensus about food safety criteria will be important if discrepancies in standards are to be resolved.

IMPLICATIONS FOR U.S. AGRICULTURE

What do all these food safety issues mean for the U.S. producer? The food industry already possesses many of the technical and administrative methods to provide the safety services wanted by U.S. consumers and our trading partners. Admittedly the flexibility of existing services is limited. This presents three not altogether new implications for producers of raw food commodities.

First, the food industry cannot provide all necessary safety services in a cost effective manner and continue to meet expectations for high quality, variety, an economy without substantially closer cooperation and coordination with the commodity producers. In order to satisfy more and increasingly technical safety specifications, producers will need to alter their production and management practices. Since open markets do not operate efficiently to determine price when a large number of commodity classes and safety specifications are involved, more contract production or vertical coordination is likely. The need to resolve long-standing issues increases; these issues include freedom of entry, especially to foreign food markets, and necessary conditions for the survival of the traditional family farm structure.

Secondly, producers need more technical services to make the adjustments that will be required in the new market environment. The needs are many, including: (1) establishment of new transaction standards based on the presence or the lack of health hazards in or on the food commodity, (2) new production methods that protect the commodity from the hazards, (3) new management information systems to record the production history of a commodity and verify compliance with safety standards, (4) up-to-date information on proper handling and use of hazardous substances in the production process, and (5) information on penalties levied by the enforcement agency for noncompliance.

Thirdly, producers need economic protection from a number of potentially threatening factors. These include less control over the production decision making process, fewer marketing opportunities, and increased exposure to product liability claims. Protection needs include: (1) an arbitration system that affords quick, inexpensive, equitable settlement of legal disputes between producer and buyers, or between producers and input suppliers over

safety compliance problems; (2) stronger enforcement measures to reduce the availability of illegal, potentially hazardous substances that could cause serious economic losses to producers who unwittingly use them; (3) methods to enable producers to verify quickly and easily the purity of purchased inputs and commodities from common contaminants; (4) a nationwide information system to track ownership of food animals and shipments of food crops from the farm through the processing stage; (5) implementation of a program to discourage misuse of potentially hazardous substances that could result in compliance violations; (6) readily available information on corrective measures to minimize losses from accidents involving dangerous substances, disposal of hazardous wastes, and contaminated commodities; and (7) readily available current information on substances and practices approved by the United States and other countries for use in producing food.

POLICY CONSIDERATION

Achieving the goal of increased food safety to satisfy domestic and international market needs will require both public and private sector involvement. Government involvement should complement the actions of the private sector. Government should be active in sponsoring basic research and developing applied techniques in situations where an uncoordinated private sector approach would lead to duplicated efforts, excessive costs, and a high probability of failure in successfully completing the research. Public policies to fulfill informational and educational needs are appropriate for the same reasons. Given the rapid changes in technology, new definitions of safety and new standards and enforcement strategies should be developed, debated, and adopted by public policymakers in order to achieve socially desired levels of compliance. Protection of producer well being and the need for extended patent protection also should be resolved by public policymakers because of the numerous legal issues involved. In addition, diplomatic protocol will probably continue to require extensive public involvement in negotiating and approving international definitions of safety and compliance standards for food and commodities sold in international markets.

What about consumers? What does the evolving food system mean for their convenience, nourishment, and satisfaction? It is likely that the U.S. food supply, already one of the safest and most abundant in the world, will become more so. It is likely that consumers will have more food safety choices in the market and will have to make more decisions between safety and food costs. It is also likely that the amount of safety-related information available to consumers will continue to grow. To be valuable to consumers, this information must be factual and free of the sensationalism that often characterizes stories on food safety problems. Consumers of all ages will require intensive education on hazards, their

consequences, and how to prevent them. Many of the most common and the most serious food safety hazards are found in the home. Finally, consumers need to understand and accept the principle that it is not possible, either technically or economically, to eliminate all risk from the food system. Rather, the food safety system acts best when it spends limited resources on the most serious problems.

The private sector can, and probably will, play a leading role in developing consensus on a number of safety issues to be dealt with by public policymakers. Furthermore, much of the market development and application of compliance methods will remain with the private sector, following sponsorship or completion of the basic research by the public sector. The private sector will continue to have a leading role in determining the structural arrangements by which producers and the food industry will coordinate production and food safety protection. And within the constraints imposed by public regulation, the private sector will test the market potential for additional services. Such services will determine future courses of action for both public and private involvement in establishing new food safety policies and programs.

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12th Annual AOAC Spring Training Workshop & Exposition

AOAC (Association of Official Analytical Chemists) will hold its 1987 Spring Training Workshop at the Skyline Hotel, 101 Lyon Street, Ottawa, Ontario, Canada, April 27-30, 1987.

This annual event promises to be an exciting and informative experience highlighted by a two-day microbiology symposium entitled, "Food- and Water-Borne Disease Investigation-Is There a Rational Approach?" Other workshop sessions will focus on chemical analysis of vitamins and nutrients, food additives, mycotoxins, drugs, trace metals, pesticides, veterinary antibiotics, and environmental contaminants; and on immunoassay, robotics, and chemometric techniques.

There will be a full two-day poster session on all aspects of analysis, and a scientific equipment exposition of 30 exhibitors displaying the latest in laboratory equipment and supplies. Registration fees

include the workshop and exposition along with a wine and cheese mixer and an evening gala.

For further developments on this meeting, contact Graham MacEachern, Agriculture Canada, Laboratory Service Building 22, Central Experimental Farm, Ottawa, Ontario, Canada K1A-0C5. Telephone: 613-994-1991, or James Lawrence, Health & Welfare Canada, Health Protection Branch, Tunneys Pasture, Ottawa, Ontario, Canada K1A-0L2. Telephone: 613-990-8495.

For information on the poster sessions, contact Russ Graham, Food Research Division, Health Protection Branch, Ottawa, Ontario, Canada K1A-0L2. Telephone: 613-990-8459.

Product Safety Top Priority As DFISA Supports Research

ROCKVILLE, MD--"Product safety is obviously the top priority for this industry and it is up to us in the industry to see that proper research receives the support necessary to achieve positive results," announced Robert C. Anderson, Jr., President of the Dairy and Food Industries Supply Association.

Anderson, President of Anderson Instrument Company, stated that DFISA has signed a letter of commitment for \$10,000 to the University of Washington to continue research into methods of detecting contamination in consumables. "The commitment," Anderson said, "was the result of a meeting attended by DFISA Executive Vice President John M. Martin, representatives of the Colgate-Palmolive Company, and University of Washington officials."

Developed by Dr. David Honigs of the University of Washington, the procedure involves coating of hard capsules and adding indicators to food, liquids or pharmaceuticals which would cause a color change when a contaminant was introduced to the product.

"Dr. Honigs has been successful in developing a concept of color indicator," Anderson said, "which must now be extended by further research. The possibilities are exciting. Such research, if properly pursued and developed, could mean, for example, that any contamination could be detected during production."

"While we can only imagine the success of such research, the potential for product protection is immense," Anderson added. "Pour milk from the container, if it is white, drink it. If a contaminant is introduced, the liquid changes color and the user is immediately aware of a problem. There is no doubt that this research must continue."

According to Dr. Honigs, the goal of his research

is to add a new layer of product protection from poisoning. Honigs stated that, "the three broad classes of poisoning, which a manufacturer needs to guard against are intentional poisoning, natural and accidental poisoning."

In discussing his new development, Dr. Honigs pointed out that a poisoning indicator would bring back some of the consumer confidence in edible products, especially those which have been the subject of tampering threats. With each product having its own tamper evident sensor, the manufacturer or processor has increased protection against idle threats and the ability to save lives as well as protect the company from inventory and economic loss in the case of an isolated tampering incident.

Dr. Honigs sets forth methods of treating a product (such as a food, drug, mouthwash or dietary supplement, intended to be taken into the mouth or consumed) to indicate the presence of contamination. A colorimetric indicator, such as an iron-containing compound capable of reacting with a contaminating substance such as a cyanide compound, is incorporated to produce an easily detectable color change indicating the presence of contamination. The methods may be used during the processing of the product, or afterwards as a coating, or may also be incorporated into the external packaging of the product.

In emphasizing DFISA's support of the efforts of Dr. Honigs and the University of Washington, Anderson urged industry companies and trade associations to join DFISA in seeing that the research moves ahead, promptly. "Sometimes industry associations get so involved in other efforts like legislation, statistics, and promotion that we overlook our primary reason for existence: the sale of products which are satisfying and safe for our customers," Anderson added.

The accomplishments of Dr. Honigs have been so impressive, Anderson said, that DFISA is determined to build all of the support necessary to see him able to continue his work.

In reporting on the meeting in Seattle, DFISA's Martin stated that, "The research ahead will focus on locating edible indicators which respond to classes of poisons such as heavy metals, ligands, alkaloids and toxins. By using a color indicator, it might be eventually possible to detect any contaminant introduced either during production or later through tampering."

"Some potential methods are to mix the indicator in with the liquid or solid product. Alternatively, the indicator can be a part of the carton or coated with stabilizers before being added to the product," he concluded.

Anderson advised that any company or association interested in supporting Dr. Honigs research or in

obtaining additional information should contact John M. Martin, Dairy and Food Industries Supply Association, 6245 Executive Boulevard, Rockville, Maryland, 20852-3938. Telephone: 301-984-1444, Telex: 908 706 DFISA ROVE.

Candidates Sought For 1987 Harold Macy Award

The Minnesota Section of IFT is seeking nominations for suitable candidates from all IFT sections for the 1987 Harold Macy Food Science and Technology Award.

The award, which was established in 1981, is to be given annually for an outstanding example of food technology transfer or cooperation between scientists or technologists in any two of the following settings: academic, government, and private industry. The purpose of the award is to advance the profession and practice of food technology and to honor Harold Macy, Dean Emeritus of the University of Minnesota and a founding member of IFT. Awardees will be invited to address the Minnesota Section. The award consists of a \$1,000 honorarium and travel expenses.

Nominations for the award should be made on an appropriate form and are due by January 15, 1987. Nomination forms are available from Susan Harlander, Chairperson, Macy Award Committee, University of Minnesota, Department of Food Science and Nutrition, 1334 Eckles Avenue, St. Paul, MN 55108.

Manuscripts Invited For ACDPI Student Essay Contest

The winner of the 1987 American Cultured Dairy Products Institute Student Essay Contest will be recognized at the Institute's Annual Meeting in Nashville, Tennessee on March 15-18, according to Board Chairman John Allen, The Southland Corporation. In addition to an all-expenses paid trip to Nashville, he/she will be provided with a \$500 cash award.

Guidelines for the contest are as follows:

1. The manuscript competition is open to college/university undergraduate students majoring in dairy and/or food science or a closely related field.
2. The essay should cover a subject within two broad topics related to cultured dairy products:
 - a. *RESEARCH* needed to solve a current or anticipated problem. This may relate to any phase of cultured dairy products research such as product

formulation, nutritional considerations, processing technologies, etc. Additionally, one may opt to highlight results of previous research pertinent to the topic or conduct a personal project and report the results;

b. *SALES/MARKETING* strategies for present or proposed cultured dairy foods. These could include suggestions for innovative promotion programs to increase product consumption or means of enhancing the image of the dairy industry and/or its cultured commodities.

3. Manuscript length should be approximately ten double-spaced typewritten pages.

Papers must be submitted by *DECEMBER 1* to Dr. Charles White, Dairy Science Department, MSU, Mississippi State, Mississippi 39762 with accompanying letter (signed by a faculty member) certifying that the essay was written by the student.

Agricultural Research Hurt by Budget Cuts

Pseudorabies can devastate a swine herd. And nitrate pollution of groundwater is a serious concern in parts of Minnesota. The two were slated for top-priority research projects through the University of Minnesota's Agricultural Experiment Station. But the combination of state and federal budget cuts means they can't be funded.

Total cuts from the Gramm-Rudman deficit reduction law will be close to \$200,000 in fiscal year 1986, according to Richard J. Sauer, director of the experiment station and vice president for the Institute of Agriculture, Forestry, and Home Economics at the university. Cuts will be even higher in fiscal year 1987. Sauer says the "most crippling" cuts in the 1987 budget are proposed for animal health research. "Some research projects that are very important to the livestock industry are proposed for elimination," he says.

The cuts would hurt hard-pressed farmers first. PigCHAMP and DairyCHAMP are new health care delivery systems for hog and dairy farmers. "These are top-priority programs that can help farmers, but funding is threatened," says Tom Fletcher, acting associate dean of the University of Minnesota's College of Veterinary Medicine. And in the longer run, budget cuts mean that "we aren't protecting our livestock industry against the potential for serious disease outbreaks," Fletcher says. Federal funding for animal disease research in Minnesota is about \$322,000 yearly.

"We can't turn research on and off like a faucet," Fletcher says. "The research is technical and requires

trained people. Once funding is cut back, it's hard to assemble the people you need to get started again."

Health maintenance for animals--like HMOs for people--is the direction that veterinary medicine needs to go, Fletcher says. The emphasis is on keeping the animals well instead of treating and controlling diseases. PigCHAMP and DairyCHAMP are examples, but current funding runs out June 30, 1986. Fletcher says their continued funding is uncertain.

"One serious disease outbreak would cost a lot more than what's supposedly being 'saved' with these budget cuts. And the federal government should be involved in supporting animal health research," Fletcher says. "Diseases don't stop at state lines. We can have one state with a large commitment to animal health disease. The neighboring state may be doing nothing, yet the disease can start there and spread into the state that has spent money to control the disease."

Several other research projects will be cancelled or delayed unless the federal budget situation changes, Sauer says. "Groundwater contamination is emerging as a large issue for agriculture in parts of Minnesota. A new research project on groundwater will be delayed due to a combination of cuts in state funding and Gramm-Rudman."

"Parents should not forget that--in addition to starches--vitamins, minerals, protein and fat are all essential nutrients for growing infants," emphasizes Ms. Behre. "The idea of increasing the fruit, vegetable and meat content, while decreasing water, sugar, salt and some starch, is an excellent idea. At the same time, however, creating fear regarding the use of modified starch, a safe ingredient, is not necessary. Let the quality and nutritive value of a product speak for itself."

The American Council on Science and Health is an independent, non-profit consumer education organization promoting scientifically balanced evaluations of foods, chemicals, the environment and health.

Copies of *ACSH News & Views* can be obtained from ACSH, 47 Maple Street, Summit, NJ 07901.

Edible Film Will Banish Goey Crusts

University of Wisconsin-Madison researchers may have the cure for goeey crust and soggy pastries in convenience foods. An edible film, recently developed at the UW's food science department, promises to banish words like mushy, gummy and slimy to the convenience-food history books.

The film, which is composed of cellulose, fat and beeswax, will improve convenience food quality by

keeping the wet and dry components separate, says project leader and food scientist Owen Fennema. Tests have shown that the film rivals Saran Wrap in its ability to keep wet components, such as pizza toppings, separate from the dry crust. "It's almost as good as a metal can," Fennema says.

The translucent film is tasteless, odorless, and about the same thickness as ordinary plastic wrap. It's designed to maintain food quality by blocking moisture transfer in foods such as pizza, filled pies and breaded fish. The film breaks down when heated, but even then contact time between wet and dry is measured in minutes instead of days.

The laminated film has three layers. A layer of cellulose gives the film its strength. A lipid, or fatty layer blocks water transfer. And a layer of beeswax boosts that water-blocking ability tenfold.

People have used edible food coatings to block moisture transfer in foods for centuries, according to Fennema. Larding, or covering foods with fat, was practiced in 16th century England. Other coating processes using wax and gelatin were patented in the 1800s. Today, thin coatings of paraffin are commonly applied to cucumbers and rutabagas to retard water loss and extend their shelf lives.

Fennema and Susan Kamper, a graduate student in food science, discovered that mixing the cellulose and lipids in an alcohol solution yielded an effective film. As the film dried, the lipid layer rose to the top, creating a moisture barrier, while the cellulose remained on the bottom, giving the film its strength.

The researchers found, to their delight, that adding a thin layer of beeswax greatly increased the film's water-blocking ability.

The next step is to devise a way to apply the film in a spray. This will cut costs, save time for commercial food processor, and open up new applications for the film. But even in its present state, Fennema said, the film would only amount to about one percent of the cost of the processed foods.

Although Fennema will continue testing the film's durability, he is already more than satisfied with the project, which started out as just a good idea with no official funding. "Right now, there's not much room for improvement," he said.

Current project funding comes from The Pillsbury Co., Inc. and began after patent rights were applied for by the Wisconsin Alumni Research Foundation at the University of Wisconsin-Madison.

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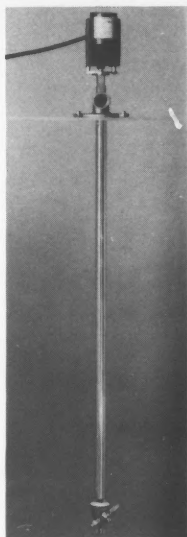
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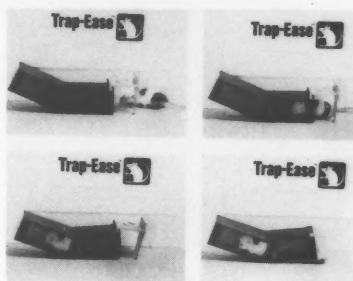
Electric Drive Tank Washer by Spraying Systems Co.

• Spraying Systems Co. announces an electrically driven version of the 190 series tank washers. Until now, the 190 tank washers were only available with an air motor drive. With the new 190E electric version, these popular tank washers can be conveniently installed in a wider range of tank cleaning operations. Just plug them in to start the orbital cleaning action.

The 190E has all of the advantages of the air driven units along with a lower price. The 190 air and electric units feature a maximum operating pressure of 500 p.s.i., and a maximum liquid temperature of 200°F. Both units require only a 3 inch diameter hole for insertion into a tank. An adjustable flange is available that permits easy spray head positioning. All wetted parts are "Teflon" or 316 stainless steel. The entire unit, with electric motor, weighs just 18 lbs. Liquid is sprayed through two high impact solid stream nozzles mounted on a rotating turret secured to a rotating housing. This provides orbital coverage for complete scouring of internal tank surfaces. Several sizes of solid stream nozzles are available for flow rates from 3 to 30 GPM. Effective cleaning at those lower flow rates can provide significant savings.

The entire drive unit on both models is located outside the tank. Where electricity can be used safely, the 190E tank washer is a natural choice. The 190A is designed for areas where spark hazards exist or an air motor drive is desired. Contact Spraying Systems Co., North Avenue, Wheaton, IL for additional information.

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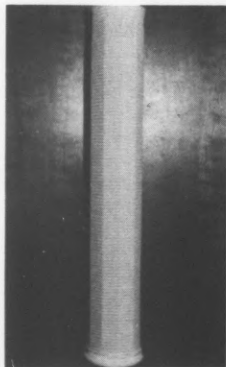
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Sulfite Determination

• Boehringer Mannheim Biochemicals offers the technology today for the simple and accurate enzymatic determination of sulfite. This comes at a time of considerable controversy over sulfite levels in our environment, both in the foods we consume and in the form of acid rains affecting our lakes and forests. Additionally, in the near future, the FDA will be mandating the labeling of products whose sulfite levels exceed a minimum threshold, making accurate and simple determinations of sulfite a must.

BMB's assay for sulfite is a simple, rapid, and highly sensitive enzymatic method. It can be used to determine the five most frequently employed sulfiting agents, sodium bisulfite, potassium bisulfite, sodium metabisulfite, potassium metabisulfite, and SO₂ gas. With adjustments to sample preparation, total, free or bound sulfite may be determined with the kit. Sulfite recovery has been found to be greater than 98% in aqueous solutions, with a correlation of 0.995 when compared to an iodometric procedure. In addition, this procedure offers a greater sensitivity (minimum levels 1.0 ppm) than the currently AOAC approved method (10-15 ppm). Alternate procedures, including ion exchange chromatography, require expensive instrumentation and extensive technical expertise. BMB's enzymatic procedure eliminates these problems. The kit supplies all buffers and enzymes in ready-to-use form and a determination takes less than 40 minutes. Batched samples can be assayed with a minimum of set-up time.

For additional information, call their Technical Services Department toll free at 1-800-428-5433 (in Indiana, call collect at 1-317-849-9350).

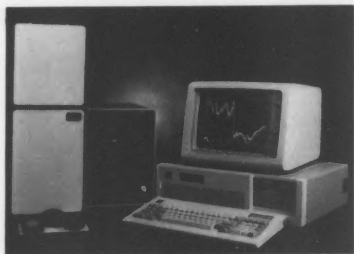
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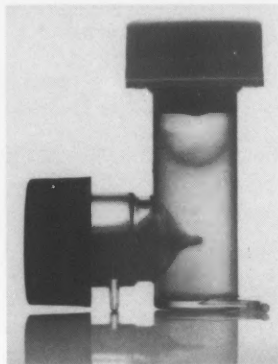
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- Video Instructional Programs, Inc. offers the first of a new series of pest control training video tapes.

Dr. Bobby C. Pass, chairman of the University of Kentucky Department of Entomology,



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There is no special equipment needed. There are no complex steps or difficult procedures to master. The 1-2 TEST can be used in all laboratory settings, including a plant site where staffing and equipment may be limited.

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developed the 90-minute tape "Initial Training and Certification." The presentation includes segments on: pest I.D., application processes and methods, mixing and handling chemicals, storing chemicals, first aid, and environmental and personal protection.

The tape is designed to prepare employees for certification testing and VIP says it can increase business and employee efficiency while leading to improved liability protection.

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Lovibond[®] Mini Test Kits For Water Analysis

- A new range of Lovibond[®] chemical testing kits has been introduced by The Tintometer Company. Designed for simple and accurate water analysis, the Minikits cover applications ranging from boiler, cooling tower, potable and waste water treatment control. Based on tablet reagents, they enable the user to achieve accurate results without any messy preparations associated with liquid reagents.

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A wide range of Lovibond[®] Minikits is available and all come with step-by-step instructions. The tablets are provided in foil packs or bottles, together with all the equipment necessary for the completion of routine tests. No chemical knowledge or training is required to perform successful tests using the new Minikits.

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structional Programs, Inc., 600 S. Main Street, Henderson, KY 42420. In Kentucky, call collect 502-826-9400, outside Kentucky call 1-800-826-7474.

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BBL® Acid Fast Stain Set

• BBL Microbiology Systems, a division of Becton Dickinson, is pleased to announce the addition of the BBL® Kinyoun TB Stain Set utilized for the detection of the tubercle bacilli.

The BBL® Kinyoun TB Stain Set facilitates performance using the familiar Kinyoun Stain technique. Acid fast organisms stain distinctly red against a light green background. Non-acid-fast organisms also stain green for clear differentiation. Each BBL Kinyoun stain set contains 1-250 ml bottle each of Basic Fuchsin, Decolorizer Solution, and Brilliant Green.

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This new TB stain set is an addition to the current BBL product group, which includes a Gram Stain Kit, sets of components, gallon containers and Tilt Slide Rack. For more information contact: Dorothy Steltzer, BBL Microbiology Systems, P.O. Box 243, Cockeysville, MD 21030. 301-666-0100 (ext. 2304).

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• Fisher systems shown here for the management of information and materials range from simple to sophisticated. They are available for medical, industrial, governmental and educational facilities, giant to small, and constitute, Fisher says, the widest selection available from a lab supplier today.

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For further information, contact: Harry Schwalb, Fisher Scientific, 711 Forbes Avenue, Pittsburgh, PA 15219. Telephone: 412-562-8468; in Canada, credit, Fisher Scientific, 112 Colonnade Road, Nepean, ON K2E 7L6

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Food and Beverage Notes

• *Food & Beverage Notes*, a new periodical devoted to High Performance Liquid Chromatography (HPLC) applications in the food and beverage industries, is available from Waters Chromatography Division of Milipore Corporation.

The first issue of *Food & Beverage Notes* features the new Waters SAM[®] Carbohydrate Separation System for rapid and versatile carbohydrate separations up to three times faster than conventional methods. Applications involving analysis of feeds and food using Waters Pico Tag[®] Amino Acid Analysis Method, sulfite analysis in food using ion chromatography, and analysis of plastic packaging using gel permeation chromatography are described. Other products featured are the Waters Automated Valve Station (WAVS[®]), Waters 410 Differential Refractometer and Waters 840 Data and Chromatography Control Station.

For a free subscription to Waters *Food & Beverage Notes*, contact: Kevin Rudden, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757. Telephone: 617-478-2000.

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NewAge Offers Transparent Steel Wire-Reinforced PVC Suction Hose

• NewAge Industries of Willow Grove, PA announces the immediate availability of a new line of transparent PVC suction hose called Vardex.

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Health Careers Guidance Manual...for the Greater Philadelphia/PENJERDEL Region, compiled and edited by Lawrence Abrams, Dean, College of Allied Health Sciences and Dorothy Grieb, Consultant/Project Coordinator, Health Careers Guidance Clinic, both with Thomas Jefferson University, Philadelphia, Pennsylvania.

Health Careers Guidance Manual is published and available through the Health Careers Guidance Clinic, College of Allied Health Sciences, Thomas Jefferson University, Philadelphia, Pennsylvania.

The *Health Career Guidance Manual/Health Career Guidance Clinic* project was initiated in 1968 as a demonstration project to provide guidance to students and others who have an interest in a health career, particularly those persons located in the eleven county area of Pennsylvania, New Jersey, and Delaware that surround Philadelphia (PENJERDEL).

The project has developed three major objectives:

1. "To provide individualized and personalized guidance and counseling for students and others with potential for the health careers at *Saturday Clinic Sessions* which provide a one-to-one relationship between a student and a working professional functioning in the health service environment."

2. "To inform school and agency guidance counselors about health careers and to strengthen motivation toward counseling in health careers by provision of a direct referral resource for students and by conduct of a *Counselor Workshop*."

3. "To develop data that might improve operations and workable principles whereby counseling efforts for the health careers will be enhanced."

The manual consists of a lengthy 380 pages and is separated into ten sections.

The first section contains 131 Health Career Job Briefs, each are varied and diverse and range from an Anatomist to a Vocational Rehabilitation Counselor. Each job brief contains a description of work, personal qualifications, employment opportunities, entrance and educational requirements, and where to write for further information.

A very thorough and excellent part of the book, this section contains the major component of the manual!

The remaining sections contain information on the following subjects: hospital educational and training programs, college and university programs available, Armed Forces Allied Health Education vocational programs, special programs and services - which includes programs available to minorities, disadvantaged and other special groups, health care employment opportunities - specifically the hospitals located in the eleven county PENJERDEL region, financial aid, volunteer services, health

career audiovisual aids, and sources of information about health careers.

It appears that this manual is aimed at the people in the greater Philadelphia, PA area. Even so, it is a very thorough and excellent resource, particularly the section containing health career job descriptions. I would highly recommend this manual as a reference, especially for counselors and those interested in a health service career.

Kevin Anderson, R.S.

Ames Health Dept.

Depot Annex

Ames, IA 50010

Engineering and Food: Volumes One and Two. Edited by Brian M. McKenna, Elsevier Science Publishing Co., New York.

Engineering and Food, Volumes One and Two, edited by Brian M. McKenna, represents the collected proceedings of the Third International Congress on Engineering and Food held in 1983 in Dublin, Ireland. The cost (\$222) of these massive volumes (1,160 pages) would make them prohibitive for most public health agencies. Their subject matter would tend to be too technically oriented for most non-engineers. However, personnel involved in food process engineering might find that these volumes contain the answer to problems they may be facing in a difficult process problem.

The two volumes have been edited and arranged in a manner that make them more valuable as a reference for the engineer. Volume One is focused on the underlying theories of heat and mass transfer. In addition, engineering properties of specific foods (milk, grain, coffee, carrots) are reviewed. In contrast, Volume Two concentrates on food processes rather than basic principles. Volume Two covers a variety of process topics ranging from instrumentation, microprocessor applied technologies, new biotechnologies, energy management problems and food engineering education.

These publications would not serve as a general reference for most public health professionals. However, both volumes would be useful additions to the libraries of schools with a food engineering curriculum. Practicing food engineers would find Volume One a useful review of basic engineering principles applied to food processing. Volume Two would be useful to engineers facing similar process problems. The editor, Brian McKenna, is to be congratulated for an excellent arrangement of papers from the International Congress into a text that will surely increase the acceptance of food engineering as a separate and distinct discipline.

Homer C. Emery, Ph.D.

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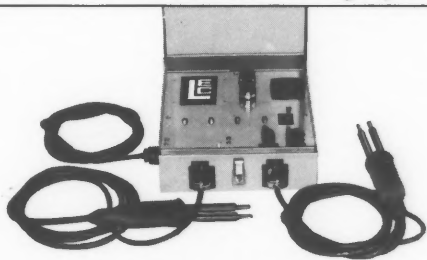
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Food Science Facts

For The Sanitarian



Dr. Robert B. Gravani
Cornell University
Ithaca, NY

Campylobacter jejuni

For many years, a number of bacteria known as *campylobacters* (meaning curved rod in Greek) were known to cause a variety of veterinary diseases in animals such as cattle, sheep and poultry. More recently, with improvements in the detection and isolation of this class of bacteria, microbiologists now recognize the importance of *Campylobacter jejuni* in causing human foodborne disease. *Campylobacter jejuni* is one of the most common causes of diarrheal illness in humans. Studies have shown that this organism is recovered as frequently or more frequently in the feces of persons with diarrhea than *Salmonella* or *Shigella*. There is still much that is not known about *Campylobacter jejuni*, but microbiologists are continuing their research to better understand the exact role of this organism in foodborne disease.

Food industry employees need to know:

- More about this organism;
- The types of foods that it is found in;
- How the organism can be killed;
- How to prevent *Campylobacter* enteritis.

This issue of Food Science Facts will provide some basic information on this emerging foodborne pathogen.

Habitat

Campylobacter jejuni are small, curved-to-spiral, rod shaped bacteria that are found in the intestinal tracts of healthy cattle, sheep, swine, ducks, chickens and turkeys. Studies have shown that fecal material from poultry, cattle and dogs contain from 1,000 to 10,000,000 *Campylobacter* per gram. With this level of *Campylobacter* present in fecal material, it is easy to understand how animal carcasses can become contaminated during the slaughtering process. *C. jejuni* has also been isolated from milk, eggs, soil and water that have come in contact with animal manure.

Food Involved

Campylobacter jejuni have been found in raw foods of animal origin including poultry, pork and beef. Poultry

carcasses and parts have been found to be a major source of *C. jejuni*. This organism has been isolated from about 92% of poultry carcasses and 85% of livers that were surveyed. It was also isolated from freshly slaughtered pork carcasses. So far, limited studies have shown that the incidence of *C. jejuni* on retail cuts of red meat is considerably less than on retail poultry meat.

The Disease

Several animal products have been involved in human *Campylobacter* outbreaks. The illness has been found most frequently in children over ten years old and in young adults, although all age groups have been affected.

The *Campylobacter* infections are thought to affect both the small and large intestine and produce a diarrheal illness. The symptoms usually appear 2 to 5 days after eating contaminated food, although a range of between 1 1/2 to 7-10 days has been suggested.

The symptoms of *Campylobacter* enteritis can vary widely. Some people have mild cases and show no visible signs of illness, but shed bacteria in their feces, while others have severe cases with bloody diarrhea, fever and prostration. Symptoms include abdominal pain and cramping, diarrhea and fever. Diarrhea usually occurs at the beginning of the illness or it may develop a few days after the abdominal pain and fever become apparent. The diarrhea is usually mild to moderate in severity. After 1 to 3 days of diarrhea, blood may appear in the stools.

Other symptoms that may occur are headache, malaise, muscle pain, dizziness and delirium. Although vomiting is not common, it has been observed in some cases.

The length of illness varies, but usually lasts from 2 to 7 days. Deaths, although rare, have been reported.

Transmission of the Disease

Since animals harbor *Campylobacter jejuni*, transmission of infection to humans can occur in several ways:

- After direct animal-to-human contact.
- Following consumption of contaminated water or food.
- By person-to-person contacts.

Since water and food have been implicated in several outbreaks of *Campylobacter* enteritis, it is apparent that the

oral ingestion of organisms is the most important mode of transmission.

The Organism

C. jejuni is a rather fragile organism that needs small amounts of oxygen to grow. The normal levels of oxygen in air inhibit the growth of this organism. The fact that it grows slowly and is difficult to culture, accounts for why it has just recently been recognized as an important human pathogen.

Survival in raw foods depends on the:

- strain of *C. jejuni*.
- initial number of organisms.
- environmental conditions—especially storage temperature.

The pH requirements of *C. jejuni* vary with strain and are influenced by the temperature and type of acid use. This organism is easily killed by heating foods to a minimum internal temperature of 140°F. The holding time at 140°F varies with the food product and is several minutes for beef and about 10 minutes for poultry.

Prevention and Control

Since *C. jejuni* has a mode of transmission similar to *Salmonella*, the same methods of prevention and control can be used. The prevention of *Campylobacter* enteritis can be achieved by following several important principles of food sanitation; they are:

- Use sanitary techniques in the slaughter and butchering process.
- Cook foods to temperatures needed to kill the organism.
- Store foods at proper temperatures.
- Prevent cross contamination of raw and cooked foods.
- Practice good personal hygiene when processing, handling or preparing foods.

By working together and following these simple rules, food industry employees can help prevent *Campylobacter* enteritis.

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Which Products Work Best?

"Bathtub mixes" are homemade mixtures of several antibiotics and anti-inflammatory drugs for treating clinical mastitis. Are you using them?

Even with good mastitis control and practices, every dairyman occasionally will have a cow that flares up, and she requires treatment. Let's examine the pros and cons of using a single dose, commercially prepared mastitis tube ("tube") compared with mixing up your own brew ("mix").

1. Drug compatibility:

Tube: Manufactured by chemists and veterinarians who know drug interactions and which combinations work.

Mix: Drugs you use might work fine individually but may be ineffective or harmful in combination.

2. Proven efficacy:

Tube: Must be researched and field tested to meet standards proven to work.

Mix: Individual components of the mix may be proven but in combination your only proof is someone's word or testimony.

3. Safety:

Tube: Must meet FDA standards to be safe and non-irritating.

Mix: No assurance of safety; some drugs are extremely irritating to udder tissue.

4. Residue avoidance:

Tube: Withholding times must be specified by directions; when adhered to, residues are not a problem.

Mix: Withdrawal times are not known, at least without testing each specific mix. Often mixes contain antibiotics that have extremely long withdrawal times.

5. Dosage:

Tube: Definitely specified on label, usually one tube (package) per treatment.

Mix: Unknown; too low equals ineffective and too high equals excessive tissue irritation and residue problems.

6. Product preparation and packaging:

Tube: Packaged under hygienic conditions and meeting stringent quality control standards.

Mix: Prepared under conditions that often lead to a contaminated product. The concentration of individual components of the mix, their stability, mixability and shelf-life all may vary.

7. Cost:

Tube: From a reputable source, except fair and reasonable cost; YOU GET WHAT YOU PAY FOR!

Mix: Individual components are cheaper, but considering all the possible problems, YOU GET WHAT YOU PAY FOR!

The bottom line is that there are more pluses for using tubes and much more risk if you are using bathtub mixes. Treating mastitis cows is a sophisticated science. It's good business to do it with the best information and best products available.

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Food Poisoning By Psychrotrophic Bacteria Growing in Pasteurized Milk And Milk Products

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The Food Poisoning Section Provincial Laboratories has received many complaints over milk and milk products since April, 1985. Most of these incidents involved children and/or senior citizens who experienced nausea, vomiting, diarrhea, fever and cramps. In other cases, complaints of rancid or off-flavours, discoloration and undesirable tastes were mentioned.

A few specimens were examined by the Provincial Dairy and Food Laboratory who found standard counts (SPC) $\times 10^4$ /ml, coliform-50/ml, and Phosphatase negative. Gram negative rods were isolated from seven specimens of pasteurized milk and sent to the Food Poisoning Section, Provincial Laboratories for identification.

To date, 41 specimens of dairy products have been tested including milk, ice cream and milk shakes. A heavy growth of psychrotrophs was found in 34 specimens - 22 *Pseudomonas* species (*Ps. fluorescens* (15) *Ps. putida* (5) and *Ps. alcaligenes* (2)), 10 *Enterobacteriaceae* species (*Hafnia alvei* (4), *Citrobacter freundii* (2), *Enterobacter aerogenes* (1), *E. cloacae* (1), *Klebsiella pneumoniae* (1) and *Serratia liquefaciens* (1), 1 *Aeromonas hydrophilia* and 1 *Bacillus cereus*.

The organisms can grow in milk and milk products at commercial refrigeration temperature of 2°- 7°C and hence are termed psychrotrophs (1). A recent article on dairy quality notes that most psychrotrophic organisms found in milk and milk products are gram negative rods (2). However, a few gram positive spore-forming thermophilic rods belonging to the genera *Bacillus* and *Clostridium* have, sometimes, caused defects in dairy products at refrigeration temperature. We found *B. cereus* in one specimen, but no *Clostridium* species were isolated.

Most psychrotrophs have an optimum growth temperature of 25°- 35°C. However, these bacteria will grow appreciably at temperatures between 2°- 7°C depending on the following factors: Sanitary condition of production, time of storage, temperature of storage, pH of the product, presence of oxygen etc. As milk has all the required nutrients it will support growth of most organisms. Bacterial growth will cause chemical changes in milk, producing defects in quality.

All the gram negative organisms that were isolated from milk are commonly found in the environment. They can contaminate milk handling equipment and holding

tanks through water, soil and uncleaned equipment. Their presence in high numbers in pasteurized milk and milk products suggest either improper pasteurization, post pasteurization contamination or lengthy holding periods at temperatures above 40°F.

Bacillus cereus is also a common contaminant of dairy products. Its spores may survive processing and germinate to form active vegetative cells. It has been shown that *B. cereus* spores may enter milk during milking or storage of the milk in the farm or during operations at the dairy. Most contamination originates from straw bedding and soil, and *B. cereus* enters milk from inadequately cleaned teat surfaces (3).

All the bacteria isolated from the milk in this survey commonly grow in the soil, vegetation, natural waters and on poorly cleaned milk equipment (4). Of all these isolates, only *B. cereus* is a recognized food poisoning pathogen. The others are regarded as non-pathogens, but when they are ingested in high numbers by children, senior citizens or by immuno-compromised patients, these organisms may cause food poisoning symptoms. Laboratories investigating food-borne diseases should be aware of this possibility, and should report these non-pathogens as "opportunists" when they are present in large numbers in food samples associated with clinical symptomatology in any of the above risk groups.

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Pasteurized Canned Ham - Should Nitrite Content Be Reduced?

The recent USDA recall of Rialto Brand Canned Ham from Holland (Est. No. 19, Code HSAZ, 12 lb. hams) due to bacterial spoilage, presented an opportunity to research the microbial ecology of pasteurized hams and the effect of nitrites. Canned hams have a limited shelf life and the Rialto brand hams were simply stored too long. Why does a properly canned ham spoil?

The pasteurized heat treatment typically given to large canned hams is so low that it is likely that many clostridial spores are not destroyed or even damaged. The safety system consists of a relatively high residual nitrite level (80-100 ppm) probably potentiated by isoascorbate, salt, and especially refrigeration. However, pasteurized canned hams are sometimes inadvertently held without refrigeration. At room temperature there is a race between decline of nitrite and decline of spores; and when the nit-

rite declines below about 30 ppm, some of the spores can initiate growth; germinated botulinal spores could produce toxin. When the product is held continuously at refrigerated temperatures, both nitrite concentration and numbers of spores decline, but the nitrite declines to sub-inhibitory levels before the spore population has died out. If such pasteurized canned hams are then placed at ambient temperature, growth of *C. botulinum* may occur; the longer they have been stored in the refrigerator, the more rapid is growth of any viable *C. botulinum* after removal to ambient temperature. Pasteurized canned hams have an excellent safety record over many decades; but because *C. botulinum* is not uncommon in pork, and we know that it can form toxin in unrefrigerated pasteurized canned hams, the levels of curing salts in such products should not be reduced. The food service operator must be aware of the limited shelf life of pasteurized canned hams and keep them properly refrigerated. (From *Microbial Ecology of Foods, Vol. 1, Factors Affecting Life and Death of Microorganisms*. International Commission of Microbiological Specifications for Foods. 1980. Academic Press, Inc.) NY State Dept. of Health. Food Protection Bull. 1/86.

Salmonella Outbreak Following A Church Social - Ontario

On the morning of 2 May 1985, the Peel Regional Health Department was notified by the Simcoe County Health Unit that several residents of Simcoe had reported ill with gastrointestinal symptoms following a meal consumed in Brampton. The suspect meal was a large buffet dinner served at a church social event on 26 April between 21:30 h and 22:00 h. Approximately 200 people from several municipalities in Southern Ontario had attended this function.

Early in the investigation, it became apparent that a small committee of church members had been responsible for food preparation and organization of the event. On the afternoon of 2 May, the coordinator of the committee was contacted and he provided a list of all those people that he could recall who had attended the function. Public health inspectors immediately contacted the people on this list to obtain case histories, and fecal specimen kits were distributed to people in the Peel Region along with an information letter requesting their cooperation in submitting samples. Several other health agencies were requested to assist in contacting residents within their respective jurisdictions.

In total, 119 persons were contacted; 84 reported being ill and 35 not, for an attack rate of 70.5%. Of the 119, 59 were male and 60 were female. Of those ill, 42 were male and 42 were female; of those not ill, 17 were male and 18 were female. The ages of those ill ranged from 13 to 57 years. Age and sex were not risk factors in this outbreak.

The epidemic curve reveals a typical case distribution for a common-source *Salmonella* outbreak, with an explosive onset followed by a gradual decline. Data from 70 reliable case histories revealed that the incubation period ranged from 1 to 58 hours, with an average of 25.8 hours and median of 12 hours. The average duration of illness was 72 hours. Although several cases were hospitalized, fortunately none died.

Symptoms reported in order of frequency of occurrence were as follows: diarrhea (86%), stomach cramps (58%), nausea (51%), fever (28%), vomiting (20%), and headache (11%).

Laboratory results were received on 49 fecal specimens submitted. Thirty-one individuals who reported ill had stools positive for 1 or more serotypes of *S. hadar*, *S. heidelberg*, and/or *S. schwarzengrund*. Of the 31, 24 were positive for 1 serotype, 6 were positive for 2 serotypes, and 1 was positive for all 3 serotypes. Isolation of more than one species of *Salmonella* is not uncommon in this type of outbreak.

Unfortunately, the only leftover food from the suspect meal available for testing was vegetable tarts. Bacteriological analysis of the tarts revealed nothing extraordinary.

Food-specific attack rate analysis indicated that the tuna and macaroni salad was the food item most likely responsible for the outbreak. However, in reviewing food preparation, transportation, and service techniques, many potentially hazardous practices were discovered, and a number of possible sources for this foodborne illness were encountered.

All food items served at the social were prepared by members of the church committee. Each member was responsible for home preparation of at least one dish to serve the 200 anticipated guests. The logistical problems associated with domestic food preparation for such a large number of people lead to multiple lapses in sound food-handling techniques. The fried chicken in sauce, for example, was prepared, pre-cooked, and refrigerated in the home of one church member on 25 April. It was then reheated in the oven the following day, prior to the event, then transported by automobile to the hall in crock pots, arriving at 20:30 h. It was served from the crock pots 1 hour later. This church member had no commercial food preparation experience; inadequate preparation, cooking, and refrigeration facilities were present in her home, and there was sufficient opportunity for contamination and time-temperature abuse. Many other potentially hazardous foods served at the social were handled in a similar manner.

Although the specific source and food item involved in this outbreak could not be determined, available epidemiological and laboratory information confirms the incident as a food poisoning.

Upon the request of the church group, a public health inspector provided a food handling seminar for 31 church members on 4 June. Topics included safe food preparation techniques, basic food microbiology, and personal

hygiene.

Can. Diseases Weekly Report 11-16-1985.

FDA Code Interpretation - Iodine Based Sanitizers and pH

Question: Is it acceptable to use iodine based chemical sanitizers in solutions which have a pH greater than 5.0?

Discussion: When iodine is used as a chemical sanitizer it is commonly formulated as an iodophor (IODO = IODINE and PHOR = CARRIER); essentially a combination of iodine with a solubilizing agent that releases free iodine when mixed with water. The formulation usually includes an acid since iodine is a more effective sanitizer in acid solution.

Iodine based sanitizers have a number of advantages. They provide quick microbial action against a wide variety of gram-positive and gram-negative microorganisms. At use concentrations, they are relatively non-toxic, non-irritating and stable. In acid solutions, they are relatively unaffected by hard water salts. Their acid nature prevents film formation and provides spot-free drying. Finally, dispensing and concentration control are relatively easy.

Iodine based sanitizers also have some disadvantages. They are not as effective as hypochlorites against spores and bacteriophages. They can stain porous and some plastic surfaces. They are relatively expensive. They should not be used above 120°F because they will begin to "gas off."

Early studies on the acceptability of iodine as a chemical sanitizer for food equipment and utensils indicated the effectiveness was *limited* to the pH range of 5.0 or lower. This information caused public health officials to become concerned about lessened effectiveness of iodine sanitizing rinses in:

- areas where municipal and private water supplies used in retail food operations were alkaline (pH up to 10.6); or
- situations where highly caustic detergent solutions are

carried over into the sanitizing rinse.

The 1962 and 1976 editions of the model Food Service Sanitation Code addressed this concern by including the requirement that an iodine sanitizing solution have a pH not higher than 5.0.

After the 1976 Code was published, several chemical manufacturers supplied FDA with information indicating that some iodine based products were formulated so that their effectiveness was extended to higher pH levels. Label claims of effectiveness at pH levels above 5.0 also had to be supported by data submitted to the Environmental Protection Agency.

Based on this information, the newer 1982 model Retail Food Store Sanitation Code was modified to state that "... equipment and utensils shall be sanitized by... immersion for at least one minute in a clean solution containing at least 12.5 parts per million of available iodine, having a pH range which the manufacturer has demonstrated to be effective and at a temperature of at least 75°F"

Since the publication of the model Retail Food Store Sanitation Code, FDA has received expressions of concern from regulatory officials who have sometimes found that the information provided by the manufacturer is insufficient. The label often does not specify the upper pH limit for which a solution containing the product will be effective. Without this information, neither the user of the sanitizer nor the field regulatory person can readily assess the acceptability of the iodine based sanitizer at a specific pH level.

Interpretation: It is acceptable to use iodine based chemical sanitizers in solutions which have a pH greater than 5.0 only if:

- the container label specifies an upper pH limit for which the recommended concentration of product in solution will be effective as a sanitizer, *and*
- the pH of the sanitizing solution does not exceed that limit. (From FDA Retail Food Protection Program Information Manual.

NY State Dept. of Health Food Protection Bull 1/86.

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Anheuser Busch
St. Louis

Jeff Nichols
Pevely Dairy
St. Louis

New Jersey

L. P. Engel
Oakite Products, Inc
Berkeley Heights

A. Jagers
SunneySide Veg Packing, Inc
Millville

Marc Tillis
Celentano Bros, Inc
Verona

New York

John Grom
Bison Foods Co
Buffalo

North Carolina

R. Richard Pierce
Dairymen/Flav-O-Rich
Wilkesboro

Oklahoma

Ruth Spears
Fort Sill

Pennsylvania

Ernest Lee
McNeil CPC
Fort Washington

Texas

Rodney Bridge
Dallas

Charles E. Gayler
Right Away Foods Corp
McAllen

Judith A. St. John
MCLAS Technologies, Inc
San Antonio

Vermont

John Jaworski
Vermont Dept of Agric
Montpelier

Virginia

H. Wayne Derstine
Leesburg

Washington

Doug Price
Gig Harbor

Ben Rotter
Vashon

Wisconsin

Michael Carney
W.M. Sprinkman Corp
Kenosha

John Hart
Tolibia Cheese Inc
Hartford

Gary Sierzchulski
Cercial Food Prod
Hales Corners

Canada
Alberta

Bonnie Jensen
Edmonton

Ontario

Robert Giguere
Maple Lodge Farms
Brampton/Norval

Australia

Mrs. J. Kovacs
Melbourne City Council
Melbourne

Jordan

Dr. M.I. Yamani
Univ of Jordan
Amman

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Chief Microbiologist

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PRESIDENTIAL ADDRESS

From the 73rd Annual Meeting
International Association of Milk, Food & Environmental Sanitarians, Inc.
Minneapolis, MN

Sidney E. Barnard

8 Borland Lab
Pennsylvania State University
University Park, PA 16802

Introduction

Here we are at the 73rd Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians. Preregistration of over 600 persons is an indication of the direction in which your association is going. You have another outstanding program before you. This has always been the key to how many people participate in a meeting. Your association has taken a number of steps which have been completed this year. You will see the changes in the next few days. Welcome to what will be a worthwhile educational program and a chance to enjoy a good time.

Program

Your Executive Board chose to invite a number of the Local Arrangements Committee to the planning meeting last fall. Roy Ginn selected some industry leaders from Minnesota. The program reflects their input. In my judgment it is the best program during my 22 years with your association. Roy Ginn, with his secretary Mary, pulled the many topics and speakers together. The *Listeria* and *Salmonella* symposia may be the highlights, but there are sessions for all regardless of your interests. These include milk, food, field, laboratory and environment.

Exhibits

Your Executive Board agreed to have a set number of educational exhibits on a trial basis this year. They were quickly filled, with other companies desperately wanting space. Your response and our judgment will determine whether these will be continued next year. We hope the exhibits are a worthwhile addition to the program this year and in the future.

Local Arrangements

When we met here last fall we were impressed with the facilities at the Radisson South. The Local Arrangements Committee under the leadership of Michael Pullen

has done a great job. Vernal Packard, David Smith and Bill Coleman have led key committees. Both attendees and companions should have a good time with the variety of social activities which they have arranged for us. They have a big challenge since we expected over 400 people to attend and the number exceeded 600.

Membership

More good news is that membership has increased in all areas. Affiliate, direct members and subscribers were up over 200 from the previous year. This is the first year in many that we have actually increased and maintained on renewals. The Advertising Department alone brought in 50 of these members. Additional promotion in terms of distribution of the journals, direct mail, and travel have brought this about. Ruth Fuqua, Membership Chairperson, and your Executive Board are putting plans into action to continue this increase. Total membership was 3,598. Twelve new Sustaining Members this year can also be credited to the efforts of the Advertising Department.

Advertising

Due to the efforts of Kate Wachtel and the Advertising staff of 2 part time and 1 full time person, over \$70,000 in advertising was sold this year. The goal for our next fiscal year is \$100,000. Advertising is very important in keeping your association in the black and maintaining your dues at the present rate.

Ivan Parkin Lectureship

At the recommendation of the Foundation Fund trustees, the Executive Board initiated an annual lectureship named in honor of Ivan Parkin, a long time active member of the association. Ivan continues to serve as parliamentarian and to give the invocation at the banquet. This annual lectureship brought us our keynote speaker, Dr. J. C. Olson.

Developing Scientist Award

This will be the first year when graduate student papers will be designated, judged and monetary awards will be given. Seven abstracts were accepted and under the leadership of Lloyd Bullerman, a judging committee was appointed and outstanding presentations will be selected. It is hoped that this will become a larger part of the program in coming years. This idea came from the trustees of the Foundation Fund and was endorsed by the Executive Board.

Foundation Fund

Money has accumulated in the Foundation Fund from Sustaining Membership fees. Both the trustees and the Executive Board endorsed the idea of developing ways to use the money in the most worthwhile manner. We are considering a proposal to develop a visual aids library for loaning slide/cassette tapes and video tapes to association members.

Affiliates

We have tried to foster more exchange of information between the affiliates and the association staff in Ames, Iowa. We need to know more about affiliate activities. To help achieve this, an effort has been made to contact the president or secretary of each affiliate this past year. You should note that all affiliates listed in this year's program have a delegate name. Sandy Engelman from the Ames office will be contacting affiliate officers throughout the year for meeting dates, annual meeting highlights, officer changes and so on. The 800 number has greatly improved the communication between affiliates and the Ames office.

Publications

Under the leadership of the editors, both publications continue to be successful. Mailing dates have been moved up so that you will be receiving your publications on a timely basis. There is a six month backlog of articles ready for printing in the *Journal of Food Protection*. *Dairy and Food Sanitation* for the first time has a comfortable backlog, but as always welcomes and needs your articles. Presentations at affiliate meetings make good articles. Your on the job experiences are of interest to the readership. You all have practical information and experiences to share with others. Rough out an article and Suzanne Trcka will work with you on it.

Committees

The backbone of IAMFES has always been its members and their activities in committees. Some of the com-

mittees have not been very active in the past few years. If there is still a purpose for your committee, let's revitalize them so they are worthwhile. Committee chairpersons are no longer required to give a report to the Executive Board. However, a report 5 minutes or less in length is requested during the business meeting.

Finances

This year has been a year of investment in the future. Substantial financial investments were made in a new and larger computer, an 800 telephone service and additional personnel. This has given the membership better service as well as increasing advertising by 75%. These investments, however, were not anticipated when the budget was prepared, but we felt the need for these areas was more important than having a better bottom line. Your association squeaked by in the black even with these added expenditures.

Ames Staff

Kathy Hathaway and our association staff have done an outstanding job. They have improved service to the members and expanded advertising. Behind the scenes they play a big part in making our annual meeting a success. They deserve our full support and thanks.

Executive Board Action

We unanimously voted to ask affiliates for a brief annual report of activities for the previous calendar year. This will be used as a basis for selecting the affiliate for the Shogren Award. In addition to certificates of merit given to members of affiliates at their meetings, we will be giving an award to the affiliate gaining the most new members for IAMFES. The 1987 meeting will be hosted by California and the 1988 meeting will be in Florida. We received two formal bids for 1989 from Kansas and Missouri.

Thanks

I appreciated serving as your president this past year. June and I have enjoyed meeting many new friends and it has surely broadened my experience. Thanks for letting me serve you, along with a strong Executive Board.

Conclusion

Your association increases its reputation because of the two publications and the many activities of its members. Our future is bright. With the election of Ron Case to the Executive Board and Roy Ginn assuming the presidency, your association will be in good hands.

73rd Annual Meeting Report



RADISSON SOUTH HOTEL

Attendance doubled that of previous years at the 73rd IAMFES Annual Meeting held in Minneapolis, MN, at the Radisson South, August 3-7.

The program was outstanding and obviously a major reason for the large audience. Symposium were held on *Listeria*, as well as *Salmonella*. Speakers from across the country, as well as the world, presented papers on timely topics of interest to all.

This was also the first year for exhibits. Twenty seven table top educational exhibits were displayed during the meeting. The Executive Board approved exhibits again for 1987. These educational table top exhibits enhanced the overall educational aspects of the meeting.

The facilities at the Radisson South were excellent, with room rates of \$63 for up to four people in a room.

Family entertainment included a bus trip to the Minnesota Zoo, along with a pig roast and entertainment by the Medicine Show Music Company. The weather was perfect, the food excellent and entertainment...superb.

Companion/spouse activities included a tour of the Ard Godfrey House, Our Lady of Lourdes Church, a comprehensive tour of the Twin Cities which included lunch at Forepaugh's, a haunted victorian mansion.

The Annual Awards Banquet held on Wednesday honored all award winners, which you will find individually listed within this Annual Meeting Report. Be sure to nominate



MIKE PULLEN, Chairperson, Local Arrangements Committee

deserving colleagues for the IAMFES Annual Awards for 1987. Information on the awards is available from the IAMFES office in Ames. You will also receive awards information in the mail in February.

The 74th IAMFES Annual Meeting will be held at the Disneyland Hotel, Anaheim, CA, August 2-6, 1987. Registration forms for both the hotel and the meeting will be available in both journals, beginning with the January issue.

Congratulations for a job well done are certainly in order for everyone involved in the planning of this most successful meeting. A special thanks to the Minnesota Local Arrangements Committee; Mike Pullen, Chairman; Assistant Chairman, Bill Coleman; Hugh Munns, Facilities/Visual Aids Chairman; David Smith, Registration Chairman; Don Berg, Finance Chairman; Vern Packard, Social & Companions Program Chairman; and Mary Anderson, Coordinator. Also, many thanks to Philip Ahn for the photographs included in this issue.

A detailed report of the 73rd IAMFES Annual Meeting follows...

Renewing Old Friendships



Beginning New Friendships

The Executive Board of the IAMFES met August 2-7, 1986 at the Radisson South, Minneapolis, Minnesota.

President Barnard called the meeting to order at 1:22 p.m. on Saturday, August 2, 1986. Board members present were Ron Case, Roy Ginn, Robert Gravani, Archie Holliday, Leon Townsend, and Helene Uhlman. Others attending were Kathy Hathaway, Elmer Marth, Kate Wachtel and Suzanne Trcka.

Mike Pullen, local arrangements chairman, welcomed the Executive Board to Minnesota and gave them some statistics on the 1986 Annual Meeting. There were currently 572 pre-registered, 100 companions, 25 young adults, 329 tickets sold for the family outing on Monday Night, 300 expected for the Early Bird reception, and 100-150 walk-ins expected.

Holliday began a discussion of the status of the Shogren Award and stated that we shortened the award form and still received no nominees. Hathaway asked whether the prize should be increased from \$50 to \$100. Barnard mentioned that the responsibility of completing the nomination form usually is done by someone from industry or academia. This year three affiliates requested forms, but no completed applications were received.

Gravani suggested that all affiliates complete an annual report and that the awards committee judge the reports (and accompanying documentation), pick the top three and request additional information (if needed). Hathaway asked about timing. Holliday suggested a January to January calendar year report. Holliday motion, Uhlman second, to remove nomination for Shogren Award and ask each affiliate to file an annual report due on January 15th on the previous year's activity. This would provide the basis for the Shogren Award winner. The Annual Reports are then sent to the Awards Committee Chairperson for selection and further consideration; motion passed unanimously.

Hathaway asked about the Shogren Award and what the monetary prize

should be. Holliday motion, Townsend second, to continue to provide a certificate for the Shogren Award and to raise the monetary award to \$100; motion passed unanimously.

Hathaway provided the auditors financial report to board members and mentioned that she and Townsend will make appropriate adjustments on the budget. Ginn motion, second Uhlman that the auditors report be accepted. Motion passed unanimously.

Hathaway gave the Executive Manager's report.

Hathaway asked that the board consider expanding the Ames office space to specifically handle subscriptions and renewals. A \$2,500 increase/year would give the office two, 8 x 10 rooms for the subscription department. The board reserved judgment until Hathaway and Townsend revise the budget.

Ginn motion, Townsend second to congratulate Hathaway on the excellent job that she's done and to accept her report. Also that action be taken on key issues deferred to later times at this Annual Meeting. Motion passed unanimously.

Hathaway mentioned the situation about having advertising in the Annual Meeting Program. Holliday suggested that advertising be considered in the Abstract booklet instead of the Annual Meeting Program. Also give exhibitors a few extra lines so that participants can see products, etc. Ginn motion, Gravani second that the 73rd Annual Meeting Program and Banquet Program be considered a model and permit the Executive Manager to secure as much advertising as possible in the abstract booklet and that a mechanism be put into place so that each annual meeting registrant receives an abstract booklet in their meeting packets. Motion passed unanimously.

Hathaway suggested that the Fall, 1986 Board Meeting be held in Ames, Iowa. It was agreed the the Board Meeting be held in Ames and begin on Friday noon, October 31. IAMFES will pay for the expenses of the board for the trip.

Marth reported on the decrease in

number of pages published in the Journal during the first 6 months of this year. Not an actual decline, but reflects fewer number of papers received - we publish 180-185 manuscripts per year. This year we are six weeks ahead of last year.

President Barnard called the meeting to order at 1:25 pm. All Executive Board members were present, as well as Harry Haverland, Dick Whitehead, Ivan Parkin, William Arledge, Earl Wright, Richard Brazis, Jim Reeder, T. Moore, and R. Crump.

Harry Haverland spoke about the Ivan Parkin Lectureship and that expenses and honorarium are not to exceed \$700. Haverland will give a brief presentation about the lectureship at the opening ceremonies on Monday.

Harry Haverland presented the Foundation Fund Committee report and submitted a written proposal on an audio visual lending library for board action. Ginn motioned, Townsend second to receive the Foundation's report and ask H. Haverland to bring it to the affiliate council for their reaction and then bring it back to the board for final vote. Motion passed unanimously.

Hathaway gave a brief overview of the Kansas Affiliate situation. Kansas is an affiliate, but they want to be given a new charter. The consensus of the board was to give the Kansas Affiliate an updated charter.

Another unusual situation is that Massachusetts says it is also an affiliate of the International but they are not on our books. President Barnard will contact persons in Massachusetts to check on the status of this affiliate chapter.

Other affiliate prospects included: Holliday mentioned a contact in Georgia, but there are no definite plans yet. Hathaway also mentioned about possible affiliates in North Carolina, Georgia, Louisiana, Arizona and Colorado.

C. Felix was soliciting member support for the National Conference

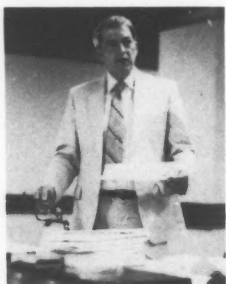
for Food Protection in Ann Arbor, Michigan on August 17 & 18, 1986. Holliday gave a brief history of the National Conference and both he and Haverland will be attending. Gravani motioned, Ginn second that we support the third National Conference of Food Protection by sending a \$250 sustaining membership and ask the President to appoint an IAMFES representative. Motion passed unanimously. Holliday was appointed as IAMFES representative to the Conference. He will send a written report of the Conference to the Fall Board Meeting.



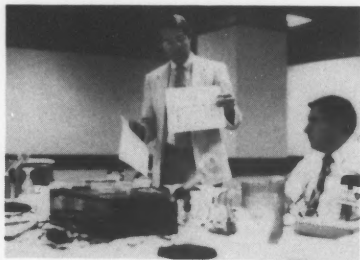
Austin Olinger updates the Board on the 1987 Annual Meeting in Anaheim at the Disneyland Hotel.



Dick Jolley and David Fry discuss the 1988 Annual Meeting in Tampa, FL with the Executive Board.



Don Bechtel presents a bid to the Board for Kansas to host the 1989 Annual Meeting.



David Welde, Missouri, also presents a bid to host the 1989 Annual Meeting.

President Barnard called the meeting to order at 8:07 am on Monday, August 4, 1986. All Board Members, as well as guests from California, Kansas, Missouri, Wisconsin and the Florida Affiliates were present.

Ginn reported that registration was currently at 625 with about 700 expected.

Austin Olinger, local arrangements chairman for the 1987 Annual Meeting, presented facts about next year's meeting. The meeting will be held at the Disneyland Hotel and many special events are planned. A special event is planned for Disneyland (for conference registrants) on Saturday and Sunday of the meeting with a discounted ticket price. (About \$5.00 off the general admission price.) There is another small discount offer on the price of a general admission ticket any day during the conference.

Companions events have been scheduled and include: August 3 a shopping tour of South Coast Plaza, August 4 a Tour of Merle Norman's Museum and a tour through the Lowry Center (spice manufacturer) with lunch, and August 5 a cooking demonstration featuring Mexican Cuisine.

The Early Bird reception will be held on the Villa Lawn and will feature California wines and cheeses. After the reception, people can see the polynesian show at the hotel that is performed nightly at no charge.

The Monday night activity will be a Mexican Fiesta night at the Disneyland Hotel with a cost of about \$20.00.

Townsend asked which airport is the best airport to fly into - Orange

County/John Wayne Airport was suggested. The Disneyland Hotel does not provide airport shuttle service, but public and private transportation is available.

A local sports personality is being sought to act as the Master of Ceremonies for the banquet on Wednesday. Price of the ticket will be about \$22.50.

The local arrangements committee estimated that 600 people will attend the meeting.

Don Bechtel, Kansas Association of Sanitarians made a bid for the 1989 Annual Meeting, with Wichita, Kansas as the possible site of the 1989 Annual Meeting. They have adequate hotel facilities. Cowtown is a restored, 3 block area for the Monday evening dinner. There are 120 members in the Kansas affiliate and about 150 people usually attend the State Meeting. Don made an excellent presentation and left pertinent information with each board member.

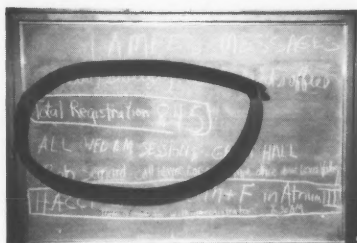
Dave Welde, President of the Missouri Milk, Food and Environmental Sanitarians also made a bid for the 1989 Annual Meeting, with Springfield, Missouri suggested as a possible site. He provided excellent materials and gave a very enthusiastic presentation. There are 3 hotel possibilities and he mentioned that there are nine carriers flying into the area.

Dick Jolley and Dave Fry of the Florida Affiliate made a brief presentation on the Tampa area as a possible site for the 1988 Annual Meeting. There are 100 members in the Florida affiliate and they've hosted two previous and very successful IAMFES Annual Meetings. Townsend motioned, Ginn second to accept Florida as the host for the 1988 Annual Meeting. Motion unanimously passed.

Dr. Lloyd Bullerman then spoke on the Developing Scientist Award. Bullerman identified that 6-8 papers were done by students. An extended abstract was developed and completed by the six students who are in the competition. Bullerman selected three judges who are from institutions not having students in the com-

petition. These judges will remain anonymous.

Ginn agreed with Bullerman and suggested that we should have an application that clearly identifies students who want to be in the competition.



Registration for the meeting doubles that of previous years.



Speaker Susan K. Harlander.

Attendees mingle during breaks from sessions.



President Ginn called the meeting to order at 8:15 am on Thursday, August 7, 1986. All Board Members, plus the new affiliate council chairman, Bill Coleman, were present. Visitors included Elmer Marth, Mike Pullen, David Smith, Lloyd Bullerman, John Bruhn, Austin Olinger, Suzanne Trcka and Kate Wachtel.

Lloyd Bullerman reported on the deliberations of the 12 member Scientific Paper/Annual Program Content Committee. The committee had several suggestions for next year's meeting including an evening symposium, a specific training program (either before or after the Annual Meeting, similar to the IFT basic symposium or short course program), and possible symposia topics for 1987 of: 1) Microbiological Methods - focusing on DNA probes, ELISA techniques, etc., 2) Water Quality in Food Processing - including the chemical, microbiological, toxicological and functional properties of water in food, 3) The Current Status of Protective Packaging and Food Tampering, 4) New Ways of Doing Business in the Dairy Industry - how design, layout and plant equipment impacts on the microbiological problems of recent times, 5) The Microbiology of Refrigerated Meals - including the concept of holding complete meals for up to 30 days, and 6) Keynote Speakers - no new names were added to last years list.

President Ginn commended Dr. Bullerman for the excellent job his committee did on this year's program.

David Smith, Local Arrangements Registration Chairman, reported on the final registration figures. There were 742 Registered for the meeting and 108 Registered for the Fieldman's Session, for a total of 850.

John Bruhn asked about the non-member registration fee. He suggested that the non-member registration fee be raised to include membership charges. Townsend agreed with this concept. Some of these areas will be further discussed at the Fall Board Meeting.

Marth encouraged IAMFES to

send announcement letters about the 1987 Annual Meeting to California, Oregon and Washington IFT members. Gravani motioned, Barnard second that a cover letter and meeting program (from the April issue of the journals) be sent to IFT members in California, Oregon and Washington to publicize the 1987 Annual Meeting. Hathaway will write the letter with assistance from Gravani. Motion passed unanimously.

Barnard motioned, Gravani second that Barnard will write resolutions and send them to the Minnesota Sanitarians Association and the Radisson South Hotel for hosting our 1986 Annual Meeting. Motion passed unanimously.

Barnard motioned, Coleman second to have exhibits at the 1987 Annual Meeting in Anaheim, CA, that they be table top exhibits and be limited to 10' spaces, each company be limited to 1 exhibit space (2 divisions of the same company can each have an exhibit space as long as they are not adjacent to each other), that backdrops be permitted and that up to 75 exhibitors be accepted on a first come, first serve basis, that hours be similar to this year (as not to conflict with the meeting schedule), and that we stress the educational nature of the exhibits. There was considerable discussion on specifics of the motion. Case commented that the board consider opening the exhibits on Monday morning. Board members concurred. Motion passed unanimously.

Case motioned, Townsend second that we charge exhibitors the following prices: Sustaining Members - \$350, Members - \$425 and Non-Members - \$550. This is for one 8 x 10 ft. space. Motion passed unanimously.

Case motioned, Coleman second that the split on income from exhibitors be 1/3 to the local affiliate, 2/3 to IAMFES and that the 1/3 be paid before the meeting to be used as seed money and the expenses for the exhibits be covered by IAMFES. Motion passed unanimously.

Barnard motioned, Townsend second to approve the managers report

pertaining to the establishment of a membership subscription department at the Ames office. Motion passed unanimously.

Coleman motioned, Barnard second that the board accept the Foundation Fund Report and establish a Visual Aids Library in the Ames Office to serve the IAMFES membership.

Gravani stated that several committee chairs are interested in having a charge while others have done nothing. Do we as a board want to come up with specific recommendations for each committee? Ginn mentioned that this is the Vice President's responsibility. Gravani will come up with specific recommendations at the Fall Board Meeting.

IAMFES Secretary Report

The Annual Business Meeting of the International Association of Milk, Food and Environmental Sanitarians, Inc. was held Monday, August 4, 1986, at the Radisson South Hotel in Minneapolis, MN.

President Barnard called the meeting to order at 3:19 pm.

Minutes of the 1985 Business Meeting were read by secretary Robert Gravani. Earl Wright made a motion to accept the minutes as read, Harry Haverland second. Motion passed.

The Executive Manager's report was given by Kathy Hathaway. Highlights of the report included:

- 1) Membership increased by 200 members.
- 2) Advertising goal of \$70,000 for



KEYNOTE SPEAKER
Dr. J. C. Olson, Jr.

1985-86 was met.

- 3) Twelve new sustaining members were added.
- 4) Exhibits at the 1986 meeting.
- 5) New, business exchange section added to *DFS*.
- 6) New membership committee under the direction of Ruth Fuqua should increase membership next year.
- 7) To cover costs, the Journal postage was increased to \$10 for members outside the U.S.
- 8) Kathy introduced the Ames office staff and explained each of their job responsibilities.

The *Journal of Food Protection* report was given by Dr. Elmer Marth.

The following committee reports were presented by the committee chairs listed below.

- 1) Sanitary Procedures - R. Whitehead
- 2) *DFS* Management - H. Bengsch
- 3) *JFP* Management - R. Marshall
- 4) Food Equipment Sanitary Standards - D. Shaw
- 5) Baking Industry Sanitary Standards - M. Ronge
- 6) Foundation Fund - H. Haverland



Ames office staff visit with Roy Gin. L to R: Renee Sharp, Sandy Engelman, Julie Heim, Lori Whitmer and Kathy Hathaway. Not pictured Bob Clark, Suzanne Trcka and Kate Wachtel.

- 7) Communicable Diseases - F. Bryan
- 8) Applied Laboratory Methods - L. Roth (Acting Chair)
- 9) Farm Methods - M. David
- 10) Membership - R. Fuqua
- 11) 3-A Symbol Council - R. Sanders
- 12) International Dairy Federation - H. Wainess
- 13) Nominating Committee - W. Arledge

The Council of Affiliates report was given by secretary Clem Honer.

There was no old business.

New business - D. Fry asked if the Association plans to honor Tommy Thompson who recently passed away. President Barnard responded that the board will act on this request at a later time.

The resolutions, which are normally presented at the IAMFES business meeting will be presented at a future board meeting.

President Barnard adjourned the meeting at 4:37 pm.

Respectfully submitted,
Robert B. Gravani, Secretary.

IAMFES PAST PRESIDENTS enjoy the Past President's Dinner put on by the hosting affiliate



Affiliate Council Report

The Chairperson for the Affiliate Council, Helene Uhlman called the August 4 meeting to order. Nineteen of the 27 affiliate delegates were present. With Executive Board and guests, 38 people were present.

Uhlman advised that CEU credits were available for members attending the 1986 meeting. Certificate of Attendance forms were available at the registration desk.

Archie Holliday, Past President of the IAMFES Executive Board presented the Executive Boards action regarding the Shogren Award. The board increased the monetary award to \$100. Affiliates will be asked to submit a calendar year-end report by January 15. The Executive Board will then select the affiliate for the Shogren Award based on the year-end report from the affiliate. Forms for the calendar year-end report were sent from the Ames office to the Affiliate Chapters.

IAMFES President, Sid Barnard announced that Florida was accepted to host the 1988 IAMFES meeting. Barnard also asked that each Affiliate improve their contact with the IAMFES office regarding news, programs, and nominations for awards.

Harry Haverland discussed a proposed IAMFES visual aid lending library. Support for the lending library would come from Foundation Funds and would serve as a technical information and training source for all members.

The Membership Report from Ruth Fuqua cited membership increasing, but that more action from Affiliates was needed. She concluded with a request for a motion that each Affiliate appoint a membership committee with one person of the committee designated to contact the Ames office regarding the committee's action.

Nominations for Chairperson of the Affiliate Council for the coming year were: Helen Uhlman, Indiana and Bill Colemann, Minnesota. Bill Coleman was elected Affiliate Council Chairperson for 1986-87. Uhlman had served the Affiliate Council for the past 3 years as Chairperson.

Lloyd Luedecke, Washington and Jim Steele, Alberta; were nominated for Affiliate Council Secretary. Lloyd Luedecke was elected new Secretary of the Affiliate Council for the coming year.

PIG ROAST AT THE MINNESOTA ZOO



John Bruhn, CA, volunteered to take a real close look at a hawk (notice hawk landing above his head as he snaps the picture).



Music by the Medicine Show, while at the zoo pig roast, was a treat for all.

**ENJOYABLE
FOR
ALL**

COMMITTEE REPORTS

IAMFES presently has 13 committees in many different areas. If you wish to serve on a committee, please contact this office so that we may put you in contact with the committee chairperson.

Journal of Food Protection Management Committee

Harold Bengsch, Jeff Farber (for Ewen Todd), Elmer Marth, Mike Doyle and Chairperson Robert T. Marshall recommended the following to the Executive Board:

1. That the Association recognize the 50th year of publication of the *Journal of Food Protection* in 1987 by publishing the Annual Meeting Issue in gold cover with "bold print" showing the 50th anniversary and by publishing in that issue an article recounting the history of the journal.

2. That the Association use the 50th year of the *Journal of Food Protection* as a promotional tool.

3. That "Instruction to Contributors" be published on an every-other-year basis.

4. That because many meat scientists publish in the *Journal of Food Protection* the Association make a bulk mailing of promotional material to members of the American Meat Science Association to solicit individual memberships.

Respectfully submitted,
Robert T. Marshall
Chairperson

Dairy and Food Sanitation Management Committee

The *Dairy and Food Sanitation* Committee had considerable discussion concerning the magazine, however all comments were of a positive nature. This speaks quite well for the editors, the Ames office staff, publication review committees and the contributing authors.

The technical assistance and article contributions of Henry Atherton have proved invaluable.

Although we now have the good fortune of reporting that we currently have sufficient articles to complete this years volume, we still solicit general interest articles from our membership and readers.

Respectfully Submitted,
Harold Bengsch
Chairperson

Foundation Fund Committee

The Committee continues to pursue appropriate activities to be supported by Foundation monies. Projects currently being funded:

1. Ivan Parkin Lectureship - Annual costs not to exceed \$700.00 (Expenses not to exceed \$500; Honorarium \$200).

2. Developing Scientist Award - Graduate Student Competition - 1st Award \$500 and a plaque; 2nd Award \$200; 3rd Award \$100; 4th Award \$50; and 5th Award \$50.

New Proposal:

Objective:

Develop a library of 16mm films, slide series, video cassettes, etc. for use by the Affiliates and members. An Affiliate or member may borrow the materials for use in conjunction with their meetings or other suitable programs.

Location and Management of the Library:

1. The library shall be located at the IAMFES central office.

2. The library will be under the direction of the Executive Manager.

3. No more than two (2) training aids will be loaned to an Affiliate or member at one time.

4. The loan period shall be for no more than four (4) weeks.

5. IAMFES will pay the cost of shipment to the borrowing Affiliate or member.

6. The Affiliate or member must pay the return shipment costs.

7. Shipment will be by first class postage or other comparable carrier service.

8. Maintenance of the training materials will be by IAMFES. (It is

suggested that suitable arrangements be explored with the University's Visual Aid Department concerning maintenance.

9. A log will be maintained on the library's activities.

Estimated Costs:

Year 1986 - \$3,170; Year 1987 - \$1,145; Year 1988 - \$1,185; and Year 1989 - \$1,215.

Evaluation:

Each year the Foundation Fund Committee will evaluate the effectiveness of the library utilizing the log maintained by the Executive Manager and comments received.

Selection of Training Materials:

Once each year the Executive Manager will request the Affiliates to identify needed training materials for inclusion into the loaning library. The Foundation Fund Committee members will also make recommendations.

The Executive Manager will submit to the Executive Board or the Foundation Fund Committee, which ever is appropriate, a prioritized list of training materials based on information that has been received.

Notice:

At least quarterly a notice will be placed in the official organization's publication announcing the availability of training materials for use by the Affiliates and members.

Respectfully submitted,

Harry Haverland
Chairman

The Ivan Parkin Lectureship

The Ivan Parkin Lectureship is part of a continuous effort by IAMFES to be assertive in providing you, the membership and guests, with outstanding educational programs each year. The concept of a Lectureship surfaced during a Foundation Fund Committee meeting in St. Louis, Missouri in November, 1984. It received Executive Board approval in 1985 and Today it is a reality. The criteria for a guest lecturer is that the individual be a recognized profes-

sional in the designated area. That the topic be of current interest to the general membership.

The Ivan Parkin Lectureship is supported through the Sustaining Membership Program. A portion of each membership dues are contributed to the Foundation Fund to further research and educational programs. We are very appreciated of their efforts. Currently, there are forty-four (44) sustaining members. A listing of the members can be found in the Journals.

The Foundation Fund Committee in their recommendations to the Executive Board indicated that the Lectureship be named after a member who has contributed substantially to the goals and objective of IAMFES. At the fall meeting of the Executive Board, here in Minneapolis, the Board requested the Executive Manager (Kathy Hathaway) to contact all past presidents and provide them with a list of all the presidents of IAMFES since it was organized in 1912 and ask the subject individuals to select three (3) names or combination of names to assist the Board in naming the Lectureship. As expected, several names, like cream, rose to the top, with Ivan Parkin being the most popular. Some of the more mature members have personal knowledge of Ivan's numerous contributions at the academic level, professionally in extension work and as a member of IAMFES.

A few comments regarding Ivan:

Ivan received his B.S. Degree in Agriculture from the University of Connecticut.

For many years he was a member of the faculty at Pennsylvania State University as a Dairy Extension Specialist.

He was elected to the IAMFES Executive Board in 1951 and served as President in 1954-55.

Ivan served with distinction on the Committee on Sanitary Procedures and the Farm Methods Committee.

He has appeared as a speaker on the IAMFES Program several times.

Ivan holds an Honorary Life Membership.

In 1970 in received the Citation

Award.

Ivan continues to serve as our Parliamentarian.

You can always rely on Ivan to lend a helping hand and to provide you with candid guidance.

Ivan is truly Mr. IAMFES serving as an example to others as a professional, a contributor, a loyal member and a kind and warm person who is most deserving of this special recognition. Ivan Parkin we congratulate you!

Presented as an introduction to the first Ivan Parkin Lectureship, Minneapolis, MN, August 4, 1986.

3-A Sanitary Standards Symbol Administrative Council

Last August it was reported that there were 255 active 3-A Symbol authorizations. Since then, three were dropped and we granted the use of 37 new ones, there is a total of 289 active authorizations to use the 3-A Symbol on Dairy Equipment.

From time to time, equipment manufacturers advertise that their equipment has 3-A Symbol Council "approval." In view thereof, a revised Notice regarding advertising in connection with the 3-A Symbol to reads as follows:

"The 3-A Sanitary Standards Symbol Administrative Council has established procedures to authorize manufacturers of equipment that meet the requirements of published 3-A Sanitary Standards applicable to specific items of equipment to mark and/or affix the 3-A Symbol to that piece of equipment. An organization holding authorization to apply the 3-A Symbol may state this capability in its advertising literature. The 3-A Symbol Council does not "approve", "certify", "rate", or "endorse" the design, construction, or use of the equipment and there shall be no statements or implications which might so indicate. An organization holding a 3-A Symbol Council Certificate of Authorization may state in advertising literature that items for which they have been issued a 3-A Symbol Authoriza-

tion meet the requirements of the 3-A Sanitary Standard. General usage is not permitted since each individual standard applies to specific items of equipment constructed in accordance with the applicable 3-A Sanitary Standards."

This Notice is sent to all equipment manufacturers when initial 3-A Symbol authorization is granted, as well as with their yearly renewals. We trust this procedure will lessen, and hopefully eliminate, such advertising inaccuracies.

At the 3-A Sanitary Standards Committee meeting in Kansas City in May, 1986, one new standard was signed to take effect in one year. It was 11-04 for Plate Type Heat Exchangers. Authorizations to use the 3-A Symbol for equipment meeting this Standard will be available in October of 1987.

The next 3-A Symbol Council meeting will be held on October 21, 1986 in Washington, D.C. Agenda items for this meeting include the adoption of the 1987 budget, and consideration of 3-A Symbol Council promotion activities to acquaint the trade with Council activities.

Respectfully submitted,
Robert Holtgrieve
Secretary-Treasurer

Farm Methods Committee

The Farm Methods Committee held its winter meeting on February 10 in conjunction with the NMC meeting. Purpose of the meeting was to update committee members on the status of all charges. Our annual meeting was held on Sunday, August 3, 1986. Approximately 51 members were present, including Steve Sims and Ken Kirby, assistant chairmen of the Farm Methods Committee.

The following reports were given by the subcommittee chairmen: *Antibiotics, Pesticides and Other Adulterants - Gerald Hein and Gary Trimmer, Co-Chairman*

Antibiotics in milk continue to be a concern in the marketplace. Since most contaminated milk containing

antibiotics results from dairy cows that have been treated to control mastitis, the antibiotic subcommittee recommends that the following procedures at the farm level should be adopted.

1. All treated dairy cattle should be identified and marked as being treated. (Animals are either separately penned or moved to hospital pen).

2. The animals not milked in a separate area are milked last. Such milk does not go into the raw milk for pasteurization tank.

3. All treated animals shall be checked using one of the acceptable tests for the detection of drugs in milk. Milk shall test negative for antibiotics before the cows are returned to the milking herd.

4. The National Mastitis Council recommends dry cow treatment on all dairy cattle when drying off. These cows must be removed from the milking string when treatment starts. When these cows freshen and before their milk enters the farm bulk tank, the milk shall be tested daily until the milk is shown to be negative for antibiotics, using an acceptable antibiotic detection procedure.

Cleaning and Sanitizing of Farm Milk Equipment - John Scheffel, Chairman

The following charges have been prepared by this committee:

Consult with the Northeast Dairy Practices Council for the purpose of expanding their guidelines for cleaning and sanitizing farm milk equipment.

Develop a universal symbol and color code for labels used on all cleaners, acids, sanitizers, and udder care products.

Education and Editorial Review - Jeff Ryan, Chairman

The Education and Editorial Review Subcommittees were combined into one committee. The committee will be chaired by Jeffrey Ryan. Ewing Row and Ann Saeman will be assistant chairpersons. The subcommittee will continue the charges of the original committees. This charge will improve the utilization of individuals' time and prevent duplication

of effort.

Plastics Subcommittee - Robert Char-ton, Chairman

No new charges have been identified by this committee.

Cooling and Precooling Raw Milk on the Dairy Farm Subcommittee

This subcommittee was not active in the past year. The subcommittee will be revitalized and brought to full potential. To do this, we are actively searching for a new chairman. We are also reviewing the charges of this committee to make sure they are in tune with the current concerns of the dairy industry.

Sampling of Raw Milk Subcommittee - Virgil Grace, Chairman

The Sampling of Raw Milk Subcommittee is considering a new charge which deals with a uniform national program for sampling over-the-road tankers for analysis and payment.

Water Treatment and Protection Subcommittee - Henry Atherton, Chairman

Dr. Atherton has written an excellent paper on the concerns of the committee in regards to the pollution of water consumed by dairy cattle. This paper will be printed in the December issue of *Dairy and Food Sanitation*.

Waste Management Subcommittee - Lowell Allen, Chairman

The Waste Management and Water Treatment and Protection Subcommittees will work together to correlate future projects dealing with waste and water treatment.

The handbook on the "Livestock Waste Facilities" is available and contains exceptional information.

Construction of Buildings and Coordination of Milking System Installation Recommendations Subcommittee - Joe Scolaro, Chairman

Current charge is to develop a universal application form to be used when installing an around-the-barn milking system or transfer system, or when making application to alter or expand an in-place around-the-barn milking pipeline or transfer system.

Farm Sanitation Chemical Advisory Subcommittee, Terry Mitchell, Chairman

The committee will finalize appropriate wording of the white paper dealing with the concerns of the industry in regards to the safety and effectiveness of dairy farm cleaners, sanitizers, and udder care products with specific reference to repackaging and bulk sale of these products direct to dairy farms. The subcommittee will submit this as a problem to the IMS board when it meets in May, 1987.

Respectfully Submitted,
Maynard David
Chairperson

Committee on Food Equipment/Sanitary Standards

I would like to express our thanks and appreciation to Mr. Karl Jones for his dedication and service to the concepts and goals of the Food Equipment/Sanitary Standards Committee. His devotion to sound public health principles has helped to make us a stronger organization.

The Committee met on August 3, 1986 and considered future activities that should enhance achievement of our objectives. These included: increased communications between Committee members; additional Committee representation; and increased input into issues of public health concern.

The Committee interacts with the NSF Joint Committee on Food Equipment Standards, the National Automatic Merchandising Association's Health Industry Council, and the U.S. Food and Drug Administration. During the past year, Mr. Jones represented the Committee at the Automatic Health Industry Council's annual meeting. The NSF 1986 Joint Committee on Food Equipment Standards meeting was held in April 1986. The Joint Committee's recommended resolutions included that: 1) NSF implement a review of Standard 7: Food Service Refrigerators and Storage Freezers, to include performance requirements for mechanically refrigerated salad bar/buffet units and

by policy, limit the evaluation and listing of units using ice for refrigeration to materials design and construction; 2) NSF implement a review of Standard 7, to develop test procedures and design requirements for rapid cooling/cool-down refrigerators; 3) that NSF ask FDA for an opinion on the MiSa Manufacturing Company's egg-breaking machine which will determine future NSF action with regards to review of Standard 8, Commercial Powered Food Preparation Equipment; 4) NSF Standard 3, Soil Removal Test, be required by policy for all commercial spray-type dishwashing machines; 5) NSF Standard 3, Task Committee, review a thermostatic control requirement for hot water dishwashing machines; 6) NSF Standard 2, Section 7-3, include a statement to provide for pressure cleaning in shelving designs; and 7) NSF apply the requirements for food contact surfaces to Standard 7, Food Service Refrigeration, and Standard 4, Commercial Cooking and Hot Food Storage Equipment.

The Committee received from the FDA Interpretations Coordinator for review, several proposed interpretations. These included: the acceptability of electrocution devices for flying insects, the sale of wild mushrooms in retail food establishments, and the use of wooden paddles in retail confectionery operations. FDA will consider the recommendations submitted by the Committee in formulating their final decision.

Respectfully submitted,
Duain B. Shaw
Chairperson

3-A Sanitary Standards Committee on Sanitary Procedures

The 3-A Meeting was held at the Hilton Plaza Inn, Kansas City, Missouri, on May 13-15, 1986. A special Ad-Hoc Meeting may be called later this year. We regret the resignation of Duane R. Spomer, but welcome the return of Richard Webber. We also are pleased to have Randy

Chloupek as our newest member. CSP will welcome new prospects who can meet with us, and will respond to the challenge with a smile and professional determination. If you are interested, let me hear from you!

This program could not be the success it is without Robert L. Sanders, Deputy Chief, Milk Safety Branch, U.S. Dept. of Health and Human Services, Food and Drug Administration, and Thomas M. Gilmore, Ph.D., Technical Director, Dairy and Food Industries Supply Association, Inc. - Thanks!

PHS/CSP comments on the tentative 3-A Standards and Accepted Practices recommended for signature are T-11-20 and T-608-10. Returned to task forces are T-05-14, T-17-20, T-605-30, T-606-40 and T-690-00.
Respectfully Submitted,
Dick B. Whitehead
Chairman

Sanitarian's Joint Council

The meeting of the Sanitarian's Joint Council was held August 4, 1986. A discussion took place and efforts will be made by Dora Coleman to contact Webster Young, Chairman of PHS Sanitarians Professional Advisory Committee to further establish contact with Department of Labor personnel to work for a uniform and equitable definition for Professional Sanitarian in the Department's Dictionary of Occupations.

A discussion was held on how each of the sanitarian's groups could effectively get new material such as information on *Listeria*, genetic engineering, etc. to the field sanitarian. After discussion, it was agreed that each representative recommend to its parent organization to consider video taping selected talks and papers from its annual meeting to be made available to those sanitarians not able to be present at the meetings. This was especially appropriate in the case of IAMFES since the board was already considering the establishment of a lending library to contain film, slide series and other visual aids for

sanitarians.

Respectfully submitted,
Robert L. Sanders
Secretary-Treasurer

International Dairy Federation Committee

Since there are many participants who have not been to an IAMFES meeting previously, it is best to repeat the function of the International Dairy Federation (IDF) and the United States of America National Committee of the International Dairy Federation (USNAC).

The IDF was created in 1903 as an independent non-political international association for progress in dairy technology. Their aim is to "promote through international cooperation and consultation the solution of scientific, technical and economic problems in the international dairy field." In order to do this, they cooperate with other organizations, national or international, in matters relating to or affected by the dairy industry and they publish information resulting from the work and activities of the Federation.

One way of accomplishing their objectives is to hold seminars, symposia, and Congresses on subjects of technological importance to the dairy industry. In 1985, as an example, after our last report, symposia were held on Natural Antimicrobial Systems in England, a seminar on production and utilization of goat's milk in Greece, and a very productive seminar, in cooperation with USNAC, in Atlanta, Georgia on "New Dairy Products via New Technology."

At the end of August there will be a seminar on Future Technologies and Extension Services in Sweden followed in September by the IDF Annual Sessions in The Netherlands and the International Dairy Congress which is held once every four years. Then from October 27-29 the "International Whey Conference" will be in Chicago, Illinois and further details on this conference are available

to those interested.

We have started to prepare for a seminar on Quality Assurance to be held in Chicago, Illinois during the DFISA Expo in October 1987. A tentative program will be available from the Secretary of USNAC some time in November of this year.

The work of IDF is divided into six commissions: A) Production Hygiene and Quality of Milk (Raw and Farm), B) Technology and Engineering, C) Economics, Marketing and Management, D) Legislation, Standards of Identity, Classification, Terminology, E) Analytical Standards, Laboratory Techniques, and F) Science and Education. Each of these commissions is composed of Groups of Experts who study many varied aspects of the dairy industry, and within each member country there are also similar Groups of Experts. Today many members of IAMFES are serving on these Groups of Experts and there is need for additional members in fields where they have the necessary expertise. The result of all this work is the publishing of monographs, bulletins and standards drawn from a pool of knowledge that is extraordinary. The U.S. does not have a corner on dairy research, and we have much to learn from other technologists, particularly from Europe where dairy research institutes and dairy schools continue to flourish.

In the April issue of *Dairy and Food Sanitation* a paper entitled, "The Role of the United States in International Dairy Federation" was published. This lists the major Groups of Experts within the IDF and USNAC. For those who are interested in contributing to the advance of dairy sanitation and dairy technology throughout the world and, in turn, garnering a tremendous amount of information as to what is happening to other parts of the world, I suggest that you review it and if you are interested in any of the groups, let me know.

Since our last report there has been considerable activity involving the following subjects. Note that each of the subjects is part of a Group of Ex-

perts and, with a few exceptions, is open to members of IAMFES.

- 1) Bovine Mastitis - a very active group with considerable input from the USA. They held a symposium in Kiel in 1985 and a large number of papers were presented by the U.S. participants.
- 2) Chemical residues in milk.
- 3) Bacteriological quality of raw milk.
- 4) Mechanical milking practices in relation to environmental factors.
- 5) Spores in raw milk.
- 6) Future techniques in extension services.
- 7) Technical aspects of packaging milk and milk products.
- 8) Heat treatment of milk and milk products - A monograph is in preparation on pasteurized milk which will contain a considerable amount of interest to IAMFES membership.
- 9) A study of fermented milks.
- 10) Lipolysis.
- 11) Flowmeters and sampling equipment.
- 12) Control systems for automated processors.
- 13) Control of water and waste water in the dairy industry.
- 14) Corrosion.
- 15) Hygienic design of dairy equipment.

A series of new standards were introduced. These include:

- 1) Interlaboratory study procedure to determine decision of an analytical method.
- 2) Sampling - inspection by variables.
- 3) Canned liquid milk products - lead content.
- 4) Iron content of milk and milk products.

This is only a sampling of one hundred Groups of Experts. To those of you who are interested, I would suggest that you obtain a copy from the USNAC office of the "Programme of Work" which lists the Groups of Experts and their functions. Copies of publications referred to in this report can be obtained from Office of the Secretary, United States of America National Committee of the IDF, 464 Central Avenue, Room 24, Northfield, IL 60093. 312-446-

2402.

Respectfully submitted,
Harold Wainess

BISSC Committee

During the past two years the BISSC Committee has been in the process of reviewing existing standards to eliminate excess verbiage and duplication of specifications in forty-one individual standards. Upon completion of this work, the BISSC Board of Directors authorized the publication of the existing revised standards for distribution at the 1985 Baking Exposition.

The Board of Directors, at their annual meeting in 1985, decided to forgo the 1986 Winter meeting of the BISSC Committee and delegated the BISSC Committee Chairman to present, to the general BISSC Committee at the 1987 Winter meeting, a format for the future that will concentrate on the formulation of new standards to keep abreast of new equipment and design concepts.

As Sanitarians, we have an obligation to actively participate in BISSC activities and serve as consultants to the Task Committees working on the formulation of a diversity of construction standards for equipment used in the baking industry. The IAMFES BISSC Committee has played a very important role in the function of the BISSC Committee and must continue to do so to fulfill our obligation to protect the Public Health of the people of the United States.

As Chairman of the IAMFES BISSC Committee, I would like to extend an invitation to all IAMFES members and all sanitarians who have an interest and background in the baking industry, to become active members of the IAMFES BISSC Committee.

Respectfully submitted,
Martyn A. Ronge
Chairperson

AWARDS BANQUET

Sanitarian's Award Presented to Jay Boosinger

The 1986 Sanitarian's Award, with a plaque and check for \$1000, was presented to Jay Boosinger.

Mr. Boosinger is currently the Director, Division of Dairy Industry for the Florida Department of Agriculture and Consumer Services in Tallahassee and has become recognized nationally for his imaginative approach to creative problem solving, not only within Florida's dairy industry, but throughout the nation.

Within the state of Florida he helped initiate the first statewide shelf-life law in the United States; the use of high pressure liquid chromatography for quantitative analysis of vitamins A and D and the use of the optical somatic cell counter in the Dairy division laboratories.

Active in the Dairy Division of NASDA since 1968, he has served as Secretary-Treasurer, Vice President and President. Also active in the NASDA Dairy Division's committee work, he has served as chairman of a number of committees including Federal/State Relations, Interstate Milk Shippers and the Committee to draft a model frozen desserts ordinance.

A member of the National Conference of Interstate Milk Shippers



Jay Boosinger receives the 1986 Sanitarian's Award Plaque and check. This award is presented annually by the Klenszade Division of Economics Laboratory, Diversey-Wyandotte and the H. B. Fuller Co.

(NCIMS) since 1969, he has served on problem task forces, as well as the Committee for Reciprocity and was the Chairman of Council II. In 1975 Jay Boosinger was appointed a voting member of the NCIMS executive board to fill an unexpired term. In 1976 he was elected agriculture's representative to the NCIMS executive board for the Eastern states. In 1977 he was elected vice chairman of the NCIMS executive board and in 1979 was elected chairman, serving as chairman through the 1983 conference.

Jay Boosinger has been a member and served as annual meeting chairman of the International Association of Milk, Food and Environmental Sanitarians; as a member and Director of the National Mastitis Council;

as Secretary-Treasurer, President, and member of the Florida Association of Milk, Food and Environmental Sanitarians, being named Sanitarian of the Year for 1972-73; as a member of the University of Florida Dairy Science Department advisory committee; and has been instrumental in establishing dairy technology societies throughout Florida.

Certainly among the many dedicated and resourceful employees of State Departments of Agriculture, Jay Boosinger's record of leadership and accomplishment has to stand out prominently. It is a record of unselfish devotion to the betterment of that area of regulatory activity he represents, but more important, an outstanding record of service to both the farmer and the consumer.



Roy Ginn, New IAMFES President, receives a gavel from Charlie Felix of the Single Service Institute.



IAMFES President Roy Ginn presents Sid Barnard with the 1986 Past-Presidents Plaque.



Dr. Robert T. Marshall accepting the Educator Award Plaque from Robert Gravani. The Educator Award is presented annually by the Farm and Industrial Equipment Institute.

Dr. Robert T. Marshall Recipient of the 1986 Educator Award

The recipient of the 1986 Educator Award Plaque and a check for \$1000 was Dr. Robert T. Marshall. Dr. Marshall is a Professor of Food Science & Nutrition at the University of Missouri in Columbia, where he has been employed since 1960. He also received his B.S., M.S., and Ph.D. in Dairy Manufacturing from the University of Missouri.

Dr. Marshall's research over the past 7 years has focused on psychrotrophic bacteria of foods and their enzymes and on cleaning and sanitizing meat and meat contact surfaces of processing equipment. Current emphases are on accelerated ripening of cheeses, especially as affected by aminopeptidases and proteases. Cooperative research is being conducted with the Bioengineering Group of ARS, USDA on eliminating pathogens from meat and meat processing equipment.

Dr. Marshall's research has been printed in the *Journal of Food Protection*, the *Journal of Food Science*, the *Journal of Dairy Science* and in *Science and Technology Guides* published by the University of Missouri

- Columbia Extension Division.

Dr. Marshall has been honored with other teaching awards: the University of Missouri-Columbia Alumni Faculty Award in 1968 (the first year of its presentation), the American Dairy Science Teaching Award in 1975 by the Milk Industry Foundation, and the AMOCO Teaching Award in 1985. He is also highly rated by his students, with various past students providing letters of support for his nomination.

Dr. Marshall has been a member of the IAMFES since 1963 and was President in 1982-83. He currently chairs the Journal Management Committee and is a member of the Applied Laboratory Methods Committee, the Farm Methods Committee and is on the Editorial Board for the *Journal of Food Protection*. Dr. Marshall is also a member of the American Dairy Science Association (he was President of that association in 1983-84), the Institute of Food Technologists, the American Public Health Association, the Missouri Milk, Food and Environmental Health Association.



Dr. Elmer H. Marth, accepts the Honorary Life Membership Plaque for John G. Collier from Archie C. Holliday.

Honorary Life Membership to John G. Collier

John G. Collier, a member of IAMFES since 1957, was presented with the 1986 Honorary Life Membership Plaque and also receives life membership with the IAMFES, including the *Journal of Food Protection* and *Dairy and Food Sanitation*.

Mr. Collier retired from the Wisconsin Department of Agriculture, Trade & Consumer Protection in 1983 and was the Food Division Regional Supervisor at that time. He received his B.S. from the University of Wisconsin-Madison in 1941. Also a member of the Wisconsin Association of Milk and Food Sanitarians (WAMFS), Mr. Collier served as their President in 1972-73. In 1979 he was the WAMFS Sanitarian of the Year.

Even though retired, Mr. Collier continues to attend IAMFES and WAMFS Annual Meetings.



Arthur W. Nesbit (l) and John Meyer (r) of Nasco, present Hugh C. Munns with the 1986 Harold Barnum Industry Award.

Hugh C. Munns Receives the Harold Barnum Industry Award

Hugh C. Munns received the 1986 Harold Barnum Industry Award Plaque and a check for \$500 for his outstanding contributions to industry and the International.

Mr. Munns, from 1948 until his retirement in 1986, worked for Mid-America Dairymen, Inc. in Minneapolis, Minnesota.

He has been a Director of the National Mastitis Council since 1968, was a Member of the NMC Executive Committee in 1977, helped organize the Minnesota Mastitis Council in 1963 and has been a Director of that organization since that time.

Mr. Munns has also been active in the Minnesota Sanitarians Association since 1948 and was President of that Association in 1971; he has been a member of the Minnesota Dairy Technology Society since 1963 and served as their Secretary for 6 years; and has been a member of the IAMFES since 1954 and has served on many committees of the IAMFES.

His activities have also included the National Conference on Interstate Milk Shipments, the National Milk Producers Federation, the Minnesota Department of Agriculture Dairy Industries Steering Committee, direc-

torship of the Dairy Quality Control Institute, and the Boy Scouts of America.

Hugh Munns has set top industry standards in regards to personal integrity, moral character and overall public relations with milk producers, sanitarians, and health officials on the local, state and national level. The outstanding job that Mr. Munns has done for the milk industry has set the highest level of performance for all individuals to attain.

Citation Award Presented to Cecil E. White

Cecil E. White was presented the 1986 Citation Award Plaque. He received his B.S. in Dairy Mfg. from the University of Tennessee in 1944; worked on and off for many years in the Tupelo, Mississippi area and for the Carnation Company; and worked from 1971, until his retirement in 1983, for the Tennessee Department of Agriculture.

He started with the Tennessee Department of Agriculture in 1971 as a State Milk Sanitation Rating Officer. In 1972 he was given the sole responsibility of all facets of the dairy program for the State and in 1975 he was appointed Assistant Director of the Dairy Division.

Mr. White was quite active in various organizations pertaining to milk and milk products and served as President of the Southern Association of States Dairy Divisions (SASDA), and was on the Board of Directors of the National Mastitis Council representing the Dairy Division of the National Association States Department of Agriculture (NASDA). He was a charter member of the Tennessee Affiliate and has served as its Secretary for many years and continues in this capacity.



Cecil E. White was presented with the 1986 Citation Award.

DEVELOPING SCIENTIST AWARDS



In 1985 the Executive Board of IAMFES instituted the Developing Scientist Awards Program for papers presented at the annual meeting by students. The program was initiated in 1986, and five students were honored at the annual meeting in Minneapolis for the papers they presented. The students and the awards they received were as follows (r to l) 1st Place, Christine M. Bruhn, University of California-Davis, \$500 award; 2nd Place, Elliot T. Ryser, University of Wisconsin-Madison, \$200 award; 3rd Place, Eileen M. Rosenow, University of Wisconsin-Madison, \$100 award; 4th Place, Lisa M. Flores, University of Nebraska-Lincoln, \$50 award; and 5th Place, Kamal M. Kamaly, University of Wisconsin-Madison, \$50 award.

Eligible graduate students are encouraged to enter the competition and present papers at the 1987 annual meeting in Anaheim. The competition is open to graduate students enrolled in M.S. or Ph.D. programs at accredited universities or colleges. The paper must be presented by the student and must represent the student's own original research. Five (5) awards will again be given (see p. 485 for details).



David Fry, FL, received the Certificate of Merit during 1986 for service to IAMFES and the Florida Affiliate.



Ruth Fuqua, Membership Committee Chairperson, presents the 1986 Membership Achievement Award to Marshall Inman of the Iowa Affiliate.



Ruth Fuqua congratulates Austin Olinger, CA. Austin brought in the most new IAMFES members during the 1986 membership drive.



1986 Sherman Award

Paul Martin (r) of the National Institute for the Foodservice Industry presents the 1986 Sherman Award to Dr. Frank L. Bryan (l) of Tucker, Georgia.

Dr. Bryan and co-author Charles A. Bartleson received the award for their 1985 *Journal of Food Protection* article "Mexican-style Foodservice Operations: Hazard Analyses, Critical Control Points and Monitoring."

Entertainment at the Awards Banquet Provided by the River Palace Group



Ivan Parkin (behind podium) delivers the invocation at the Awards Banquet.



*Your 1986-87 Executive Board
front row (l to r): Sid Barnard, Past-President and Roy Ginn, President. Back row (l to r): Bob Gravani, 1st Vice President; Leon Townsend, President-Elect; Ron Case, Secretary and Bill Coleman, Affiliate Council Chairperson.*



*IAMFES Ames Office Staff promotes next years meeting
(l to r) Suzanne Trcka, Kathy Hathaway and Kate Wachtel.*

SEE YOU IN ANAHEIM, at the Disneyland Hotel, August 2-6, 1987

Equipment / Supplies

JUST RECEIVED

SWENSON 36 cu. w.ft. T316s/ s JKTD. Ribbon Mixer/Crystallizer
 GROEN INA-200 200-Gal. s/s Inclined Motion Agit. Kettles - 2 Available-Good Condition
 HARTEL CORP s/s Manifold Panel w/Controls
 BUFLOVAK 37.6 sq. ft. Chrome Plated Double Drum Dryer
 CB MODEL O 200-Gal. T316s/ s Open Top Tanks w/Inconel Immersion Heaters - 3 Available
 LADISH/TRI-CLOVER 1½ x 1½ T316s/ s Centrifugal Pumps - 3 Available - Excellent Condition
 TUTHILL 300 & 600 T316s/ s Post. Disp. Pumps - 5 Available
 MUELLER 220-Gal. T316s/ s JKTD. Closed Top Tank - Excellent Condition
 CHEM-TEK/WILL-FLOW JOYS 224-Gal. s/s JKTD. Agit. Open Top Tank - Excellent Condition
 SIMPLEX Dual Twin 4-Head T316s/ s Piston Filler
 NIAGARA 371 sq. ft. s/s Vertical Leaf Filter
 KOMLINE-SANDERSON 3' x 2' T316s/ s Flexible Rotary Vacuum Filter
 ALFA-LAVAL A10-RCF 175-Plate s/s Plate & Frame Heat Exchangers - 4 Available - Excellent Unused Condition - Can't Be Beat!
 PARKSON LAMELLA T316s/ s LT-196 Gravity Settler/Thickener
 GRASSLAND s/s Pallet Washer
 PICK "DASH-1" T316s/ s Steam Injection Liquid Heaters - 4 Available - Excellent Condition
 LADISH/TRI-CLOVER s/s Air-Operated Valves - 10 Available

LOEB EQUIPMENT

%Marvin Swirsky
 4131 S. State
 Chicago, IL 60609
 312/548-4131

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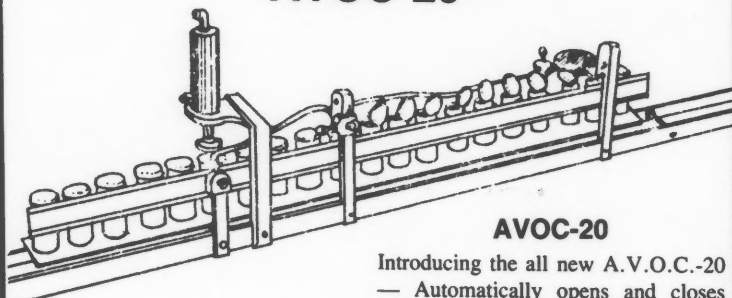
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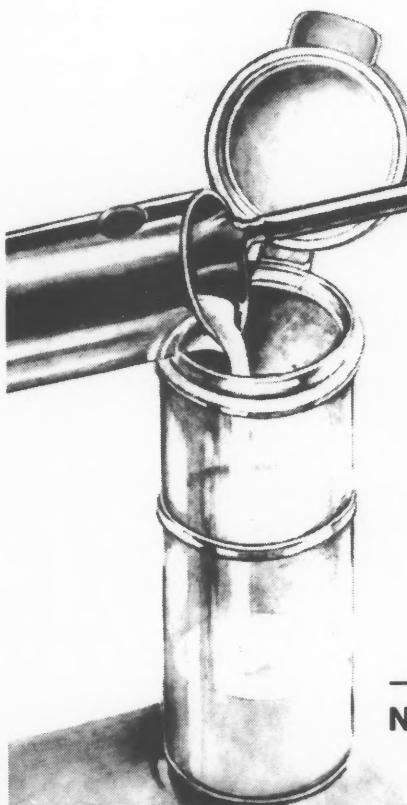
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Incidence of Clostridia in Cooked Meat Products in Japan, Y. Kokubo, M. Matsumoto, A. Terada, M. Saito, K. Shinagawa, H. Konuma and H. Kurata, Division of Milk and Meat Sanitation, Department of Food Hygiene and Nutrition, The Tokyo Metropolitan Research Laboratory of Public Health, 24-1, Hyakunincho 3 chome, Shinjuku-ku, Tokyo, 160, Japan; Nippon Veterinary and Zootechnical College, 7-3, Sakaminami-machi 1 chome, Musashino-shi, Tokyo 180, Japan; Aichi Prefectural Institute of Public Health, 7-6, Tsuji-machi aza-nagare, kita-ku, Nagoya, 462, Japan; Iwate University, 18-8, Ueda 3 chome, Morioka-shi, Iwate 020; National Institute of Hygienic Science, 18-1, Kamiyoga 1 chome, Setagaya-ku, Tokyo 158, Japan; and Department of Pathology, School of Medicine, Kitasato University, 1-15-1, Kitasato, Sagami-hara-shi, Kanagawa, 228, Japan

J. Food Prot. 49:864-867

A total of 469 cooked meat products collected from meat processing factories in Tokyo were examined for contamination by *Clostridium* species. Enumeration of clostridia was made by the MPN method with H₂S production as an indicator. The clostridia were detected in 154 (32.8%) products, with more than half of the sausages indicating contamination. One hundred forty (90.9%) of the positive samples showed contamination of less than 10 of the organisms/g. A total of 15 species, such as *Clostridium bifermentans*, *Clostridium perfringens* and *Clostridium sporogenes* were identified. *Clostridium botulinum* was not detected. One hundred sixty-seven (75.9%) strains of the spores of 220 typical isolates survived heat treatment of 65°C for 30 min, whereas only 15 (6.8%) remained intact at 100°C for 10 min. Growth which was noted in most species at 10°C was rarely detected at 5°C. Although 165 (75.0%) of these strains demonstrated proteolytic activity, lipolytic activity was hardly seen except in *C. sporogenes*. The results suggest that presence of the clostridia should not be ignored in assessment of the bacteriological quality of the cooked meat products, especially of sausages.

A Practical Evaluation of the Delvotest P Multi Plate Test in Screening Raw Milk for Antibiotics, Lyse Larocque and G. A. Neville, Chemical Standards Division, Bureau of Drug Research, Health Protection Branch, Health and Welfare Canada, Tunney's Pasture, Ottawa, Canada K1A 0L2

J. Food Prot. 49:868-870

The Delvotest P Multi plate test was evaluated by screening 100 milk samples for total antibiotic residues (penicillin G, streptomycin and neomycin). The samples were taken in conjunction with an antibiotic depletion study in milk derived from six cows treated with a multiple antibiotic, intramammary infusion product. Within the limits of sensitivity of the Delvotest, only penicillin G persisted in milk samples taken beyond 60 h, whereas in some samples, the other antibiotics appeared to be depleted as early as 48 h. More sensitive tests, however, detected neomycin (*Staphylococcus epidermidis*, ATCC 12228) in 50% of samples taken at 60 h and streptomycin (*Bacillus subtilis*, ATCC 6633) at 14.5 d after discontinuation of infusion.

Selected Biological Properties of Enterotoxigenic Staphylococci Isolated from Milk, F. M. Abbar, M. Tahir Mohammed and S. H. Arslain, Department of Biology, College of Science, and College of Veterinary Medicine, University of Mosul, Mosul, Iraq

J. Food Prot. 49:871-873

A total of 79 strains of staphylococci isolated from milk of mastitic cows in different Ninevah localities was divided into three groups based on biochemical activity. Group A was classified as *Staphylococcus aureus*. The resistance of these strains to antibiotics was: penicillin, 47.17%, streptomycin, 20.75%; erythromycin, 9.43%; and chloramphenicol, 5.66%. Most of the strains were resistant to the international phage set but were sensitive to phages 78 and 102 of the bovine phage set. Five strains produced enterotoxin C and two strains produced enterotoxin D.

Survival and Outgrowth of *Clostridium sporogenes* Spores during Curing and Storage of Corned Beef with Reduced Levels of Sodium Chloride, R. C. Whiting, R. C. Benedict and M. Cangialosi, USDA—ARS, Eastern Regional Research Center, 600 East Mermaid Lane, Philadelphia, Pennsylvania 19118

J. Food Prot. 49:874-876

Brines for curing meats contain salt and nitrite levels (up to 21% and 900 ppm, respectively) that inhibit outgrowth of spores. Brines containing lowered levels of salt were examined for their effect on *Clostridium sporogenes* spore outgrowth in cured corned beef during curing and subsequent storage (20°C). Outgrowth of *C. sporogenes* spores was monitored in the corned beef and also in Botulism Assay Medium (BAM) under various levels of sodium chloride and nitrite and different pH values. NaCl concentrations of 2.5% or less in cured corned beef had little effect on initial rates of growth, but 3.5% slowed the growth rate. Nitrite levels decreased during curing so that spores in corned beef containing 2.5% salt made with and without nitrite had similar rates of outgrowth during subsequent storage.

Tolerance of *Plesiomonas shigelloides* to pH, Sodium Chloride and Temperature, Mary L. Miller and John A. Koburger, Food Science and Human Nutrition, University of Florida, Gainesville, Florida 32611

J. Food Prot. 49:877-879

Forty strains of *Plesiomonas shigelloides* representing environmental and clinical isolates were characterized as to their tolerance to sodium chloride, acid and alkaline conditions and growth temperatures. In Tryptone broth all isolates grew in 3% but not 4% sodium chloride; whereas, in Trypticase Soy broth all isolates grew in 4% and 65% of them grew in 5% sodium chloride. All isolates initiated growth at pH 4.5 and 8.5 and 58% of the isolates grew at pH 4.0. Only 22% of the isolates grew at 8°C and 25% of them grew at 45°C. Heating at 60°C for 30 min destroyed all isolates tested.

Growth of and Aflatoxin Production by *Aspergillus parasiticus* in a Medium Containing Potassium Chloride or a Mixture of Potassium Chloride and Sodium Chloride, Gulam Rusul, Fathy E. El-Gazzar and Elmer H. Marth, Department of Food Science and The Food Research Institute, University of Wisconsin-Madison, Madison, Wisconsin 53706

J. Food Prot. 49:880-885

Twenty-five milliliters of glucose-yeast-salts medium containing 0, 2, 4, 6, 8 and 10% KCl or a mixture of NaCl (%) and KCl (%) (0:0, 1.5:0.5, 3.25:0.75, 4.75:1.25, 6.5:1.5, and 8:2) was inoculated with 1 ml of a spore suspension containing 10^6 conidia of *Aspergillus parasiticus* NRRL 2999 and incubated at 28°C for 10 d. The pH, dry weight of mycelium and aflatoxin production were determined after 3, 7 and 10 d of incubation. Amounts of aflatoxin produced were determined using reverse-phase high-performance liquid chromatography (HPLC). The mold growing in the presence of 0, 2 and 4% KCl produced maximum amounts of aflatoxin after 3 d, whereas in the presence of 6, 8 and 10% KCl it did so after 7 d. This trend was also true when the mold grew in the presence of mixtures of NaCl and KCl. Amounts of aflatoxin produced decreased with increasing concentrations of KCl or of the mixture of NaCl and KCl. The mycelial dry weight increased with increasing concentrations of KCl or the mixture of NaCl and KCl, although there was an extended lag phase at higher concentrations of both treatments.

Growth of Spoilage Bacteria in Broth and Vacuum-Packed Bologna-Type Sausage at Fluctuating Temperatures and Low Temperature Storage, H.-J.S. Nielsen and P. Zeuthen, Department of Biotechnology, Food Technology, The Technical University of Denmark, DK-2800 Lyngby, Denmark

J. Food Prot. 49:886-890

The influence of fluctuating temperatures on some important spoilage bacteria, i.e., *Brochothrix thermosphacta*, *Serratia liquefaciens* and a *Lactobacillus* sp., as well as *Vibrio* sp. and *Yersinia enterocolitica* was determined in broth culture and in vacuum-packed Bologna-type sausage. Temperatures used were -2.0, 2.0 and 5.0°C. The influence of fluctuating temperatures varied considerably among the organisms studied. *B. thermosphacta* grew irrespective of temperature, numbers of *S. liquefaciens* decreased each time the product was stored at -2°C but grew at temperatures above 0°C. The effect on the *Lactobacillus* sp. depended on the initial storage temperature, whereas no significant difference in numbers of *Y. enterocolitica* were observed during fluctuating temperature storage. Generally the time-temperature combination was important and was the determining factor in the number of bacteria present after equivalent periods at the incubation temperatures above and below 0°C. The study indicated that with short periods of 2 to 3 d at each temperature, *B. thermosphacta* was favored. For long periods of 5 or 7 d at each temperature, lactics, *S. liquefaciens* and *Vibrio* sp. also increased to high numbers. *B. thermosphacta*, but neither *S. liquefaciens* nor *Y. enterocolitica* grew at a constant temperature of -2°C.

Concentration of *Giardia* Cysts from Water by a Centrifugal Cream Separator, E. P. Merrill, Department of Biological and Physical Sciences, Agricultural and Technical College, State University of New York, Cobleskill, New York 12043

J. Food Prot. 49:891-892

A method utilizing centrifugal separation followed by membrane filtration recovered 31 to 61% of *Giardia* cysts from 38-L samples of water.

Occurrence of *Salmonella* in Porcine Liver in Northern Ireland, R. H. Madden, B. Hough and C. W. Gillespie, Agricultural and Food Bacteriology Research Division, Department of

Agriculture for Northern Ireland, Newforge Lane, Belfast BT9 5PX, Northern Ireland and Department of Agricultural and Food Bacteriology, The Queen's University of Belfast, Newforge Lane, Belfast BT9 5PX, Northern Ireland

J. Food Prot. 49:893-894

Pork livers from four pork processing plants in Northern Ireland were studied to assess their contamination by salmonellae. Additionally, aerobic plate counts (APC) and counts of *Enterobacteriaceae* were made. One hundred twenty livers were sampled immediately after evisceration and 110 sampled after being chilled overnight in the commercial premises. No salmonellae were detected. Geometric mean values for the APC were 1.6×10^4 and 3.1×10^5 CFU/g for fresh and chilled livers, respectively. Homologous geometric mean values for *Enterobacteriaceae* were 7.9×10^2 and 6.0×10^2 CFU/g, respectively.

***Campylobacter jejuni* Infection on Poultry Farms and its Effect on Poultry Meat Contamination during Slaughtering**, C. Genigeorgis, M. Hassaneh and P. Colling, Department of Epidemiology and Preventive Medicine, School of Veterinary Medicine, University of California, Davis, California 95616

J. Food Prot. 49:895-903

In 1984, we monitored 4 ranches with a total of 24 houses (15,000-20,000 birds/house) for 3 consecutive generations (January-August). On epidemiologic grounds, infection of birds did not originate at the hatcheries or the central water and feed. Considering all lots of birds, the infection rate increased from 2.3% by the 10th day to 9.5, 29.7, 47.9, 65.7, 78.6 and 81.8% by the 20th, 30th, 40th, 45th, 50th day and at slaughter times, respectively. Transmission from one generation of chickens to the next via the old litter is suspected, but not proven microbiologically. A 5-log reduction of *Campylobacter jejuni* was shown in experimentally inoculated litters stored at 17 and 30°C for 6 d and 8°C for 11 d. The houses remained empty for 9-29 d before being filled with new chicks. Carrier flocks contaminated the slaughterhouse equipment to such an extent that negative flocks processed afterwards resulted in contaminated meat. Lack of effective sanitation at the end of the day contributed to the contamination of meat from *Campylobacter*-free birds processed the next day. Feather picker drip water was positive 94% of the sampling times at levels of \log_{10} 3.4 (1.0-4.7). Scalding temperatures did not affect the level of contamination in the finished products ($P > 0.2$). An ELISA based on heat-stable antigens was adapted for the detection of circulating anti-

bodies. Of 56 broilers aged 50 to 68 d, only 2 (3.5%) 68 d old with \log_{10} 5.4 *C. jejuni*/g of feces were considered as positive. Birds considered negative harbored *C. jejuni* in their ceca at levels of \log_{10} 2.0 to 5.4/g of feces. Five out of 6 (83%) 18 month-old hens were considered as positive. Yet, none of these birds were found carrying *C. jejuni* in their feathers or ceca.

Histamine Levels in Commercially Processed Fish in Morocco, L. Ababouch, M. M. Alaoui and F. F. Busta, Département de Microbiologie Alimentaire et Biotechnologie, Institut Agronomique et Veterinaire Hassan II, Rabat-Instituts, 6202 Rabat, Morocco; Laboratoire de Recherches et d'Analyses Veterinaires de Casa, Ministère de l'Agriculture et de la Reforme Agraire, 43 Rue de Tours, Casablanca, Morocco and Food Science and Human Nutrition Department, University of Florida, Gainesville, Florida 32611

J. Food Prot. 49:904-908

Histamine levels were determined in 248 samples of fish commercially processed in Morocco. Concentrations ranging from <0.01 to 694 mg/100 g of fish (mg%) were observed. The mean value was 12.33 mg% (sardines, 9.75; mackerel, 13.74; tuna 9.86) and the standard deviation was 55.28 mg% (sardines, 43.21; mackerel, 71.99; tuna, 25.05). The bulk of the samples (85.5%) had low histamine levels (<10 mg%); 26 samples (10.5%) had levels within the range 10-50 mg% and should be classified as not from fresh fish or of low quality; 10 samples (4%) had toxicologically significant levels, above 50 mg%. Tuna fish was more susceptible to histamine development than were sardines or mackerel; 7% of tuna fish samples contained levels above 50 mg% as compared to 3.7% and 3.2% for sardines and mackerel, respectively. The percentage of samples containing levels above 50 mg% was somewhat higher for fish processed in the central region (7.1%) than the southern (4.3%) or northern (1.3%) regions; however, statistically the regional differences were not significantly different. Histamine development in sardines demonstrated first-order kinetics. Reaction rates ranged from 0.00200 to 0.000421 min^{-1} . Refrigeration controlled histamine development. Fish held at 8°C showed a shelf life 12 h longer than fish held at 17°C. A combination of salting and refrigeration was more effective. Fish held at 8°C and salted at a level of 5 or 8% showed a shelf life 35 h longer than fish held at 17°C with no salt.

Determination of Dibromochloropropane and Related Fumigants in Citrus Fruit, Yasuhide Tonogai, Yoshio Ito,

Shunjiro Ogawa and Masahiro Iwaida, National Institute of Hygienic Sciences, Osaka Branch, 1-1-43, Hoenzaka, Higashiku, Osaka 54, Japan

J. Food Prot. 49:909-913

A simple and systematic procedure for determination of 1,2-dibromo-3-chloropropane (DBCP), 1,3-dichloropropene (DCP), chlorobutol (TCB) and seven related compounds in citrus fruits was established. Since these compounds have extremely high volatility, the distillation apparatus for volatile oil determination was used. These compounds were trapped into cyclohexane (more than 94.2-98.4% at spiking levels of 0.5-50 ppm) by this distillation. The distillate was purified by Florisil column chromatography. All compounds except TCB were eluted with n-hexane:ether(93:7) and TCB was eluted with ether. Each eluate was injected into an ECD-gas chromatograph directly for determination. Their recoveries from lemon, orange and grapefruit were within 91.5-98.6% at the spiking levels of 0.01-1 ppm.

Rapid Determination of Mono-, Di- and Tri-isopropyl Citrate in Foods by Gas Chromatography, Sumiko Tsuji, Yasuhide Tonogai and Yoshio Ito, National Institute of Hygienic Sciences, Osaka Branch; 1-1-43, Hoenzaka, Higashiku, Osaka, 540, Japan

J. Food Prot. 49:914-916

A simple and rapid method for determining mono-, di- and tri-isopropyl citrates in foods was developed. Isopropyl citrates in butter and milk powder were extracted with ethyl acetate under acid condition and in edible oil with hexane. The ethyl acetate containing isopropyl citrates was evaporated and the residue was taken up in hexane. The isopropyl citrates in hexane were extracted into acetonitrile. After evaporation of the solvent, isopropyl citrates were methylated with diazomethane, and they were determined by gas chromatography. Recoveries of mono-, di- and tri-isopropyl citrates from edible oil, butter and milk powder by this method were more than 92.9%, 95.7% and 94.8%, respectively. The detection limits of isopropyl citrates were 1 µg/g of sample.

Effect of Film Oxygen Transmission Rate on Lean Color and Microbiological Characteristics of Vacuum-Packaged Beef Knuckles, J. W. Savell, D. B. Griffin, C. W. Dill, G. R. Acuff and C. Vanderzant, Department of Animal Science, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas 77843

J. Food Prot. 49:917-919

Seventy-two beef knuckles were packaged (n=12) in each of six different bag types with oxygen transmission rates (OTR) of 1, 10, 12, 13, 30 and 400 cc/m²/24 h at 4°C and 100% relative humidity to study brown discoloration of knuckles during refrigerated storage. Knuckles in bag types of OTR of 1 and 12 cc did not discolor as compared to those in bags with higher OTR (30 and 400 cc) probably due to differences in

oxygen tension in the package and in the types of bacteria present. Deterioration of lean color of knuckles in some bag types of low OTR appeared associated with large percentages of *Leuconostoc mesenteroides* in the microflora.

Reactivation with Pancreatin of Coproantibody-Neutralized Virus in Ground Beef, K. D. Kostenbader, Jr. and D. O. Cliver, Food Research Institute (Department of Microbiology and Toxicology), World Health Organization Collaborating Centre on Food Virology, and Department of Bacteriology, University of Wisconsin, Madison, Wisconsin 53706

J. Food Prot. 49:920-923

Viruses transmissible through food are sometimes shed in association with coproantibody, which may preclude their detection by conventional means. We had shown previously that a large volume of food extract (up to 1.4 ml/cm² of monolayer) can be tested in cell culture, and that the inoculum can be transferred from one type of cell culture to another to afford a broader spectrum of virus sensitivity. Here we report that pancreatin is capable of reactivating the majority of coproantibody-neutralized poliovirus and that pancreatin-treated extract from ground beef samples can be tested in large volumes and transferred among cell cultures as described above.

Incidence of Foodborne Disease in the Netherlands: Annual Summary - 1981, H. J. Beckers, Laboratory for Water and Food Microbiology, National Institute of Public Health and Environmental Hygiene, P.O. Box 1, 3720 BA Bilthoven, The Netherlands

J. Food Prot. 49:924-931

Data on the incidence of foodborne disease in 1981 are presented. A total of 415 incidents affecting 3618 ill persons was analyzed. In 122 incidents (1683 cases) the etiology was established: micro-organisms appeared to be the main causative agents. *Clostridium perfringens* was responsible for 18 of these incidents (106 cases), *Staphylococcus aureus* for 17 (67), *Salmonella* for 16 (1114), including the outbreak during the European Summit Conference at Maastricht (700 cases), *Bacillus cereus* for 15 (135) and *Campylobacter jejuni* for 13 (142). Two episodes were probably caused by *Clostridium botulinum* (2 cases) and ECHO-viruses (48). In 7 episodes (11 cases) illness resulted from ingestion of food contaminated with scrobrotxin, in 6 episodes (13) with saxitoxin (shellfish poison). In 16 incidents (32 cases) foods had been contaminated with chemical substances. Cases of foodborne disease recorded by the Chief Medical Inspectorate included infections from *Salmonella* (7496), *C. jejuni* (1496) and *Yersinia enterocolitica* (262). However, these could not be analyzed further due to a lack of epidemiological information. Meat and meat products (49 incidents), fish and shellfish (42), Dutch meals (42) and Chinese foods (128) were associated with outbreaks most frequently. About 60% of the incidents involved places where food is prepared for immediate consumption. Examples of outbreaks are presented.

1986

November 6, TENNESSEE AFFILIATE WORKSHOP, to be held at Ellington Agricultural Center, Nashville, TN. For more information contact: Dennis Lampley, Rt. 1, P.O. Box 468-B, Bon Aqua, TN 37025. 615-360-0157

November 20, WESTERN NEW YORK IFT SYMPOSIUM, Rapid Microbiological Methods, Rochester, NY. For more information contact Donald L. Downing, Cornell University - NYSAES, Geneva, NY 14456, (315) 787-2273.

November 27, ONTARIO FOOD PROTECTION ASSOCIATION ANNUAL MEETING, to be held at the Airport Holiday Inn-Toronto. For more information contact: Jack Willekes, P.O. Box 79, Streetsville, Ontario L5M 2B7 Canada.

December 11-12, 7TH ANNUAL UNIVERSITY OF WISCONSIN-RIVER FALLS FOOD MICROBIOLOGY SYMPOSIUM. For more information contact Dr. P. C. Vasavada, Food Science Department, University of Wisconsin, River Falls, WI 54022. 715-425-3150.

1987

January 12-23, BAKING FOR ALLIED AND NON-PRODUCTION PERSONNEL, Manhattan, Kansas. Contact Registrar at 1-800-633-5137 or write: Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

January 19-21, PACKAGING, Manhattan, Kansas. Contact Registrar at 1-800-633-5137 or write Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

January 26-28, BAKING PRODUCTION TECHNOLOGY, location to be announced. Contact Registrar at 1-800-633-5137 or write: Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

January 26-29, BASIC-FOOD PROCESSING SANITATION, Manhattan, Kansas. Contact Registrar at 1-800-633-5137 or write: Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

January 26-30, SPECIALIZED COOKIE PRODUCTION FOR THE RETAIL BAKER, Manhattan, Kansas. Contact Ellen Thurlo at 1-800-633-5137 or write: Ellen Thurlo, Research Department, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

February 4-5, FOOD PROCESSORS' SANITATION WORKSHOP, to be held at the Holiday Inn, Santa Nella, CA. For more information contact: Kathryn J. Boor, Food Science and Technology, University of California, Davis, CA 95616. 916-752-1478.

February 5-7, FOOD ADDITIVES, THE CHANGING CLIMATE? 1ST INTERNATIONAL CONGRESS, to be held at the Hilton Hotel, Vienna, Austria. For more information contact Secretariat of the Food Additives, The Changing Climate, 1st International Congress, 30 Deane Way, Ruislip, Middlesex HA4 8SX, England.

February 11-12, DAIRY AND FOOD INDUSTRY CONFERENCE: THE OHIO STATE UNIVERSITY. For information contact John Lindamood, Department of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210-1097

February 19, WESTERN NEW YORK IFT SYMPOSIUM, Pest Management and Sanitation, Rochester, NY. For more information contact Donald L. Downing, Cornell University - NYSAES, Geneva, NY 14456. 315-787-2273.

February 23-25, ABC RESEARCH, 13TH ANNUAL TECHNICAL SEMINAR. For more information contact Sara Jo Atwell, ABC Research Corporation, P.O. Box 1557, Gainesville, FL 32602. 904-372-0436.

February 23-25, FAMFES 1987 EDUCATIONAL CONFERENCE, to be held at the Louisville, Kentucky, Executive Inn. For more information contact: Bland Doris, 711 Cottonwood Drive, Bowling Green, KY 42101.

March 3-4, VIRGINIA ASSOCIATION OF SANITARIANS AND DAIRY FIELDMEN'S ANNUAL MEETING, to be held at Virginia Polytechnic Inst. and State University. For more information contact: W. J. Farley, Rt. 1, P.O. Box 247, Staunton, VA 24401. 703-434-3897.

March 10-12, WESTERN NEW YORK IFT SYMPOSIUM, Freezing Technology, Geneva, NY. For more information contact: Donald L. Downing, Cornell University - NYSAES, Geneva, NY 14456. 315-787-2273.

March 23-27, MID-WEST WORKSHOP IN MILK AND FOOD SANITATION, The Ohio State University. For more information contact: John Lindamood, Department of Food Science and Nutrition, 2121 Fyffe Road, The Ohio State University, Columbus, OH 43210-1097.

March 25-27, MICHIGAN ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL MEETING, to be held at the Hilton Hotel, 28th St., Grand Rapids, MI. For more information contact: Ike Volkens, Environmental Health, Michigan Dept. of Health, 3500 N. Logan, Lansing, MI 48909. 517-335-8268.

March 26, WESTERN NEW YORK IFT SYMPOSIUM, Better Process Control School Refresher, Rochester, NY. For more information contact: Donald L. Downing, Cornell University - NYSAES, Geneva, NY 14456. 315-787-2273.

March 31 - April 1, WESTERN FOOD INDUSTRY CONFERENCE, to be held at the University of California, Davis, CA. For more information contact: Robert Pearl, Conference Chairman, 916-752-0980 or Shirley Rexroat, Conference Coordinator, Department of Food Science and Technology, University of California, Davis, CA 95616.

April 7-8, WESTERN NEW YORK IFT SYMPOSIUM, Wine Industry Workshop, Rochester, NY. For more information contact Donald L. Downing, Cornell University - NYSAES, Geneva, NY 14456. 315-787-2273.

April 22-24, SOUTH DAKOTA ENVIRONMENTAL HEALTH ASSOCIATION ANNUAL MEETING, to be held in Aberdeen, SD. For more information contact: Stan Iwagoshi, South Dakota Dept. of Health, 1320 S. Minnesota Ave., Suite A, Sioux Falls, SD 57105. 605-335-5037.

April 27-30, AOAC SPRING TRAINING WORKSHOP AND EXPOSITION, to be held at the Skyline Hotel, 101 Lyon Street, Ottawa, Ontario, Canada. For more information contact: Graham MacEachern, Agriculture Canada, Laboratory Service Building 22, Central Experimental Farm, Ottawa, Ontario, Canada K1A-0C5 (613) 994-1991 or James Lawrence, Health & Welfare Canada, Health Protection Branch, Tunneys Pasture, Ottawa, Ontario, Canada K1A-0L2. 613-990-8495.

May 11-14, WESTERN NEW YORK IFT SYMPOSIUM, Better Process Control School, Rochester, NY. For more information contact: Donald L. Downing, Cornell University - NYSAES, Geneva, NY 14456. 315-787-2273.

May 18-20, THE PA DAIRY SANITARIANS & LABORATORY DIRECTORS ANNUAL MEETING, to be held at Penn State University, J. O. Keller Convention Center, State College, PA. For more information contact: Audrey Throne, Hershey Choc. Co., 19 E. Chocolate Ave., Hershey, PA 17033. 717-534-4031.

August 2-6, IAMFES 74TH ANNUAL MEETING, to be held at the Disneyland Hotel, Anaheim, California. For more information contact Kathy R. Hathaway, IAMFES, Inc., PO Box 701, Ames, IA 50010. 800-525-5223, in Iowa 515-232-6699.

1988

October 9-13, AACC ANNUAL MEETING, to be held at the Hotel InterContinental San Diego, in San Diego, California. For more information contact: Raymond J. Tarleton, American Assoc. of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121. 612-454-7250.

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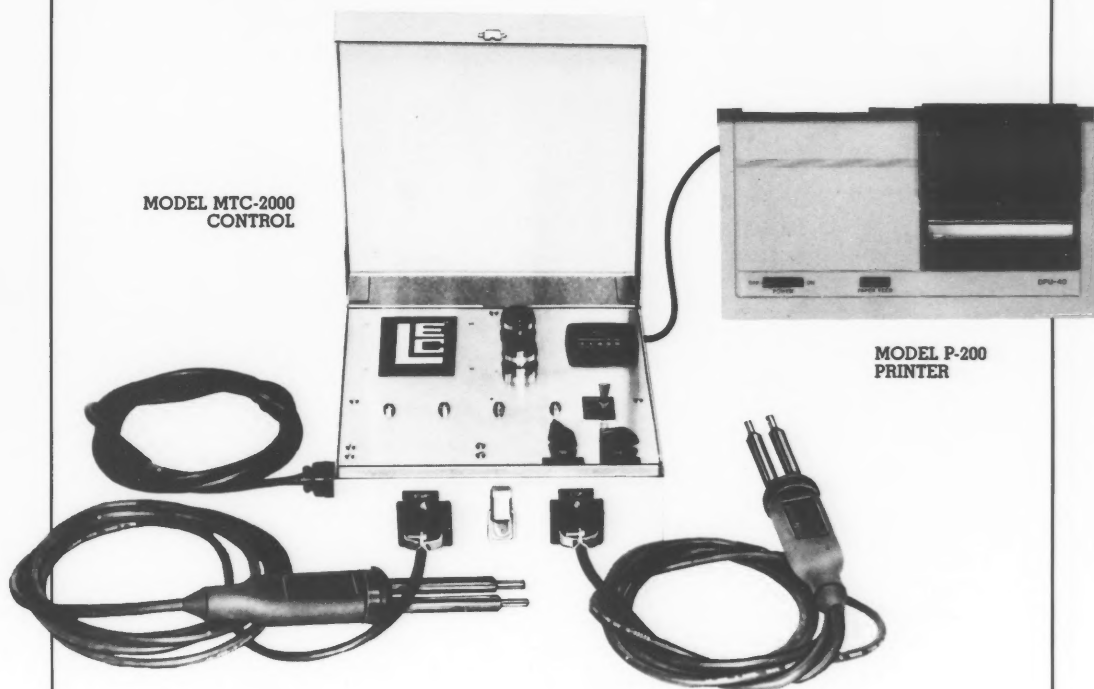
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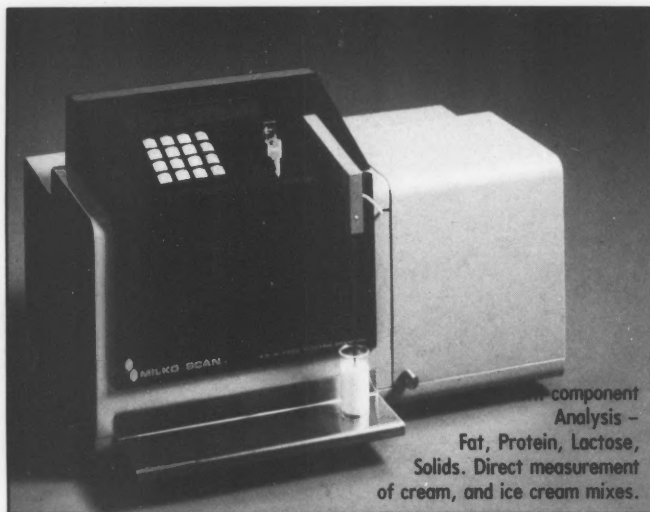


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