

ISSN:0273-2866
Box 701
Ames, Iowa 50010

November, 1988

Vol. 8, No. 11
Pages 581-648
\$6.00

PD FEB 88
UNIVERSITY MICROFILMS
INTERNATIONAL
300 NORTH ZEEB ROAD
ANN ARBOR, MI 48106

®

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

Radiation Exposure
In Laboratory Personnel
Using a P-32 Labelled
DNA Probe Assay

1988 IAMFES
Annual Meeting Report

When Water and
Manure Don't Mix



A Half Century of
Food Microbiology - -
And A Glimpse at
the Years Ahead

Neogen Aflatoxin
Testing Method
Receives AOAC Approval

Blue Metal-Detectable
Bandage Can Save U.S.
Food Processors Money

Call for Research Papers for the 1989 Annual
Meeting. See the October issue.
Developing Scientist Award Papers also being accepted, see p. 581

Team up on milk residue problems with two sure and simple tests.



SULFA

SIGNAL
ELISA SULFAMETHAZINE
DETECTION TEST

The SIGNAL ELISA Sulfamethazine Detection Test helps avoid the costly consequences of violative sulfa residue problems in milk.

This economical and highly-accurate microtiter well format test can detect sulfamethazine in milk, as well as, tissue, serum, urine or feed.


SIGNAL ELISA is also quick. Test results can be seen in 25 minutes.

Penzyme[®] III

*Antibiotic Residue
Screen Test for Milk.*

Penzyme III is the sure and simple antibiotic residue test for milk. Penzyme III can detect penicillin, amoxicillin, ampicillin, cloxacillin, cephalirin and other beta-lactam antibiotics.

In studies screening thousands of unknown samples, Penzyme consistently detected positive loads.



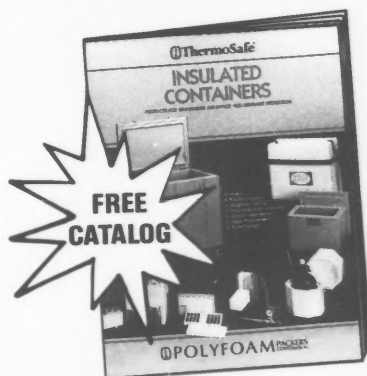
The Penzyme III Residue Screen Test can be completed in 60 seconds and results can be read 15 minutes later. Best of all, Penzyme III can detect antibiotic residues for less than \$1.65 per test.



SmithKline Animal Health Products

A DIVISION OF SMITHKLINE BECKMAN CORPORATION
P.O. Box 2650, West Chester, PA 19380
(800) 877-7303 Ext. 7506

Insulated Containers from Polyfoam Packers



Temperature and breakage protection
for every requirement

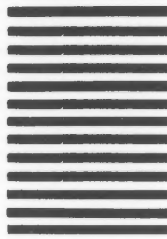
- NEW packaging for bio-hazardous materials to meet regulations from U.S. Post Office and major couriers.
- Ship with complete assurance: clinical, analytical and environmental samples.
- Expanded line of non-electrical temperature maintenance accessories: dry ice storage chests, refrigerant packs, dry ice machines.

 **POLYFOAM** PACKERS
CORPORATION

Name _____
Firm _____
Street _____
City _____
State, Zip _____
Phone () _____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 364 WHEELING, IL

POSTAGE WILL BE PAID BY ADDRESSEE

POLYFOAM PACKERS CORP.
2320 South Foster Avenue
Wheeling, IL 60090 — 9969



DFS
11/88

IAMFES

Announcement Developing Scientist Awards

(Supported by Sustaining Members)

Awards

Five (5) awards will be presented: 1st place, \$500 and a plaque; 2nd place, \$200 and a certificate; 3rd place, \$100 and a certificate; 4th place, \$50 and a certificate; 5th place, \$50 and a certificate. All of the winners will receive a 1 year membership including both *Dairy and Food Sanitation* and the *Journal of Food Protection*.

Purpose

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

Who Is Eligible

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

Criteria

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

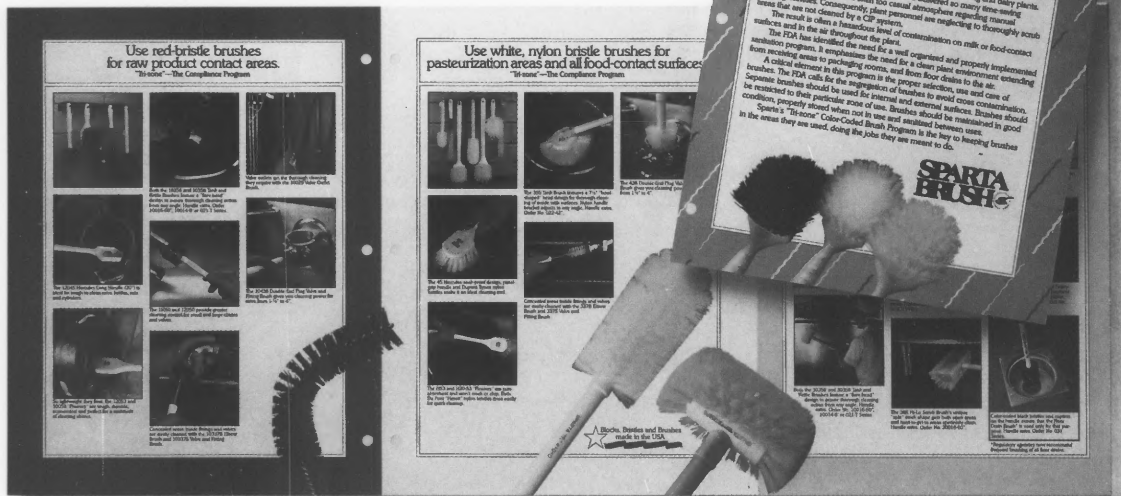
Publishers of the *Journal of Food Protection* and *Dairy and Food Sanitation*

International Association of Milk, Food and Environmental Sanitarians Inc.

P.O. Box 701 - 502 E. Lincoln Way - Ames, Iowa 50010 - (515) 232-6699 - 1-800-525-5223 (outside of Iowa)

Tri-Zone™

A Color Coded Brush Program offering a positive approach to controlling cross contamination.



Introducing the new Sparta Tri-Zone Brush Color Coding System. It's designed to help you prevent bacterial cross contamination through brush segregation.

The Tri-Zone concept gets right to the heart of the FDA's recommendation to keep brushes in the areas where they are used, doing only the jobs they are meant to do.

Red-bristle brushes are designated for use only in raw product contact areas. White-bristle brushes for pasteurization areas and all food-contact areas. Yellow-bristle brushes for environmental cleanup of non-food-contact surfaces.

Preventing brushes from traveling from one plant area to another, or from one cleaning job to another, can help control the transmission of bacteria. So, making Tri-Zone an important part of your bacteria control program, along with proper maintenance and usage of brushes, can go a long way in fighting bacteria in your food service facility or processing plant.

For your copy of Sparta's free brochure, contact your Sparta distributor or Sparta Brush Company, P.O. Box 317, Sparta, Wisconsin 54656-0317 • 608-269-2151 • 1-800-356-8366 FAX: 608-269-3293 • TLX: 759-901.

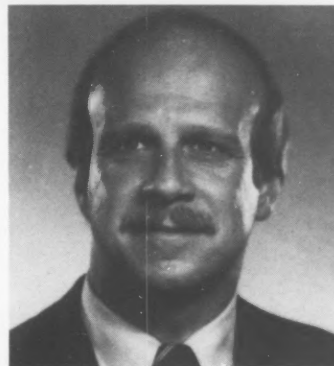
SPARTA BRUSH

MADE IN THE USA

Thoughts From the President . . .

By

Robert B. Gravani



This year our association celebrated its Diamond Jubilee annual meeting and begins its 77th year. (Apparently an annual meeting was cancelled during the war years.) This is certainly a milestone of longevity and professional commitment to dairy, food and environmental protection.

From the first annual meeting in 1912 when Charles J. Steffen and thirty four people gathered to discuss...“how to proceed to more completely safeguard the milk supply and to encourage the employment of competent, experienced men as inspectors, and to standardize and make uniform our work,” our association has grown significantly in size and scope.

Today, IAMFES has almost 4,400 members and subscribers and is a strong, viable and internationally recognized organization. The membership is quite diverse and represents sanitarians, microbiologists, food scientists, quality assurance personnel, environmental health technicians and many other professionals from industry, academia and regulatory agencies.

Our 75th annual meeting that was recently held in Tampa, Florida on July 31-August 3, featured 11 technical sessions, 9 symposia and approximately 102 presentations. The program was the most ambitious session ever planned for our association and it provided the approximately 800 registered participants with facts and perspectives in many important areas. The nine symposia provided in-depth information on specific topics and issues and were very well attended. The symposia were on timely topics such as:

- The Microbiological Safety of Fresh Processed Poultry
- The Future of Water Quality and Its Affect on the Dairy and Food Industry
- The Handling and Safety of Ingredients Used in Dairy Products
- The Safety of Extended Shelf Life Refrigerated Foods
- Environmental Health Responses to Disasters
- The Hazard Analysis Critical Control Point (HACCP) Concept
- Current Perspectives on Seafood Sanitation
- An Update on Pest Problems, Strategies, and New Control Technologies for the Food Industry
- Microbiological Concerns in Specialty Cheeses and Other Dairy Products

Many IAMFES members contributed greatly of their time and talents to assure the success of this meeting. Although they are too numerous to mention here, I do want to acknowledge with thanks the special efforts of Professor Edmund Zottola, Program Coordinator, Professor Ronald Schmidt, Local Arrangements Chairman, and Ms. Sonya Gambrel, Special Events Coordinator, and all of the hard working members of the FAMFES local arrangements committee for contributing to the success of our Diamond Jubilee Annual Meeting. The Ames office staff also deserves thanks for their tireless efforts in attending to all the important details of the Annual Meeting.

Congratulations are due to all of our award winners and especially to the five graduate students who placed in the Developing Scientist Award competition. More information and photos of the annual meeting are featured in this issue.

As your President for 1988-89, I pledge to work diligently to uphold the objectives of our association. With the assistance of the Executive Board, the excellent Ames office staff, under the direction of Executive Manager Kathy Hathaway, and all of the members of IAMFES, I hope to continue to strengthen our organization as we look to future opportunities and challenges in the year ahead.

IAMFES Sustaining Members

ABC Research, Dr. William Brown, P.O. Box 1557, Gainesville, FL 32602

Access Medical Systems, Inc., Clara B. Munson, 21 Business Park Dr., Branford, CT 06405

Accurate Metering Systems, Inc., Mike Lucas, 1651 Wilkening Court, Schaumburg, IL 60173

Aeration Technical Services, John Micketts, 4100 Peavey Rd., Chaska, MN 55318

Alex C. Ferguson, Larry LaFrenz, Spring Mill Rd., Frazer, PA 19355

Alfa-Laval, Inc., R. E. Gray, Agri-Group, 1110 North Congress Avenue, Kansas City, MO 64153

Alpha Chemical Services, Inc., Milford Juckett, P.O. Box 431, Stoughton, MA 02072

Anderson Chemical Co., Leif A. Anderson, Box 1041, Litchfield, MN 55355

Anderson Instrument Co., Mike Cunningham, RD 1, Fultonville, NY 12072

Angenic, Inc., L. Robert Johnson, 100 Inman St., Cambridge, MA 02139

Aquafine, Pat McGuire, 25230 W. Ave. Stanford, Valencia, CA 91355

Artek Systems Corp., Mike Bender, 170 Finn Court, Farmingdale, NY 11735

Associated Milk Producers, Inc., Phil Hermesen, 830 N. Meacham Rd., Schaumburg, IL 60195

Babson Bros. Co., Terence M. Mitchell, 1354 Enterprise Dr., Romeoville, IL 60441

Becton Dickinson Microbiology Systems, Joy Sussman, P.O. Box 243, Cockeysville, MD 21030

Belmonte Park Laboratories, James A. Elam, 1415 Salem Ave., Dayton, OH 45406

Bio Control Systems Inc., Howard Volin, 19805 North Creek Parkway, Bothell, WA 98011

Borden, Inc., Terry D. Ryan, Dairy & Services Div., 16855 Northchase, Houston, TX 77060

Canada Packers, S. N. J. Mawji, 5100 Timberlea Blvd., Mississauga, Ontario L4W 2S5 Canada

Capitol Vial Corp., H. Carl Smith, P.O. Box 611, Fonda, NY 12068

Carnation Co., Phillip R. Crain, 5045 Wilshire Blvd., Los Angeles, CA 90036

Chem Bio Laboratories, Robert Deibel, 5723 West Fullerton Ave., Chicago, IL 60639

Chemland, Inc., Paul Hyde, 1298 South Walnut, Turlock, CA 95380

Cherry-Burrell Corp., Vince Mills, 2400 6th St. SW, Cedar Rapids, IA 52406

Control One Inc., Yves M. Hendrickx, P.O. Box 493, Old Greenwich, CT 06870

Dairilab Services, Steven Kohl, 2415 Western Ave., Manitowoc, WI 54220

Dairy & Food Labs San Francisco and Modesto, Inc., Tom Swafford, 1581 Cummins Dr., Suite 155, Modesto, CA 95351

Dairy Quality Control Inst., Roy Ginn, 2353 No. Rice St., St. Paul, MN 55113

Dairymen, Inc., William Arledge, 10140 Linn Station Road, Louisville, KY 40223

Darigold, Bill Brewer, 635 Elliott Ave. W., Seattle, WA 98109

Dean Foods, George Muck, 1126 Kilburn Ave., Rockford, IL 61101

Difco Laboratories, Nancy Hyzer, P.O. Box 1058, Detroit, MI 48232

Diversey/Wyandotte, Maynard David, 1532 Biddle Ave., Wyandotte, MI 48192

Domino's Pizza, Inc., Pamela Hill, 30 Frank Lloyd Wright, Ann Arbor, MI 48198

DTR Temperature Recorder, Fred Wu, 1408 N. Carpenter Rd., Unit 1C, Modesto, CA 95352

Dynisco Inc., Bernard Shapiro, 10 Oceana Way, Norwood, MA 02062

Eastern Crown, Inc., John W. Raht, P.O. Box 216, Vernon, NY 13476

Education Testing Services, Chuck Teryek, 225 Langhorne-Lardley Rd., Langhorne, PA 19047

Environmental Test Systems, Inc., Robert F. Myers, P.O. Box 4659, Elkhart, IN 46514

Foss Food Technology Corporation, Charles H. Lowden III, 10355 West 70th St., Eden Prairie, MN 55344

FRM Chem, Inc., Raymond E. Kastendieck, P.O. Box 207, Washington, MO 63090

GENE-TRAK Systems, Ralph Johnston, 31 New York Ave., Framingham, MA 01701

Gerber Products Co., Guy H. Johnson, 445 State St., Fremont, MI 49412

Gist-Brocades, Jim Yeaman, P.O. Box 241068, Charlotte, NC 28224

Henkel Corp., Curtis E. Frye, 300 Brookside Ave., Ambler, PA 19002

H. B. Fuller Co., Nan Wolly, Monarch Chemicals Div., 3900 Jackson St. NE, Minneapolis, MN 55421

IBA Inc., Daniel J. Belsito, 27 Providence Rd., Millbury, MA 01527

Kendall Co., Peter Godfredson, One Federal St., Boston, MA 02101

Klenzade Division, Charles McDuff, Economics Laboratory, Inc., 3050 Metro Drive, Suite 208, Bloomington, MN 55420

Land O'Lakes Inc., Don Berg, P.O. Box 116, Minneapolis, MN 55440

Maryland & Virginia Milk Prod. Assn., Inc., Jim Reeder, P.O. Box 9154 Rosslyn Station, Arlington, VA 22209

Metz Sales, Inc., S. Rex Metz, 522 West First St., Williamsburg, PA 16693

Michelson Labs, Sally Michelson, 4555 Produce Plaza, Los Angeles, CA 90058

Mid America Dairymen, Inc., Gene Marti, P.O. Box 1837 SSS, 800 W. Tampa, Springfield, MO 65805

Milk Industry Foundation, Glenn Witte, 888 16th St., NW, Washington DC 20006

Milk Marketing, Inc., Norm Corlett, P.O. Box 36050, Strongsville, OH 44136

Minnesota Valley Testing Laboratories, Fred Day, 326 Center St., New Ulm, MN 56073

Nalge Co., Thomas F. Stender, P.O. Box 365, Rochester, NY 14602

Nasco International, John M. Meyer, 901 Janesville Ave., Fort Atkinson, WI 53538

National Mastitis Council, John Adams, 1840 Wilson Blvd., Arlington, VA 22201

National Milk Producers Federation, John Adams, 1840 Wilson Blvd., Arlington, VA 22201

National Sanitation Foundation, Tom S. Gable, P.O. Box 1468, Ann Arbor, MI 48106

Norton Company Transflow Tubing, Steve Little, P.O. Box 350, Akron, OH 44309

Oregon Digital Systems Inc., David Bowman, 885 N.W. Grant Ave., Corvallis, OR 97330

Organon Teknika, Joann O'Connell, 800 Capitola Dr., Durham, NC 27713

Oxoid USA, Inc., John Putko, 9017 Red Branch Rd., Columbia, MD 21045

Penicillin Assays, Inc., Stanley Charm, 36 Franklin St., Malden, MA 02148

The Pillsbury Company, Howard Bauman, 311 Second St., S.E., Minneapolis, MN 55414

Ross Laboratories, Muriel Schruggs, 625 Cleveland Ave., Columbus, OH 43216

Schlueter Co., Charles Benskin, P.O. Box 548, Janesville, WI 53547

Seiberling Associates, Inc., D.A. Seiberling, 11415 Main St., Roscoe, IL 61073

Silliker Labs, Damien A Gabis, 1304 Halsted St., Chicago Heights, IL 60411

SmithKline Animal Health Products, Chris Cashman, P.O. Box 2650, West Chester, PA 19380

Sparta Brush Co. Inc., Jack Horner, P.O. Box 317, Sparta, WI 54656

Swagelock Co., Earl Ray Frink, 29500 Solon Rd., Solon, OH 44139

Tekmar Co., Joe Borer, 10 Knollcrest Dr., Cincinnati, OH 45222

Time Products, Inc., Hank Fields, 3780 Browns Mill Rd SE, Atlanta, GA 30354

The Stearns Tech Textile Co., Robert L. Westerfield, 100 Williams St., Cincinnati, OH 45215

3M/Medical-Surgical Div., Paul Heerwald, 225-5S-01, 3M Center, St. Paul, MN 55144-1000

Universal Milking Machine Div., Larry Hemmingsen, Universal Coops, Inc., Dairy Equipment Dept., P.O. Box 460, Minneapolis, MN 55440

Vitek Systems, Mark Kozak, 719 Alexander Rd., P.O. Box 3103, Princeton, NJ 08540

Walker Stainless Equipment Co., Donald Rutherford, 601 State St., New Lisbon, WI 53950

West Agro Inc., Winston Ingalls, 11100 N. Congress Ave., Kansas City, MO 64153

Westreco, Inc., Gene Clyde, 140 Boardman Rd., New Milford, CT 06776

Dairy and Food Sanitation

CONTENTS

Articles	586	National Mastitis Council	638
A Half Century of Food Microbiology And A Glimpse At The Years Ahead	586	Association News	581
<i>E. M. Foster</i>		Developing Scientist Award Announcement	581
Radiation Exposure in Laboratory Personnel Using a P-32 Labelled DNA Probe Assay	593	Thoughts From the President	583
<i>Mark A. Mozola, Karelee V. Dow and George H. Parsons</i>		75th Annual Meeting Report	610
When Water and Manure Don't Mix	596	IAMFES Committee & Chairperson Listing	639
<i>Rick Mooney</i>		New Members	640
		From the Ames Office	648
News	598	Business Exchange	643
Neogen Aflatoxin Testing Method Receives AOAC Approval, Blue Metal-Detectable Band- ages Can Save U.S. Food Processors Money, Manuscripts Invited for ACDPI Student Essay Contest		Classifieds	643
* * * and much more * * *		Membership Application	646
Industry Products	602	Coming Events	647
Food & Environmental Hazards To Health	606		

Dairy and Food Sanitation (ISSN 2073-2866) is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc., executive offices at PO Box 701, 502 E. Lincoln Way, Ames, IA 50010. Printed by Heuss Printing, Inc., 911 N. Second St., Ames, IA 50010. Second-class Postage paid at Ames, IA. Postmaster: Send address changes to IAMFES, 502 E. Lincoln Way, Ames, IA 50010-0701.

Manuscripts: Correspondence regarding manuscripts and other reading materials should be addressed to Kathy Hathaway, PO Box 701, Ames, IA 50010-0701. 515-232-6699.

"Instructions to Contributors" can be obtained from the editor.

Orders for Reprints: All orders should be sent to IAMFES, Inc., PO Box 701, Ames, IA 50010-0701. Note: Single copies of reprints are not available from this address; address reprint requests to principal author.

Business Matters: Correspondence regarding business matters should be addressed to Kathy R. Hathaway, IAM-

FES, PO Box 701, Ames, IA 50010-0701.

Subscription Rates: \$75.00 per year. Single copies \$6.00 each. No cancellations accepted. U.S. FUNDS ONLY.

Sustaining Membership: A sustaining membership in IAMFES is available to companies at a rate of \$375 per year, which includes \$100 credit toward an ad in the "annual meeting issue" of the Journal, the July issue. For more information, contact IAMFES, PO Box 701, Ames, IA 50010-0701. 515-232-6699.

Membership Dues: Membership in the Association is available to individuals only. Direct dues are \$33 per year and include a subscription to **Dairy and Food Sanitation**. Direct dues and the **Journal of Food Protection** are \$58.00. Affiliate and International Membership include both journals for \$58, plus affiliate dues. Student membership is \$17.00 per year, with verification of student status, and includes **Dairy and Food Sanitation** or **Journal of Food Protection**. No cancellations accepted.

Claims: Notice of failure to receive copies must be reported within 30 days

domestic, 90 days foreign. All correspondence regarding changes of address and dues must be sent to IAMFES, Inc., PO Box 701, Ames, IA 50010-0701. 515-232-6699.

Postage: Canada and foreign add \$12 PER journal subscription. U.S. FUNDS ONLY-ON U.S. BANK.

IAMFES EXECUTIVE BOARD

President, Robert Gravani, 8A Stocking Hall, Cornell University, Ithaca, NY 14853, 607-255-3262

President-Elect, Ron Case, Kraft Inc., Kraft Court - OP-5, Glenview, IL 60025, 312-998-2056

First Vice-President, Robert Sanders, PHS/FDA, 200 C St. SW, Washington, D.C. 20204, 202-485-0138

Secretary, Damien A. Gabis, Silliker Labs, Inc., 1304 Halsted St., Chicago Heights, IL 60411, 312-756-3210

Past President, Leon Townsend, 110 Tecumseh Trail, Frankfort, KY 40601, 502-695-1088

Affiliate Council Chairperson, William W. Coleman II, Minnesota Dept. of Agriculture, 90 West Plato Blvd., St. Paul, MN 55107, 612-296-1586

EDITORS

KATHY MOORE HATHAWAY, *Editor and Executive Manager*, Box 701, Ames, IA 50010
MARGARET THORNTON MARBLE, *Associate Editor*, Box 701, Ames, IA 50010
HENRY ATHERTON, *Technical Editor*, University of Vermont, Carrigan Hall, Burlington, VT 05405.

EDITORIAL BOARD

K. ANDERSON Ames, IA
H. V. ATHERTON Burlington, VT
K. J. BAKER Rockville, MD
S. BARNARD University Park, PA
H. BENGSCHE Springfield, MO
F. BODYFELT Corvallis, OR
J. BRUHN Davis, CA

J. BURKETT Sioux City, IA
J. CHAMBERS West Lafayette, IN
W. CLARK Chicago, IL
W. W. COLEMAN St. Paul, MN
O. D. COOK Rockville, MD
R. DICKIE Madison, WI
F. FELDSTEIN Culpeper, VA
R. FUGUA Mt. Juliet, TN
J. GERBERICH Eau Claire, WI
P. HARTMAN Ames, IA
C. HINZ Le Roy, NY
D. JOLLEY Bradenton, FL
W. LAGRANGE Ames, IA
J. LITTLEFIELD Austin, TX
P. MARTIN Warrenville, IL
J. MIRANDA Los Angeles, CA
D. NEWSLOW Orlando, FL
D. PEPPER Sioux City, IA
M. PULLEN St. Paul, MN
J. REEDER Arlington, VA
D. ROLLINS Springfield, MO
R. SANDERS Washington, DC
P. C. VASAVADA River Falls, WI
E. O. WRIGHT Bella Vista, AR



E. M. Foster

Introduction

You may wonder why I chose this title for tonight's program. Well, it didn't come easy, and it doesn't tell you much either. I have never been very good at devising clever titles that grab your attention, but they said I had to have a title; so what you see is what you get.

Actually, the first half of the title has a personal connotation. I started my professional career in food microbiology in the fall of 1937, as a student of Professor William Frazier. I say that to establish my credentials. My primary interest tonight, however, is the second part of the title. I want to make you look ahead at some of the problems we face in providing a safe and adequate food supply for the American people.

I can understand and respect you if you are one of those people who don't like to look ahead--who prefer not to know where you are going. Life can be a lot more fun if you don't have to worry about what is under every rock you turn over. I have friends who still eat raw oysters and I respect them for it. They don't have to share my conviction that we don't always know where our sewage goes and if they like to live a little more dangerously than I do, let 'em. I've just known too many people who contracted infectious hepatitis and if it is all right with you I would prefer not to share that experience. It never struck me as a very pleasant way to spend several months of my life.

The Universe of Foodborne Disease

Before we worry too much about the future, however, let's see where we are today. A favorite way of mine to

¹Dr. E. Michael Foster, Professor Emeritus of Food Microbiology and Toxicology at the University of Wisconsin delivered the Ivan Park Lecture at the Seventy Fifth IAMFES Annual Meeting in Tampa, Florida.

A Half Century of Food Microbiology-- And A Glimpse At the Years Ahead¹

by
E.M. Foster

Food Research Institute
University of Wisconsin
Madison, Wisconsin

look ahead is to start by looking back. At that time we recognized only three authentic foodborne diseases--botulism, staphylococcal food poisoning and salmonellosis. Dr. Dack believed then, and he went to his grave convinced, that the alpha-type streptococci could cause food poisoning, but the evidence for that is still uncertain even today.

During the next three decades, from 1945 to 1975, we discovered a few other foodborne disease agents. *Clostridium perfringens* came along in 1946. The aflatoxins were discovered in 1959; and many other mycotoxins have been described since that time. I first heard of *Vibrio parahaemolyticus* in the early 1960s. Somewhere in there we learned that the long familiar *Bacillus cereus* can cause food poisoning. This organism is a widely distributed aerobic sporeformer that most of us used when we learned how to make a gram stain in beginning bacteriology. It is also a first cousin to *Bacillus thuringiensis*, which is a so-called "natural" insecticide that we have sprayed all over this country by the ton. I would not wish to guarantee that the food poisoning genes of *B. cereus* will never turn up in *B. thuringiensis*.

Some time between 1945 and 1975 we learned that food can serve as a vehicle of viral infections and of *Shigella* dysentery.

More recently, during the past 10 to 15 years, we have had a bumper crop of new foodborne disease agents. These are the so-called emerging pathogens: *Campylobacter*, *Yersinia*, *Vibrio*, *Listeria*, *Escherichia coli*, *Aeromonas hydrophila* and *Plesiomonas shigelloides*.

In addition to these, we are recognizing a group of so-called "opportunistic pathogens", whose role in public health is far from certain. These organisms are widespread in nature and most of them have long been considered harmless. However, some have apparently caused diseases in segments of the population with impaired immune systems, and the regulatory authorities are concerned about

the public health significance of these organisms in certain types of food.

The best way to illustrate the situation today, in my view, is to show you the table of contents of a new book now in press titled "Foodborne Bacterial Pathogens" (Table 2). Edited by Professor Michael Doyle, who is well known to you as the former Associate Editor of the *Journal of Food Protection*, this book includes a chapter on each of 15 bacterial agents of disease. A 16th chapter is devoted to "less recognized or presumptive foodborne bacterial pathogens." I would make just a few comments about some of these organisms.

Aeromonas hydrophila and *Plesiomonas shigelloides* still occupy an uncertain status, though evidence that they can cause infection by the oral route is growing rapidly. All the other organisms on the list are now well-accepted agents of foodborne disease.

Bacillus cereus and *Clostridium perfringens* are widely distributed sporeformers that become problems only in cooked foods that suffer gross temperature abuse. Thus far these organisms have been a relatively minor problem to the food service industry and no problem at all to U.S. food processors.

Campylobacter jejuni is a well known animal pathogen that was formerly called *Vibrio fetus*. In animals it causes contagious abortion. This organism is very common in raw animal products and causes more gastroenteritis in humans than *Salmonella* and *Shigella* combined. The most common source of Campylobacteriosis in man is believed to be poultry.

Clostridium botulinum was the scourge of commercial canners until the early 1920s, when industry-supported scientists worked out controlled heat processes that would guarantee destruction of botulinum spores. This is the so-called 12-D process, or "botulinum cook." Since that time the canning industry has had only minor problems with this organism, but it still represents a threat to home canners. Although it is commonly associated with canned foods, *C. botulinum* has a remarkable ability to find a place for itself in other segments of our food supply. During the last quarter century, for example, we have suffered outbreaks of foodborne botulism from such diverse commercial products as frozen pot pies, smoked fish from the Great Lakes, kapchonka, spaghetti sauce, mexican hot sauce, potato salad, sauteed onions and chopped garlic in oil. One can never relax around *C. botulinum*. This versatile producer of the world's most potent toxin always finds a way to bite us.

The genera *Escherichia*, *Salmonella* and *Shigella* are all in the bacterial family *Enterobacteriaceae* and have many characteristics in common; hence I shall consider them as a group.

Escherichia coli has long been known as a normal inhabitant of the intestinal tract of man and other animals. It was used as an indicator of fecal contamination but was otherwise considered harmless. Now we know that certain types of this species are actually capable of producing gastrointestinal disease. *E. coli* can cause infant diarrhea, travellers diarrhea and a gastroenteritis that resembles

Shigella dysentery. These organisms are not usually foodborne but are spread from person to person, often via sewage-contaminated drinking water. In recent times we have suffered two large outbreaks of gastroenteritis that were traced to *E. coli* in soft cheese imported from France.

About six years ago, however, we observed outbreaks of bloody diarrhea that were caused by a specific serotype, *E. coli* 0157-H7. This is a severe disease that has caused numerous fatalities among young children and elderly residents of nursing homes. Not infrequently it spreads to the kidneys and causes Hemolytic Uremic Syndrome, or HUS. Most ominous of all the pathogenic *E. coli* types discovered thus far, this organism appears to live in the food animal population. Outbreaks have been attributed to the consumption of beef and raw milk. The organism has been isolated with reasonable frequency from beef, pork, lamb, chicken and raw milk.

Salmonella is a huge genus with more than 2000 recognizable serotypes. Typically, these organisms live in the intestinal tracts of man and other animals, and sometimes cause disease. As far as we know any *Salmonella* serotype can cause gastroenteritis in man if the dose is large enough. The ability to cause disease depends on the virulence of the strain, the resistance of the host, the number of organisms ingested, and possibly the nature of the food in which the organism is swallowed. There is no way to define a minimum infective dose that holds for everyone. *Salmonella* remains a serious and recurring problem to most sectors of the food industry.

Shigella organisms cause severe dysentery in man and are usually transmitted by contaminated water. They can be foodborne, however. Unlike *Salmonella*, these organisms are not found in animals. Their natural reservoir appears to be limited to man. Infected food handlers are important sources of contamination.

Listeria monocytogenes is a long-known animal pathogen that also infects man. However, the general public paid little attention to it until 1981, when an outbreak of listeriosis in Canada was attributed to consumption of cole slaw. Since then we have had two outbreaks that were attributable to soft cheese, one in California and the other in Switzerland. Unlike most pathogens, this organism can grow at refrigeration temperatures and it can be found with relatively high frequency in food plant coolers, thus providing opportunity for recontamination of processed ready-to-eat foods.

Staphylococcus aureus is one of the longest known and best understood of the bacterial causes of foodborne disease. Thanks largely to the efforts of my colleague, Dr. Merlin Bergdoll, and a few other dedicated researchers, we know what to do to prevent staphylococcal food poisoning. There is no longer any excuse for this disease to happen.

The vibrios are the big surprise to me.

Vibrio cholerae causes the dreaded Asiatic Cholera that we have long read about in Asia, Africa, and other far-away places. Now you can read about it in seafood taken from the Gulf of Mexico off the coast of Louisiana. Within

the past year people in Louisiana have contracted Asiatic Cholera after eating raw oysters.

Vibrio parahaemolyticus is the leading cause of gastroenteritis in Japan. We have it too, in Chesapeake Bay and off the Gulf Coast. It is not just a curiosity. It can make people sick.

Vibrio vulnificus may be the worst one of all. This highly invasive organism sometimes kills its victims within two or three days. The organism can be foodborne, as by raw oysters, or it can enter the body through a break in the skin.

Yersinia spp. are interesting pathogens that we don't know enough about. These organisms have long been known as animal pathogens in the genus *Pasteurella*, which includes the causal agents of Tularemia and Bubonic plague. The main species associated with food is *Y. enterocolitica*. The foodborne outbreaks observed in the United States thus far have been associated with dairy products for the most part. The food vehicle in one incident involving over 1200 cases was pasteurized milk from a large modern dairy. This organism also can grow at refrigeration temperatures.

Well, that leaves Chapter 16 in Doyle's book (Table 3), the "Less Recognized or Presumptive Foodborne Pathogens." What are they? These are organisms whose significance in foodborne disease is not yet established; but clearly there are reasons to question their safety. This statement applies to members of at least 10 genera in the family *Enterobacteriaceae*. Many of these belong to the coliform group, which we have long considered harmless. There is no doubt that *Klebsiella pneumoniae* and *Serratia marcescens* sometimes cause disease; but the whole group is under suspicion and the term "opportunistic pathogen" is often applied to them. I think this term means that some strains cause illness in some people some of the time.

Organisms in the genus *Pseudomonas* are very common in nature, and some of them are bad actors. *P. coveenans* causes the often fatal "Bongkrek Poisoning" when it grows in food. This organism is a recognized problem in Indonesia. *Flavobacterium farinofermentans* poses a similar problem in China with a fermented cornmeal product. With the proliferation of ethnic foods in this country do not be surprised if these organisms show up on our dinner tables some day.

And on we go with the sporeformers such as the anthrax bacillus and various *Clostridium* species. Some of the non-cholera vibrios and the corynebacteria are causing concern. This is also true of certain streptococci. The zoonotic agents, such as *Brucella* and *Mycobacterium* have long been known to be transmissible by food.

I show these organisms from Chapter 16 of Professor Doyle's book, merely to tell you that people are thinking about other problems that may lie ahead. If we share their thinking we may be able to avoid some unpleasant surprises.

Although I have restricted this presentation to the bacterial agents discussed in the Doyle book, I do not wish

to minimize the significance of mycotoxins, parasites and viruses in foodborne disease. These agents are increasingly important to the food supply.

What Does It All Mean?

Well, that's where we stand. Here we are up to our necks in pathogens, emerging pathogens and opportunistic pathogens in our environment, and therefore in our food. What does that mean to our everyday lives? What *can* we do about it, and what *should* we do about it? People have to eat, so we can't very well just ban all food; but to paraphrase Rachel Carson, how are we going to live and operate within this sea of pathogens around us?

Needless to say, I don't know the answer to that question, but I have been on the food poisoning scene for a long time and I should like to share some of my thoughts with you. Maybe my experience will help some of you find the magic answers. For lack of a better plan I have organized my thoughts under three headings; scientific considerations, industrial considerations, and regulatory considerations.

Scientific Considerations

There is no doubt that we have learned a great deal about foodborne disease during the past half century. We have recognized and identified over a dozen new disease agents and have learned a great deal about the long timers—*C. botulinum*, *S. aureus* and *Salmonella*. Yet we have never eliminated a single disease; we have simply learned to live with them. And just about the time we think we have things under control here comes *Salmonella* or *Listeria* or even *C. botulinum*. In a place where we least expect it to be.

All you have to do to appreciate how little we know about food poisoning is to ask yourself how we identify the causal agent of a disease outbreak. Let's say people get sick, and we want to find out what caused the illness. Foodborne diseases have one thing, and only one thing, in common—the causal agents are transmitted by food. Most—but not all—of them exert their effect on the gastrointestinal system. So, if we have reason to suspect a food source we send a specialist to conduct an epidemiologic investigation. He or she will record the symptoms, onset times and duration of illness; determine who ate what and who got sick; and take samples of food, environmental materials, stools, blood, vomitus, etc. for laboratory analysis.

Sometimes we get lucky. We find the same pathogen with the same plasmid profile, antibiogram and phage type in the food and in the patient's stool. If the symptoms and other patient responses are compatible with that pathogen we can feel reasonably confident that we know the causal organism. The icing is on the cake if the food histories clearly reveal an appropriate vehicle and we find the suspect organism lurking there.

But more often than not we are left uncertain. We can't isolate the organism from the stool, or the food has

been discarded, or there is no reliable test for the organism, or something else is wrong. We are often left with nothing more than the epidemiologic evidence, which is rarely clear cut and definitive by itself. Unfortunately, this is where far too many investigations have to end. There is nothing else we can do.

The foregoing statements do not exhaust our list of scientific considerations with regard to foodborne disease. There is a lot we don't know, and much that we once thought we knew turned out to be wrong. If you will permit me to use an oxymoron, I shall mention several of these "false truisms."

I used to tell my classes in dairy bacteriology that pasteurization had eliminated the health hazards once associated with fluid milk products. I was proud of the fact, and I still am. But now I have to be a lot less positive when I say it. There is no question that pasteurization helped prevent the dreadful epidemics of milk borne typhoid fever, septic sore throat, diphtheria and other human diseases that plagued the dairy industry and the nation many years ago; yet our recent experiences force me to agree with the FDA spokesman who said that something has gone wrong. Between 1982 and 1985 the health authorities of this nation attributed three large outbreaks of disease to good old safe pasteurized milk made in America. Both industry and government have put forth great effort to find what went wrong and how to fix it. I am sure it can be done, but today I am much more careful in my dogmatic statements that pasteurization has guaranteed safe milk in the United States.

I have long been aware of the *Salmonella* problem with processed egg products. I am well tutored in the fact that cracked, checked or soiled eggs in the shell can be the source of *Salmonella* infections in humans. But I have never stinted in my advice that clean, whole, grade A eggs with intact shells do not pose a risk of *Salmonella* infections. Wrong again. The current and spreading epidemic of *Salmonella enteritidis* infections attributed to whole eggs in the shell comes as a total surprise to those of us who learned our salmonellology 25 years or more ago. There is always something new to worry about in this business.

For as long as I can remember it has been accepted dogma that *C. botulinum* can not grow at pH values below 4.6. This figure is based on both experimental trials and decades of experience in the canning industry. In fact, it has been incorporated in FDA's low acid canned food regulations wherein products with a pH below 4.6 do not have to be exposed to a heat treatment that will kill botulinum spores. Now we learn that under certain circumstances *C. botulinum* spores can, in fact, germinate, grow and produce toxin at pH values well below 4.6. Several investigators have shown that this can happen. The practical importance of this observation is still in doubt and I certainly do not suggest that regulations or practices should be changed on the basis of laboratory results reported thus far. However, manufacturers of acidified "engineered" foods may wish to take these observations into account before marketing entirely new formulations that have no background in

experience. A challenge test with botulinum spores should tell if the product will allow *C. botulinum* to grow.

It was always reassuring to be able to tell my students that they didn't have to worry about pathogenic bacteria growing in refrigerated foods. We long believed that the minimum temperature for growth of human pathogens was much higher than the 40° to 45°F temperature of a home refrigerator. In the early 1960s I learned that *C. botulinum* type E can grow at slightly less than 40°F, but I regarded that as more curiosity than hazard to health. However, I was certainly not prepared to learn during the past decade that several important foodborne pathogens grow quite nicely in refrigerated food. These include *Listeria monocytogenes*, *Yersinia enterocolitica*, *Aeromonas hydrophila*, various strains of *E. coli*, the nonproteolytic varieties of *C. botulinum*, and numerous other organisms among the emerging and opportunistic pathogens that I referred to earlier. Although these organisms grow more slowly as the temperature drops, just as any other bacteria do, the concept that no pathogens can grow at all under normal food refrigeration temperatures must, I regret, be abandoned. This becomes especially important in connection with prolonged storage of low acid cooked foods under refrigeration.

No doubt there are other truisms that I could recant and abandon, but let's get on with more important subjects that concern us today. During the past two decades we have made reasonably good progress in the development of methods for detecting foodborne pathogens and their toxins. When we discover a new organism we quickly learn its basic facts of life and death--its heat resistance, growth rates, etc. But we are poorly prepared for totally new problems, such as the recent advent of Listeriosis as a foodborne disease; and we often don't know where to turn when new problems arise. The fact is that food microbiology has not been a popular and well-supported science during the past 50 years, and our overall data base is rather skimpy. Our needs for knowledge and how to get it could be the subject of an entire lecture such as this.

Industrial Considerations

Innovation is the life blood of the food industry in the United States and marketing is its heart. Every successful food company manager knows that his job is to sell product and make money. That is why marketing specialists dominate the successful companies. Marketers want products that consumers will buy. In recent years this has produced a trend toward products with more convenience in greater variety with better quality at lower cost. At the same time, and in response to a perceived preference on the part of consumers, the marketers have stressed natural products that undergo minimal processing.

Marketing's demands on product developers include such features as:

- (a) No artificial ingredients
- (b) No preservatives
- (c) Less salt

- (d) Refrigerated distribution
- (e) Longer shelf life
- (f) Cheaper ingredients

The reasons for these requirements may be obvious, but the effects many not be. Critics of the American food supply have urged consumers to avoid "highly processed" foods that contain preservatives and other so-called "artificial ingredients." "Highly processed" is equated with traditional preservation methods such as freezing, drying and canning. Hence, the marketer wants new products that suggest "natural, fresh and unprocessed" food for busy consumers who want nothing but the freshest and the best the year around. The federal government has advised all Americans to reduce their salt intake, so our friendly marketing manager tells his product developers to cut down on the salt. Longer shelf life and cheaper ingredients will reduce the cost, which is still a factor in the highly competitive food business.

What has all this to do with safety? Plenty. Removing preservatives, using less salt, and distributing under refrigeration, especially with a prolonged shelf life, offers all kinds of opportunity for growth of pathogenic bacteria and disastrous outbreaks of foodborne disease. This is precisely the concern that is being expressed today by knowledgeable food scientists in connection with the explosive growth of interest in refrigerated distribution of cooked and low acid foods. Minimal processing combined with no preservatives and distribution through an often unreliable refrigeration system is frightening enough. But the marketers also want extended shelf life that may reach up to 60 days. Storage times like these can be achieved only by in-package pasteurization or by a very effective controlled atmosphere in the package. The extended shelf life may be just the circumstances that permits cold tolerant pathogens to grow and reach dangerous levels or, if refrigeration fails, anaerobic sporeformers such as *C. botulinum* may be able to develop.

Please do not interpret my remarks as opposing innovation per se. I am well aware that innovation is necessary to avoid stagnation, and I am much in favor of new ideas and new ways of doing things. But to change a process or a product willy nilly without considering possible undesirable consequences is foolhardy. It has been tried before to the sorrow of those who did it. Here are a few examples:

In the mid-1950s there was a thriving business in hot smoked fish along the shores of the Great Lakes. This product was made by lightly salting chubs or small lake fish, then cooking them over a smoky open fire. The moisture content was high and the product had a short shelf life. Then an enterprising salesman of packaging materials learned that the shelf life could be extended by packaging the fish under vacuum in plastic pouches. This would allow the manufacturers to reach wider markets and increase business. In the early 1960s two interstate shipments of vacuum packaged hot smoked fish from the Great Lakes caused outbreaks of type E Botulism with at least seven deaths. In both outbreaks, the fish suffered tem-

perature abuse that allowed the botulinum spores naturally present in the fish to germinate and grow. It was disaster for the Great Lakes smoked fish industry.

Several years ago someone had the clever idea of selling foil-wrapped raw potatoes for baking. The potatoes were cleaned, sized and wrapped in foil by the processor. A restaurant could keep a supply on hand and bake them as needed for each meal. Inevitably, some potatoes will be left over and, rather than throw them away, many eating establishments will save them and make potato salad after enough have accumulated. This can take several days, of course. The danger in this practice was revealed some time ago when more than 30 people contracted botulism and two died after eating potato salad at a buffet meal. Subsequent investigations at my institute and at the National Food Processors Association showed that *C. botulinum* could grow and produce its deadly toxin in a foil-wrapped baked potato within just a few days at room temperature. Inoculation is not necessary. Many potatoes carry naturally occurring *C. botulinum* spores on their skins. The FDA has advised all food handlers to treat foil-wrapped baked potatoes as a perishable product that requires refrigeration.

When the frozen pizza business expanded rapidly some 20 years or so ago there suddenly developed a shortage of canned sliced mushrooms for toppings. The industry that supplied the mushrooms simply could not meet the demand. One enterprising canner found that he could pack a lot more product if he vibrated the cans during filling. This reduced the heat penetration rate of the product, but he did not increase the heating time to compensate. Underprocessing resulted and a great deal of spoiled product had to be disposed of. To make matters worse, some of the underprocessed mushrooms had already been used to make frozen pizzas, which also had to be destroyed.

A few years ago an entrepreneur in Japan introduced slices of fried lotus root in plastic pouches. The product was very popular with consumers but it showed a high rate of mold spoilage. The processor solved this problem by pasteurizing the product in the package. Unfortunately he did nothing to inhibit *C. botulinum* spores, which grew, produced toxin and killed at least eight people.

Only three or four years ago several patrons of a restaurant in Canada developed symptoms of botulism. The food vehicle was garlic butter, which was prepared in the restaurant by blending ordinary butter with a commercial product consisting of chopped garlic suspended in soybean oil. The commercial product, which was made in the U.S., was clearly labelled "Keep Refrigerated", but somebody in the restaurant had left the product in the pantry at room temperature. Evidently that is when *C. botulinum* grew and produced the toxin.

There are many other examples of misadventures such as these, but I hope I have made my point that new ideas must be examined thoroughly for safety hazards before they are offered for sale. It is unconscionable to use consumers as the test animals to see if a product or a process is safe.

Regulatory Considerations

Anyone who is familiar with the complex and multifaceted American food regulatory system will understand why I am able to consider only a small fraction of the subject in the time remaining. I have chosen, therefore, to restrict my remarks to the difficult problem of regulating pathogenic microorganisms in processed foods by the Food and Drug Administration.

The Food, Drug and Cosmetic Act, which is enforced by the FDA, forbids the sale of adulterated food in interstate commerce. There is little basis for argument that a pathogenic bacterium in food should be considered a "poisonous or deleterious substance that is injurious to health," which means the food is adulterated. Until the mid-1960s FDA's limited resources allowed the agency to do little more than respond when there was a disease outbreak that was traceable to a food in interstate commerce.

However, following a nationwide outbreak of *Salmonella New Brunswick* gastroenteritis in 1966, the FDA undertook very extensive surveys for *Salmonella* contamination throughout the processed food industry, with emphasis on dried products. These included milk, yeast, cocoa, gelatin, spices and a few others, plus products containing these foods as ingredients. Needless to say, FDA found *Salmonella* with considerable frequency.

Whenever they found the organism in a finished product the agency "encouraged" the manufacturer to remove that product from the market. I am aware of no one who refused to comply. There were many very expensive product recalls which, if nothing else, greatly heightened the food industry's appreciation of microbiological problems. How much good these recalls did for public health is clearly debatable, but as one wag put it, the recalls did wonders for food plant sanitation in the United States.

Food manufacturers regarded the presence of *Salmonella* in one of their products as roughly equivalent to having an idiot child in the family--it was something you didn't talk about. The validity and significance of FDA's test results were seldom questioned. The agency took the position that any *Salmonella* at all, regardless of number or serotype, constituted a violation of the Food, Drug and Cosmetic Act. The question of number of cells or infectious dose was not considered. If the product contained *Salmonella* it was violative. If it did not contain *Salmonella* it was O.K.

But how do you know if *Salmonella* is present in a food product? You simply take a sample of the food, subject it to the appropriate cultural procedures, and see if *Salmonella* grows. If the organism is present in the culture that means it came from the food.

But what if there are no *Salmonella* organisms in the culture? Does that mean there was none in the food? Well, not quite. You see, it's all a matter of sample size. *Salmonella* could have been present in low numbers in the food but you just didn't happen to get one in the sample you chose to culture.

Let's illustrate the problem with an example. Let us

imagine 100 squares and assume that the 100 squares represent a 100-gram lot of a dried food product. Let us further assume that the 100 grams contain a single *Salmonella* cell (lower left hand corner). Finally, let us assume that you take one gram of the 100 gram lot as you sample to test for *Salmonella*.

Now, what is the chance that you will find the organism in your 1-gram sample? The answer, obviously, is 1 in 100. That's not very good odds; so what happens if you test 2 grams. Now your odds of detection are 1 in 50. If you test 10 grams the odds become 1 in 10, and if you test 50 grams the odds of finding the *Salmonella* organism become 1 in 2.

But please notice. The **only** way to be absolutely sure that you find the *Salmonella* is to test the entire lot of product--every gram of it. Anything less than total destructive sampling may not detect low numbers of *Salmonella* organisms.

So what can we do? In 1969 the Committee on *Salmonella* of the National Academy of Sciences recommended a sampling plan that took into account the risk of infection from various foods among various classes of consumers. For the higher risks the samples were larger than they were for the lower risks. This increased the chances of finding the organisms, if there were present, in foods that posed the greatest risks of disease. FDA accepted the committee's recommendations and has been using the sampling plan since 1970. We recognize that a negative test does not guarantee the absence of *Salmonella*, but we know that such a guarantee is totally impractical. Simply stated, the sampling plan told everybody when to quit testing and accept a negative result. It was arbitrary--it had to be because we did not know what the infectious dose was and we still don't--but apparently it worked. We have been living with this plan for almost 20 years with no indication that the original concept was faulty.

Now, almost two decades later, we have much the same problem on our hands again. FDA has completed an intensive survey of the dairy industry and has been able to identify *Listeria monocytogenes* in a small percentage of finished dairy products. Again there have been extensive and costly product recalls, with the heaviest burden falling on specialty frozen dairy dessert manufacturers.

Meanwhile, surveys of meat packing plants have revealed *Listeria monocytogenes* with disturbing frequency in product coolers, on packaging equipment and even in finished product. U.S.D.A.'s Food Safety and Inspection Service has announced plans for extensive surveillance of the meat packing industry similar to that already completed by FDA for dairy products.

But there is a disturbing difference between the two regulatory programs. FDA's survey of *L. monocytogenes* in dairy plants involved the analysis of varying amounts of product. At first they tested 375 grams per lot; then 250 grams; and now they are down to 50 grams per lot of product. FSIS, on the other hand, proposes to test only 1 gram of meat product for *L. monocytogenes*. One is forced to wonder about the logic in choosing such widely differ-

ent sample sizes which, as we have already seen, has such a profound effect on the likelihood of detecting the organism.

One would like to think that the primary objective of both agencies is to protect the public health. In that case, however, it is difficult to understand the rationale for the widely differing sample sizes. One is forced to conclude that agency philosophy and industry capability have a strong influence on the choice of sample sizes.

The two agencies clearly look at the matter differently, and I am not here to say that one is right and the other is wrong. I am simply pointing out one of the regulatory difficulties that we face; and there are plenty more where that came from. Both agencies are prepared to take regulatory action any time they find *Listeria monocytogenes* in a ready-to-eat food product. They are satisfied that all bacteria possessing the characteristics of *L. monocytogenes* are pathogenic. Yet there are some strains that do not seem to cause disease. How do we deal with those?

Well, I think it should be clear that our regulatory agencies have their work cut out for them in the years ahead. Aside from the question of sample size we still have to face up to the matter of numbers of organisms and infectious dose. Furthermore, we still don't know if all organisms with the same name are equally infectious. So, there is plenty of work ahead for all of us.

It has been a pleasure for me to address you this evening. I am deeply honored to be selected for this third Ivan Parkin Award Lecture. In view of my rather pretentious title--50 years of food microbiology--some of you may feel that I have a rather warped and narrow view of the subject. I assure you that I do not. I know there is a great deal more to food microbiology than the food poisonings I have discussed tonight. But that is where the interest lies these days, and I simply tried to conform to the trends.

I hope you have a most successful meeting during the rest of your visit here in Tampa.

REDFERN & ASSOCIATES

Dairy Education And Consulting

Proposed Annual Programs 1988-1989

Refrigeration, Steam Generation, Safety and Maintenance for Dairy & Food Plant Engineers

November 14-17, 1988, Knoxville, TN

Completely NEW COURSE on fundamentals of vapor systems, steam generation, boiler efficiency, steam system safety, refrigeration systems, humidity control, ammonia safety, prevention of accidents and hazard communication. Waste management, waste treatment and preventive maintenance programming and execution are also included. Course designed for plant engineers and maintenance personnel who manage the engineering and maintenance functions of dairy and food processing plants.

Cultured Dairy Products Technology

January 16-19, 1989, Raleigh, NC

A NEW COURSE brought back by popular demand. Includes demonstration of cottage cheese making in state of the art cultured products plant; culture programs on buttermilk, cottage cheese, yogurt and sour cream—plus sensory evaluation of all products in the market place.

Ice Cream Technology

February 13-16, 1989, Raleigh, NC

Our most popular course in its 16th year provides everything you need to know about ice cream formulation, mix making, freezing, packaging, hardening, sanitation, flavoring and tasting (judging). Discussions on quality control, waste management, processing equipment and various frozen desserts and novelties. **Special in 1989** is a one-day session for those whose primary interest is in soft serve and dipping store operations. Special session will be on February 15 and will run concurrently with the general course. Participants may register for the entire course and attend either session OR they may register for the one-day session.

Enrollments Are Now Being Accepted!

Program participation in each course is limited. Course details available upon request. Contact Ms. Terry Johnson at (919) 787-8496 or 787-8400 for immediate response or write to:

REDFERN & ASSOCIATES, LTD.

5151 Glenwood Ave., P.O. Box 31108 • Raleigh, NC 27612

FAX 919-782-1139 • TELEX 4996995 FMI UI

Please circle No. 110 on your Reader Service Card

Radiation Exposure in Laboratory Personnel Using a P-32 Labelled DNA Probe Assay

Mark A. Mozola, Karelee V. Dow and George H. Parsons*

Gene-Trak Systems
Framingham, MA 01701

Introduction

The discovery of radioactivity is less than a century old, but its use has already proven invaluable in medicine and biomedical research. Radioactive tracers permit the precise tracking and quantitation of very small amounts of analytes, often unattainable by any other method. Yet for all its utility, the most common initial reaction that most people have toward handling radioisotopes is fear of increased risk of cancer or birth defects. While exposure to large doses of radioactivity can be harmful, the effects of low level exposure are less well known. Life on earth has evolved in an environment that has a natural level of background radiation of about 50 mrem per year at sea level. The sources of this background radiation at sea level are roughly equally divided between cosmic radiation, terrestrial radiation from naturally occurring isotopes in the environment and internal radioisotopes⁹. Cosmic radiation levels are dependent on altitude, and persons at elevated altitudes accumulate increased amounts of exposure. Background radiation doses in Colorado Springs, Colorado are roughly double those at sea level because of loss of atmospheric shielding². Many building materials such as brick and stone contain naturally occurring isotopes (e.g., uranium and thorium) that can result in human radiation exposure. Even our own bodies are radioactive. The typical 70 kg (155 lb) human body contains 17 mg of naturally occurring K-40. This results in emission of 237,000 high energy beta particles per minute⁸. Human activities over the last century have roughly doubled the amount of radiation exposure for the average person at sea level. By farm, the largest contributor to this increased exposure is the use of diagnostic X-rays, which on the average is nearly equal to all natural sources combined⁹. Average background doses due to fallout from nuclear weapons tests and nuclear power production total less than 5% and 0.4%,

respectively, of the theoretical natural pre-industrial radiation dose⁹. The average total radiation dose from all sources for a person living at sea level is about 100 mrem per year.

The use of radioactivity is not unlike the use of other discoveries such as fire and electricity. These are forces that can be harnessed to provide significant utility, but they must be treated with respect for the harm that they can do when handled carelessly. This dual potential of radioactivity has been recognized by state and federal authorities and is the basis of the licensing requirements that are a prerequisite for receipt and use of radioactive materials. The intent of this study is to examine the doses of radiation recorded for users of a radiolabeled DNA probe test and to put that exposure in a context of typical background exposure and Nuclear Regulatory Commission guidelines. Nuclear Regulatory Commission guidelines limit exposure of a non-pregnant individual over eighteen years of age to no more than 1250 mrem per quarter or 5000 mrem per year¹¹.

Methods and Materials

The DNA probe assay which was used by the participants in this study is described in detail elsewhere⁶. Approximately 0.5 uCi pf P-32 are use for each sample tested. For comparative purposes for those less familiar with radioactive measurements, this is equivalent to the amount of isotopic material contained in the typical home smoke detector (Sears Model No. 462.573581, 9 Volt Smoke Detector, U.S. NRC License No. #04- 17640-01E, 0.9 uCi Americium 241). The filter that is counted at the end of the test to detect the presence or absence of *Salmonella* in a sample typically has a count rate of 1500-20000 counts per minute (cpm) for a positive sample and 100-500 cpm for a negative sample. To put these figures in context, background is usually 50-75 cpm. Additionally, recently a count of 12000 cpm was obtained from commercially

*Corresponding Author

available mantles intended for use in kerosene lanterns (B. Sall and R. Johnston, unpublished results). The materials from which these mantles are made contain thorium, a naturally occurring radioisotope.

All users of this test were duly licensed to handle and utilize radioactivity by either the U.S. Nuclear Regulatory Commission (NRC) or the appropriate state agencies. Personnel in all laboratories received training in the safe use and handling of the isotope used in this test. Among other topics, this training included the use of light-weight, transparent plastic shielding to minimize radiation exposure. The beta particle radiation that is emitted by P-32 is absorbed quantitatively by a 0.66-cm thickness of plastic⁸. The beta-gamma film badges used by most of the participants in this study were supplied by R.S. Landauer, Jr. and Co., Glenwood, IL. Other suppliers of film badges were Radiation Detection Company, Sunnyvale, CA and Siemens Gammasonics, Inc., Des Plaines, IL. Film badges for each worker who deals with isotopes are shipped to each laboratory on a monthly basis. Exposed badges are returned to the supplier for processing, and the results reported to the laboratory on a monthly and cumulative basis⁷. In accordance with NRC and appropriate state regulations, these monthly personnel reports are maintained by each lab as provided in their radioactive materials license. The results are also available to employees on request. The cost of these is volume dependent and averages about \$3.00 per person per week for the average size laboratory in this study. The sensitivity of the badges is approximately 10 mrem for gamma rays and x-rays and 40 mrem for energetic beta particles¹. Exposure to gamma and beta radiation can be differentiated on a film badge by examination of so called deep and shallow doses. Beta particles have very little penetrating ability and therefore can yield only shallow doses¹. Most participants use body badges that are worn either on the breast pocket or side pocket of a lab coat. One laboratory (Lab H in Table 1) used finger-ring badges. Another laboratory (Lab I) used a different type of badge which is based on the loss of thermoluminescence of certain ceramic materials when exposed to radiation. The sensitivity of this type of dosimeter is equivalent to the film badge type¹. In October of 1987 a letter was sent to the users of the DNA probe *Salmonella* test requesting a copy of their most recent monthly film badge report. Monthly reports include yearly and cumulative lifetime exposures as well.

Results

Thirteen reference and food laboratories, spanning a wide spectrum of food microbiology laboratories with respect to size and geographical locations, use the test routinely and responded to our request for data (Table 1). On the average, the laboratories had been using the test for 7.54 months with a range from 1 to 29 months. A total of seven lab workers from this cohort of 81 (8.6%) showed any detectable exposure above background. However, five of those apparent exposures occurred in one laboratory

during a month for which no control badge was available. A control badge is included with each shipment from the badge supplier to control for effects on the badges that are not related to exposure in the laboratory. These effects can include exposure to extremes of temperatures, radiation exposure during shipment or inherent variability in the sensitivity of the film. The apparent exposures of laboratory personnel in Lab F may be due to some of these effects and may not in fact be due to actual radiation exposure in the laboratory. The highest exposure for which a control badge was available was Operator 1 in Lab J. This individual received a dose of 20 mrem in one month. A colleague in Lab J received 10 mrem in the same month. These exposures have not been repeated in subsequent months. It is also interesting to note that all of these exposures were recorded as identical deep and shallow doses. It has been the experience of the manufacturer in handling larger amounts of probe as they do in manufacturing it, that actual P-32 beta exposure results in a characteristic pattern of deep and shallow exposure. Typically, the shallow exposure is roughly three times higher than the deep exposure. This is to be expected from the lack of penetrating power for P-32 beta particles. It may be that the doses reported in this study are from sources other than P-32, analytical artifacts or from the low energy x-rays produced when P-32 beta particles impinge on materials such as metals.

One laboratory (Lab H in Table 1) used finger-ring badges. It would be expected that higher recorded doses would be seen from this type of badge because of the increased proximity of the radioisotope to the badge and the lack of shielding, but in fact, no dose above background was seen. It is instructive to compare these recorded doses to the guidelines issued by the NC for permissible radiation exposure during pregnancy. The total allowable dose during pregnancy is 500 mrem¹⁰, which is much more than would be accumulated during the nine month period even from the highest monthly dose rate observed during this study (30 mrem). It should also be noted that this dose rate was not repeated during subsequent months and that, as was discussed above, no control badge was available for this month in this lab. The highest verifiable dose rate was 20 mrem per month and that also was not repeated in subsequent months. Even beta particle doses that were slightly below the minimum sensitivity of the badges (40 mrem) would not result in exposures that exceed the 500 mrem limit for pregnant workers. It can be concluded from these data that a large majority of laboratory workers using this DNA probe test experience no additional radiation exposure above background as judged from sensitive monitoring badge data. It is recommended that users of this test minimize their exposure by simple expedients such as the use of plastic shields. These data support the effectiveness of such precautions. The use of radioactive DNA probe tests offers many advantages in terms of the accuracy and timeliness of results⁶, and when used by properly trained operators results in minimal additional radiation exposure over natural background levels.

References

1. Anonymous, Film badge interpretation literature, R.S. Landaure, Jr. and Co., Glenwood, IL.
2. Arena, V. 1971. Ionizing Radiation and Life. p. 246, The CV Moseby Co., St.Louis, MO.
3. Fitts, R., M. Diamond, C. Hamilton and M. Neri. 1983. DNA-DNA hybridization test for the detection of *Salmonella* spp. in foods. Appl. Environ. Microbiol. 46:1146-1151.
4. Fitts, R. 1985. Development of a DNA-DNA hybridization test for the presence of *Salmonella* in foods. Food Technology. 39(3):95-102.
5. FLower, R.S. 1985. Comparison of rapid *Salmonella* screening methods and the conventional culture method. Food Technol. 39:103-108.
6. Flowers, R.S., M.J. Klatt, M.A. Mozola, M.S. Curiale, D.A. Gabis, and J.H. Silliker. 1987. DNA hybridization assay for detection of *Salmonella* in foods: collaborative study, J. Assoc. of Anal. Chem. 70:521-529.
7. Friedlander, G., J.W. Kennedy, J.M. Miller. 1966. Nuclear and Radiochemistry. John Wiley & Sons, Inc. New York, New York. p. 161.
8. Shapiro, J. 1981. Radiation Protection: A Guide for Scientists and Physicians, pp. 17, 55 Harvard University Press, Cambridge, MA.
9. Upton, A.C. 1982. The biological effects of low-level ionizing radiation. Sci. Amer. 246:41-49.
10. U.S. Nuclear Regulatory Commission. 1975. Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure, pp. 4-15, Washington, D.C.
11. U.S. Nuclear Regulatory Commission. 1978. General Radiation Exposure Guides, Title 10, Part 20, Code of Federal Regulations (9-1-78), Washington, D.C.

TABLE 1. Operator film badge data.

Lab	Operator	Months of Use (a)	Cumulative Doses (b) (mrems)		H (d)		M	M
			Deep	Shallow				
A	1	10	M	M	1	2	M	M
	2	19	M	M	2	2	M	M
	3	19	M	M	3	1	M	M
	4	10	M	M				
	5	10	M	M				
	6	5	M	M				
	7	5	M	M				
B	1	19	M	M				
	2	19	M	M				
	3	19	M	M				
	4	19	M	M				
	5	3	M	M				
	6	3	M	M				
C	1	10	M	M				
	2	10	M	M				
	3	4	M	M				
D	1	1	M	M				
	2	1	M	M				
	3	1	M	M				
	4	1	M	M				
	5	1	M	M				
	6	1	M	M				
	7	1	M	M				
	8	1	M	M				
	9	1	M	M				
	10	1	M	M				
	11	1	M	M				
	12	1	M	M				
E	1	8	M	M				
	2	8	M	M				
	3	8	M	M				
	4	5	M	M				
	5	2	M	M				
	6	2	M	M				
F	1	13	M	M				
	2	13	30	30				
	3	13	30	30				
	4	13	30	30				
	5	13	20	20				
	6	11	30	30				
G	1	3	M	M				
	2	3	M	M				
	3	3	M	M				
	4	3	M	M				
H	I (d)	1	2	M	M			
		2	2	M	M			
		3	1	M	M			
	I (e)	1	15	M	M			
		2	3	M	M			
		3	3	M	M			
	J	1	9	20	20			
		2	9	10	10			
		3	9	M	M			
		4	9	M	M			
		5	9	M	M			
		6	9	M	M			
K	7	5	M	M				
	8	2	M	M				
	9	2	M	M				
	1	4	M	M				
	2	4	M	M				
L	3	4	M	M				
	4	4	M	M				
	5	4	M	M				
	1	5	M	M				
	2	5	M	M				
M	3	5	M	M				
	4	5	M	M				
	5	5	M	M				
	6	10	M	M				
	7	8	M	M				
	8	6	M	M				
	9	6	M	M				
	10	5	M	M				
	11	5	M	M				
	12	5	M	M				
	Totals	81	610	170	170			
		Operators	Man Months	mrems	mrems			

- a)Number of months for which badge data were reported. Cumulative totals reflect exposure over this period.
- b)Absorbed dose in mrems. All figures reflect reported doses measured by body beta-gamma film badges unless otherwise noted. "M" indicates less than 10 mrems for deep doses associated with gamma or x-ray and less than 40 mrem for shallow doses associated with beta particle radiation.
- c)All recorded doses were measured during a monthly period for which no control badge was returned.
- d)Finger-ring badges.

When Water and Manure Don't Mix

by

Rick Mooney

You've been hearing plenty about the growing concern over pesticides and other agrichemicals in groundwater. Now the focus is about to shift to a topic closer to home - the effects of livestock manure on water quality.

"There has been a lack of national attention in this area," says Chuck Benbrook, executive director of the National Academy of Sciences' (NAS) Board on Agriculture. "Manure isn't a sexy subject like toxic wastes. But more and more people are starting to look at feedlots and other situations where animals are confined as a potential source of contamination. It's an issue agriculture is going to have to address."

The crackdown has already begun in some states. For example:

- In 1987, more than 100 dairy operations in California's Chino Valley were notified that there were violating local ordinances governing manure disposal. One Chino dairy now operates under a cease-and-desist order that prohibits the producers from spreading manure until the year 2026.

- In Wisconsin over the past three years, the state has notified roughly 150 livestock operations that they've been improperly discharging pollutants into water supplies.

- In Florida, more than 40 dairies are taking steps to comply with a new "dairy rule" that governs manure runoff. Purpose of the rule is to prevent phosphorus contained in dairy cow manure from draining into mammoth Lake Okeechobee.

Tougher regulations raise a web of concerns for dairy producers, with increased costs near the top of the list. New state rules on waste handling added 50% to the grading and leveling costs of building a new 1,200-cow dairy, estimates Brad Bouma, El Paso, Texas.

Bouma also needed to hire a lawyer and an environmental engineering firm to help him work through the complex requirements of the laws. "It's frustrating enough to keep you up nights," says Bouma, who plans to begin operation at the new facility.

Cost figures from Florida dairies trying to comply with the state's "dairy rule" are even more startling. By some estimates, producers will spend an average of \$285 per cow to comply.

Boyd Rucks, owner of a 750-cow dairy in Okeechobee, Florida, estimates his costs at \$165,000. Included in those

costs: ditching to trap water in high-intensity cattle-use areas, installing irrigation systems to move water from lagoons to grasslands and fencing cattle out of ditches and waterways.

While state and federal cost-share programs covered a big chunk of the total cost, Rucks figures his own out-of-pocket costs at \$35,000. "It's going to be hard to pay for," says Rucks. "I know a half-dozen producers in the area who would jump at another dairy termination program because of the rule. It's an added cost they don't want to face."

The question of who should pick up the tab for protecting water from manure pollution is an important one. Texan Pearson Knolle summed up the feelings of many dairy producers when he addressed a U.S. House subcommittee on groundwater late last year. "We cannot afford to burden the agricultural producer with more overhead than he already has," said Knolle, who operates a 1,000-cow dairy near Sandia, Texas. "But neither can he expect a complete subsidy to correct his problem."

The federal government needs to explore options like low-interest loans and tax-break incentives, Knolle says. "Whatever the incentive, it should be made available with the least direct cost to the federal government and provide some benefit to the producer to enable him to comply," he says.

Another concern for dairy producers in the face of tougher manure laws: even well-intentioned regulations can become outdated as conditions change.

Developments in the Chino Valley offer a good example. In the early 1970s, the local water-quality control board established one of the first programs in the country requiring dairies to obtain individual waste-discharge permits. Major concern was the high concentration of dairy animals in the Chino groundwater basin - roughly 250,000 dairy cows in a 50-square-mile area.

One of the regulations in the program established a limit of three dry tons of manure per year to be spread on each acre of designated disposal land (land used exclusively to percolate barn water and runoff water). Officials estimated roughly a third of the manure generated by Chino dairies could be sold to composting and bagging operations and exported out the Chino basin. The remainder

could be spread on dairy producers' designated disposal land and on nearby vineyards and croplands.

But after the program was set up, land-use patterns in the Chino Valley changed dramatically. As Los Angeles spread eastward, the vineyards and cropland were gobbled up for urban development leaving no place for producers to spread excess manure.

"The lack of sufficient cropland available for manure disposal has caused many dairy producers to make the choice between violating their discharge requirements of (facing) a set winter with a heavy manure pack in their corrals," said California dairyman Fred Douma, appearing at the same congressional hearing as Knolle.

More of a concern to many dairy producers is the fact that the agencies that establish pollution rules often appear to have little understanding of agriculture's complexities. Knolle points out the new Texas waste-handling rules don't distinguish between large drylot operations and less-intensive "pasture type" dairies.

Knolle says he'd like to see a balanced panel made up of producers, USDA and Environmental Protection Agency personnel and state enforcing-agency representatives meeting on a regular basis to help determine what is reasonable for each type of enterprise.

Perhaps the greatest frustration for the dairy industry as it attempts to deal with increased regulation in this area, however, is a lack of basic research about the movement of manure components in soil and water.

At Oregon State University, inadequate funding recently forced researchers to shelve an ambitious project aimed at determining how manure applied to fields moves through the soil into subsoils and groundwater pathways. Without more detailed research, says Oregon's Extension dairyman Mike Gamroth, producers can't expect a great deal of help when asking for recommendations on manure applications. "It's frustrating," says Gamroth. "With limited research, the best we can hope to do is make wild guesses."

The situation in Florida drives the point home in a different way. While producers have already spent large amounts of money to bring operations into compliance, researchers are only now beginning to gear up for studies on the movement of phosphorus in certain soil types and the effects of ration/nutrition programs on manure's phosphorus content.

"We really don't know if what we're doing is going to be enough to solve the problem or not," says Florida dairy producer Boyd Rucks. "A lot of dairy producers here share a concern that the state may have been a little bit hasty in passing a dairy rule without more research to back it up."

Unfortunately, the solution isn't likely to change very much in the near future. Earlier this summer, the U.S. Senate Appropriations Committee proposed an additional \$2 million for ag/water-quality research during the coming year. "It's peanuts," says Benbrook of NAS.

"Take \$2 million and split it up among 50 state experiment stations [necessary because problems vary widely by regions], and what do you have?" Benbrook asks. "It won't buy very much in the way of research."

Reprinted from *Dairy Today*/August 1988, p. 32-33.

**University of Wisconsin--Madison
University of Wisconsin--Extension
Training Courses: January 1989**

Milk Pasteurizer Operation

- 3-1/2-day course
- Hands-on training
- Uses FDA training manual
- Topics presented by field experts
- Final examination for certificate
- Regulatory sanction
- Next course: January 3, 1989
- Fee: \$150

Ice Cream Technology

- 4-1/2-day course
- 10+ Hours of lab work
- Topics presented by field experts
- Training manual with fact sheets
- Broad product coverage
- Course starts: January 16, 1989
- Fee: \$300

To receive a brochure call (608) 263-1672
Agricultural Conference Office
Jorns Hall, 650 Babcock Drive
Madison, Wisconsin 53706

Wax

Please circle No. 115 on your Reader Service Card

Neogen Aflatoxin Testing Method Receives AOAC Approval

The Association of Official Analytical Chemists (AOAC) has approved the Neogen method for aflatoxin detection. It is the only immunoassay method for mycotoxins to receive the association's approval.

Aflatoxins are a type of mycotoxin (mold toxin) that are present in many commodities and final products, including; corn, peanuts, small grains, cottonseed, feeds and peanut butter. The toxins are known to cause many health problems in livestock, and have been found to be carcinogenic in laboratory studies.

The U.S. Food and Drug Administration has set a regulatory action level for the presence of aflatoxins in foods and feed at 20 parts per billion.

The Neogen method for aflatoxin detection received interim Official First Action Approval in a decision on April 1, 1988. The method was developed and is produced by Neogen Corporation, a Lansing, MI based biotechnology company. It is one of several mycotoxin diagnostic kits manufactured by the company and marketed under the trade name Agri-Screen[®].

Approval of the Neogen method was the culmination of two years of collaborative studies by 15 AOAC collaborators in the U.S. and seven other countries. The Associate Referee was Dr. Douglas Park, formerly of the U.S. Food and Drug Administration (now with the University of Arizona). The study was jointly sponsored by the AOAC and the International Union of Pure and Applied Chemistry (IUPAC).

AOAC is a scientific organization whose membership is composed of scientists, U.S. federal and state government regulatory officials, academia and industry laboratories world-wide. AOAC coordinates collaborative studies and gives official approval to acceptable methods. The organization's approval is accepted by virtually all U.S. federal, state and foreign authorities.

The approval of an immunoassay test for mycotoxins represents a breakthrough for both science and industry. Prior to the approval of the Neogen method of testing for mycotoxins, only chemical-based testing methods, such as Thin Layer Chromatography (TLC) and High Performance Liquid Chromatography (HPLC) were AOAC approved methods for mycotoxin detection. Chemical methods generally require highly specialized laboratory equipment and hazardous chemicals to test for aflatoxin.

The Neogen method, on the other hand, requires no specialized equipment or hazardous chemicals. Aflatoxin-specific antibodies are used to pinpoint aflatoxin. The test can be run not only in the laboratory, but in

the field and on-site locations as well. The method takes less than 10 minutes from start to finish.

The AOAC study tested the Neogen method for screening aflatoxin in mixed feed, cottonseed, cottonseed meal and ammoniated cottonseed during collaborative studies. The results of the tests on these products were the basis for AOAC's Interim Official First Action Approval.

The Agri-Screen test for Aflatoxin is part of a complete line of mycotoxin diagnostic kits marketed by Neogen Corporation. Other Agri-Screen diagnostics include tests for Aflatoxin M-1, zearalenone, T-2 Toxin, and Vomitoxin. Early research on the method was conducted in collaboration with Professors James Pestka and L.P. Hart, of Michigan State University.

Neogen Corporation is a six-year-old, privately-held biotechnology firm. The company develops and markets products for the diagnosis and prevention of diseases in plants and animals, using new procedures made possible through biotechnology.

Nomination for the 1989 ACDPI Research Award Sought

Deadline for submitting nominations for the 1989 American Cultured Dairy Products Institute Research Award is February 1, according Institute Vice President/Secretary Dr. C. Bronson Lane. The Award (sponsored by Nordica International) consisting of \$1,000 and a permanent plaque, is given annually to a college professor for outstanding research contributions in the cultured products field.

The guidelines for eligibility are as follows;

1. The work (on cottage cheese, buttermilk, sour cream, yogurt or other fluid and semi-fluid products made by the action of cultures) for which the award is made must have been completed within the past 10 years at a college or university.
2. The recipient must have been a full time faculty member at the college or university during the time the work was done.
3. The person must not be a previous recipient of the ACDPI Research Award.

The individual selected for the '89 award will be recognized at the ACDPI Annual Meeting/Clinic/International Cultured Product Evaluation Sessions to be held in San Antonio, Texas on March 12-15.

Nomination letters should be sent directly to Dr. C. Bronson Lane, ACDPI, PO Box 547813, Orlando, FL 32854-7813.

Blue Metal-Detectable Bandage Can Save U.S. Food Processors Money

A metal- and visually-detectable bandage that can help prevent product contamination, production line downtime and product loss has been introduced to the U.S. food processing industry by Florida-based Detectable Products.

"Bandages can fall off the hands and fingers of workers on the processing line," says Judd Humpherys, president of Detectable Products. "Our metal-detectable bandage offers a quick, easy way to recover them." He explains that even workers who wear gloves risk losing their bandages when removing the gloves.

The Detectable Products Bandage can be spotted two ways. The bandage is bright blue and can be easily seen, since virtually no food is this color. Most important, the bandage features a non-toxic metallic foil under the pad which enables it to be detected by the standard metal detection equipment installed at most food processing plants, without any adjustments or modifications.

There are more than 2,000 food processing companies in the United States which can benefit from using the Detectable Bandage. Tyson Foods, a leading processor of poultry products, already has purchased 2.5 million bandages for use in its 33 plants nationwide. Other food processors have established company-wide policies to use only the blue metal-detectable bandages in all of their facilities.

"Food processing workers need a detectable bandage that is comfortable and specifically designed for movement, especially for awkward places like fingertips," says Humpherys. He explains that the company's product, which is comparably priced with standard elastic fabric bandages, is highly flexible, comes in a variety of sizes and features a hypoallergenic adhesive and large pads that won't stick to an injury.

Detectable Products has been developing the metal-detectable bandage for two years, and the product became ready for distribution in the Spring of 1988. Other clients to date include M&M Mars, Chicago, Frito-Lay, Orlando, FL., and Dorskocil Foods Company, Hutchinson, Kansas. The company is currently expanding its sales force for a direct-sales-only distribution effort.

Detectable Products can be contacted at P.O. Box 476, Altamonte Spring, FL 32715, 407/830-4668.



Daniel A. Gescheidle Named New President of Educational Foundation

Daniel A. Gescheidle will be the new President of The Educational Foundation of the National Restaurant Association, effective January 1, 1989, it was announced by Henry J. Cockerill, Chairman of The Educational Foundation. In the interim, Cockerill will serve as both Chairman and President of the foundation.

Gescheidle succeeds Richard J. Hauer, who is stepping down after six landmark years as Executive Director of The Educational Foundation.

Gescheidle is Executive Committee Chairman of ComSource, which was formed through a merger of North American Foodservice Companies, Inc. and NIFDA, Inc. in August, 1987, to create the largest independent foodservice distribution organization in the country with over \$6 billion in annual sales. At the time of the merger, Gescheidle was President and Chief Executive Officer of North American.

He started his career with the Morton Salt Company, where he progressed through positions of increased responsibility to President and CEO of the company. Gescheidle left Morton Salt to join Don Roth Restaurants, a high quality restaurant chain in the Chicago area, as President and partner.

He is a former Chairman of the International Foodservice Manufacturers Association (IFMA), as well as founder and former Chairman of the IFMA Educational Foundation; Vice Chairman and Trustee of The Educational Foundation of the National Restaurant Association; President and Board Member of a local school board in Glencoe, Illinois; Trustee Emeritus, The Culinary Institute of America, Hyde Park, New York; Trustee and Chairman of the Endowment Fund, Lake Forest College, Lake Forest, Illinois. In 1975, he was inducted into the NIFI College of Diplomates.

The Educational Foundation of the National Restaurant Association was formed on January 1, 1987, through consolidation of the National Institute for the Foodservice Industry (NIFI) and the educational and training activities of the National Restaurant Association.

QC BATCH NO. 02-3A

ACCEPTED
 REJECTED

Detect *E. coli* before you can say 4-Methylumbelliferyl- β - D-glucuronide

Well... maybe not that fast. But when traditional tests for the presence of *E. coli* often take a week or longer, Marcor's overnight MUG (4-Methylumbelliferyl- β -D-glucuronide) testing reagent seems awfully fast.

How does it work? Almost all strains of *E. coli* produce β -glucuronidase, an enzyme which hydrolyzes MUG. The result is 4-methylumbelliferone, a fluorogenic product which can be easily detected under long wave UV or 366-nm light. When MUG is incorporated into a modified MacConkey Agar or Lauryl Sulfate Broth, seeded with a single *E. coli* cell, fluorescence is usually detectable in 12 to 20 hours.

Plan now for future QC speed and economy. Perform both gas production and fluorescent tests simultaneously, and compare the results. For recommended test procedures and complete product specification, Marcor is just a phone call away.

MARCOR
DEVELOPMENT
CORPORATION

206 PARK STREET
HACKENSACK, NJ 07601
201-489-5700
TELEX 710 990 5131
MARCORDEV HAK

For more information contact: Charles Sandler, Director of Educational Information, Educational Foundation of the National Restaurant Association, 20 N. Wacker Drive, Suite 2620, Chicago, IL 60606 312/782-1703.

Manuscripts Invited for ACDPI Student Essay Contest

The winner of the 1989 American Cultured Dairy Products Institute Student Essay Contest will be recognized at the Institute's Annual Meeting in San Antonio, Texas on March 12-15, according to Board Chairman Earl Carter, Holland Dairies. In addition to an all-expenses paid trip to San Antonio, he/she will be provided with a \$1,000 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 Dept., MSU, Mississippi State, MS 39762, with an accompanying letter (signed by a faculty member) certifying that the essay was written by the student.

Contact Dr. C. Bronson Lane, ACDPI, PO Box 547813, Orlando, FL 32854 407/628-1266 if more information on the contest is desired.

Please circle No. 203 on your Reader Service Card



The First Course in Sanitation is Education.

Doing right starts with knowing right. Foodservice operators know how vital sanitation is to their success.

The Applied Foodservice Sanitation program of the Educational Foundation of the National Restaurant Association has been raising operator consciousness, and the standards of sanitation, for over 15 years.

We educate to motivate a change in sanitation practices; then we test and certify. That's what sets our program apart. And the operator's cost is less than testing alone.

We provide an operator with complete training and testing materials to initiate a course that can be tailored to their particular needs, and is consistent with FDA model codes and interpretations.

Assist operators in your jurisdiction by helping them put first things first. Call toll-free: 1-800-522-7578.



Applied Foodservice Sanitation

250 S. Wacker Drive, Chicago, IL 60606 (312) 782-1703.

Industry Products

Thermal Wall Insulation Also Acts as Insecticide

• An innovative wood fiber insulation that kills insects where they live and breed is now available through In-Cide Technologies, Inc., a Phoenix-based chemical manufacturer and distributor of biodegradable specialty chemicals.

In-Cide Pest Control Insulation® is formulated with Reylon 2100, a safe, odorless borate chemical that wipes out pests - especially cockroaches - that live and breed in walls and space voids, yet is safe for people and pets.

In-Cide® is the only insulation approved to kill insects by the Environmental Protection Agency and its active ingredient, Reylon 2100, has been tested over 98 percent effective by the Department of Entomology of the University of California.

Insects crawling through the insulation pick up microscopic particles of the chemical on their bodies. When the pest, such as a cockroach, cleans itself and others in the nest, the chemical is ingested during the grooming process. It then solidifies like cement in the insect's digestive tract, forcing it and any others who have had contact to starve or dehydrate. Death occurs within three to ten days.

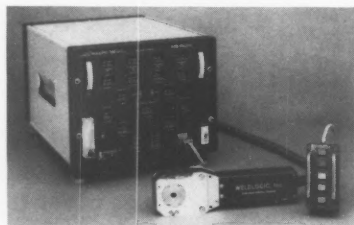
In addition to cockroaches, In-Cide® has been tested effective in controlling termites, ants, silverfish, palmetto bugs and others.

"When In-Cide® is used, it's like having a full-time exterminator integrated into the building. This is definitely important when you consider facts such as that for every cockroach seen in a building, there can be as many as 1,000 unseen within the walls," comments James Blasius, Vice President of Research of In-Cide Technologies. He added, "The potential for use of this product in both new building construction and retro-fitting projects is practically unlimited."

In addition to its unique pesticidal qualities In-Cide® is flame resistant, has a much greater R-Value than either rock wool or fiberglass, provides for high sound absorption and is extremely safe (it has a toxicity rating 6 times less toxic than common table salt).

In-Cide® is available in both loose-fill and cavity spray forms.

**Please circle No. 262
on your Reader Service Card**



Industrial Water Temperature- Controls for Plant Sanitation

• Industrial Water Temperature Controls from Leonard Valve, Cranston, RI, provide constant temperature control for washing, sanitation and processing in poultry, seafood and all meat packing industries. Leonard industrial controls mix steam or hot water with cold water for a constant, predetermined tempered water supply for any wash-down or processing application.

Leonard Valve offers a variety of hose stations including Thermostatic Steam and Water Mixers, Steam and Water Blenders and Single Temperature Hose Stations. A Thermostatic Steam and Water Mixer and Thermostatic Controller are available for processing operations.

Thermostatic Steam and Water Mixers provide a flow of hot water at a desired temperature within a range of 160°F to 200°F without the need of storage tank, booster or instantaneous heater. Leonard thermostatic Controllers maintain hot water temperature for washup sinks, vats and other factory processes where a fixed temperature setting and line control are needed.

All Leonard industrial controls have castings and interior parts made of the highest quality nonferrous alloys for long-lived durability. Each unit is designed to be easily cleaned or serviced without disturbing pipe connections. A variety of cabinet and pedestal assemblies are also available. Accessories include heavy-duty hoses in 5 to 50 foot lengths and adjustable-spray industrial hose nozzles.

**Please circle No. 263
on your Reader Service Card**

Weldlogic, Inc.

• Model PA-100-STW automatic tube welder is designed for automatic TIG welding of all weldable grades of tubing. Transistorized 100 amp power supply is housed in a portable, rugged aluminum enclosure and uses 115 VAC (200/220 VAC is available). Repeatability factor if $\pm 1\%$ with line voltage variations of $\pm 12\%$. Standard weld heads accommodate tubing from 0.125 to 6 inch diameters; viewing port in top of head allows verification of alignment.

**Please circle No. 275
on your Reader Service Card**

5th Edition of Fisher Electrode Handbook

• Just off the press is the newest edition of Fisher Scientific's comprehensive annual on pH and ion-selective electrodes, a handy reference for industrial, biomedical, government, educational and research laboratories, as well as personnel engaged in in-plant monitoring and field measurements.

There are sections on working theory, electrode types, care of electrodes, troubleshooting, and pH and ion-selective instrumentation.

The new handbook, measuring 8-1/2 by 11 inches, and pre-punched for binders, is available without charge. There are 60 color illustrations of Fisher ion-selective, metallic, pH-indicating, combination-pH, and reference electrodes. Each is photographed actual size.

**Please circle No. 264
on your Reader Service Card**

Pure Product Aerosol Offers New Convenience For Foods

• A new, 100% pure product aerosol delivery system developed by Enviro-Spray Systems offers a neat, convenient tamper-resistant method for dispensing liquid and viscous foods.

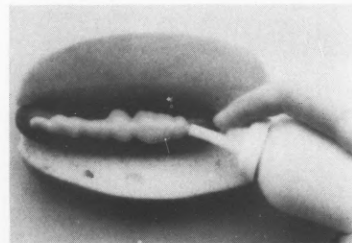
The unique sealed barrier pouch separates the safe, inert carbon dioxide propellant from the food product to assure absolute purity.

The inert CO₂ propellant permits a multi-directional spray which operates at any temperature for efficient product evacuation and extended shelf-life.

The Enviro-Spray System is available for use in aluminum, tin plate or plastic containers up to 16 ounces.

The tamper-resistant, long life qualities make Enviro-Spray Systems especially well suited for quality food products.

**Please circle No. 265
on your Reader Service Card**





Blue Metal-Detectable Bandage Introduced to Food Processing Industry

A visually and metal-detectable bandage that can help prevent product contamination, production line downtime and product loss has been introduced to the food processing industry by Florida-based Detectable Products.

The Detectable Products Bandage can be spotted two ways. The bandage is bright blue and can be easily seen, since virtually no food is this color. The bandage features a non-toxic metallic foil under the pad which enables it to be detected by the standard metal detection equipment installed at most food processing plants.

The Detectable Products Bandage offers a quick, easy way to recover bandages that fall off the hands and fingers of workers on the processing line. The bandage enables companies to take a proactive stance toward product quality and integrity. It helps prevent the possibility of costly product recalls and preserves food processors' reputation. Priced comparably with standard elastic fabric bandages, the Detectable Products Bandage is highly flexible, comes in a variety of sizes and features a hypoallergenic adhesive and large pads that won't stick to an injury.

**Please circle No. 266
on your Reader Service Card**



CannonBear Introduces the Fathom™ 1001 Level Transmitter -- A Major Advancement in the Reliability and Accuracy of Non-contact Level Measurement

CannonBear, Inc., a U.S. manufacturer of microwave devices for flow/no-flow and point-level detection, has introduced the new Fathom™ 1001 Level Transmitter. The transmitter's sensing head mounts at the top of the vessel and sends a low-level microwave beam (radar) down to the process material. Remote, microprocessor-based electronics calculate the time of flight of the signal reflected off of the vessel contents over a 1 inch to 200 foot range to measure level with either ± 1 or $\pm 1/8$ inch accuracy and ± 0.04 inch repeatability.

The FATHOM transmitter consistently measures the level of liquids, flat surfaces, and solids with varying angles of repose, if 20% or more of the solid particles on the surface are greater than 1/4 inch in diameter. Software compensates for wave action, passing agitator blades, and fixed obstructions in the transmitter's sensing beam.

The transmitter sensing head can be flange-mounted on the outside of the vessel with a nonconductive and inert process seal separating the sensor from the vessel interior; or it can be mounted inside the vessel, suspended from and NPT fitting. Process pressure can be up to 400 psi, and process temperature can be up to 400°F. The electronic housing is NEMA 4X or NEMA 4&7, and it can be mounted up to 1000 feet away from the sensor. The sensor is designed to meet hazardous area requirements through use of an optional intrinsic safety module in the electronic housing. Both the flange-mounted sensor and the electronics are replaceable without disrupting operations for quick maintenance.

All outputs are isolated and include: a 4 to 20 mA output, up to 2 solid-state, 3A switch outputs, and a RS422 digital output that can be daisy-chained through 16 transmitters and connected to an optional terminal or to a user's computer. The microprocessor-based electronics are CMOS for -40 to +180°F ambient range and 20 Watt power consumption. Equations and look up tables that can hold up to 100 points of user-determined calibration data are programmable via the RS422 port to take advantage of the transmitter's high repeatability and to convert to volume or mass readouts. Either a digital or analog display is available on the electronics housing. The FATHOM transmitter is backed by a money-back application warranty.

**Please circle No. 267
on your Reader Service Card**

Lease-A-Lab

Looking for an answer to the problem of fitting new lab equipment into your tight budget? HEMCO introduces the Lease-A-Lab program featuring the UniLab, a new concept in pre-engineered modular room design that can be quickly assembled to fit your exact space requirements. Typical applications include environmental rooms for quality control testing, isolation/containment rooms for lab procedures, and clean rooms for micro-electronic manufacturing/assembly and pharmaceutical processing/packaging.

UniLabs for the Lease-A-Lab program may be ordered fully equipped with lighting, ventilation, casework, countertops, fume hoods, and electrical and plumbing services, or as an enclosure only with equipment to be leased/purchased separately.

Leasing offers many financial advantages over purchased equipment. The minimum outlay of cash and low monthly payments allow leased equipment to fit into even the tightest budgets. Leasing saves working capital for other uses such as business development, accounts payable/receivable, and personnel. Existing credit lines remain open when leasing equipment. Leasing removes the need for equity financing, allowing your company to make use of an asset without making a down payment. Payments on leased equipment are 100% tax deductible as a business expense; financed equipment offers depreciation and interest deductions only.

Use of the HEMCO Lease-A-Lab program generates savings and profits.

**Please circle No. 268
on your Reader Service Card**

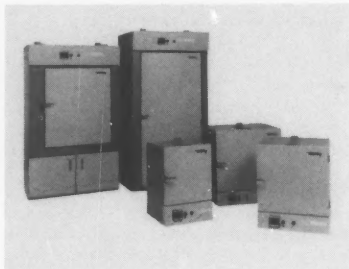
Pre-Mixed Electrophoresis Buffers

ICN Biochemicals announces the availability of a series of a pre-mixed, ready-to-use electrophoresis buffers. These buffer preparations eliminate the need for numerous individual chemicals and the many repetitive weighings usually associated with preparing buffers.

Conveniently pre-weighted and pre-mixed, the buffers are packaged in foil packets. Each packet, when reconstituted, makes up 4-liters of precise buffer solution. Twelve foil packets are included in each box.

Pre-mixed buffers available include Tris/Glycine; Tris/Glycine/SDS; Tris/Borate/EDTA; Tris/EDTA; Tris/NaCl/EDTA; and DNA/RNS Running Buffer. These easy-to-use buffers will simplify electrophoresis procedures and save time in the lab.

**Please circle No. 269
on your Reader Service Card**



Allen-Bradley Introduces Photoswitch[®] Series 8100 Programmable Counters With Higher Speeds and Expanded Communications

The Photoswitch Division of Allen-Bradley has introduced a new series of programmable counters with higher counting speeds and expanded communications capabilities.

The Photoswitch Series 8100 programmable counters now communicate over serial communications link RS-232C and RS-423 networks as well as 20 mA current loop.

The new series of counters is a high-speed system with dual preset, batch, totalizer, ratemeter, timing and scaling capabilities. It combines an advanced microprocessor and CMOS (complementary metaloxide semiconductor) circuitry to provide a control with exceptional reliability and noise immunity for industrial environments.

The counters are six digit, bidirectional controls that use dual inputs to obtain 10 distinct counting capabilities: add and subtract, count with directional control (also called quadrature times one), with stop/start, up or down with two inputs, with scaling, with three preset levels and with resolution quadrature times two and times four.

All functions are programmed easily with the front panel mounted keypad. A highly visible front panel display consists of six large, LED numeric characters, a programmable decimal point and four LED legends indicating items being displayed, value of the count, or the counter-control program. Three plug-in power supply modules for 120 VAC, 240 VAC, or 11 to 16 VDC are available and there is a choice of three plug-in input modules permitting the use of a wide range of sensors as input devices to the counter.

Overall dimensions are 3.85 in. wide, 3.85 in. high and 6.12 in. deep. The counter housing is a molded Noryl plastic designed for industrial environments. The counters are UL listed. CSA certification has been applied for.

Allen-Bradley is a Rockwell International company.

**Please circle No. 272
on your Reader Service Card**



New Tenney Forced Air and Vacuum Ovens

Tenney Engineering, Inc., of Union, New Jersey, the largest and most experienced manufacturer of high technology environmental test equipment, announces the introduction of a brand new line of Constant Temperature Ovens.

Five forced air and two vacuum models, with sizes from 1 to 32 cubic feet, are offered. These new ovens have been designed and built with the quality and extra features that have made Tenney Engineering a leader in the environmental equipment industry for over 55 years.

All ovens are controlled from 5°C above ambient to 300°C by RFI-free electronic controllers having sensitivity of $\pm 0.1^\circ\text{C}$. The controllers guarantee uniformity and accurate temperatures under all conditions.

**Please circle No. 270
on your Reader Service Card**

The Trichinella Spiralis Antibody Test

For rapid, cost effective detection of *Trichinella spiralis*.

Idetek's product line represents its successful transfer of proven human clinical diagnostic technology to food quality control.

With the *Trichinella spiralis* Antibody Test Kit, rapid testing of swine blood samples can be conducted in a simple procedure. Test results are traceable to individual animals. The results can be reported rapidly, enabling the producer to rail out infected animals in the slaughterhouse. In the research laboratory environment, the kit provides yet another effective tool for epidemiological studies and veterinary research.

The kit is based on proven methodology. The same technology that goes into this test has been used successfully in human diagnosis of cancer, AIDS and metabolic diseases. Years of medical diagnostics experience have been translated into a highly specific, sensitive and reproducible test for *Trichinella spiralis*.

Unable to perform the test at your site? Send samples to our Reference Library for rapid analysis and accurate results.

**Please circle No. 271
on your Reader Service Card**

ITC Introduces Kosher Yogurt Stabilizer

The Ingredient Systems Division of Ingredient Technology Corporation has introduced an all-kosher stabilizer for yogurt.

Traditionally, yogurt stabilizers contain gelatin and starch. Yogurt containing gelatin, a product derived from animal fat, can not be classified as kosher according to the Jewish dietary laws. ITC's C-7229 Kosher Yogurt Stabilizer is a free-flowing powdered stabilizer designed for the manufacture of a creamy-bodied yogurt with a soft gel set without the use of gelatin.

The new stabilizer, according to division vice president David Carpenter, utilizes a combination of vegetable-based stabilizing agents to produce a soft gel set equal to that of gelatin-based stabilizers.

The product is available in 250 lb. fiber drums, and may be stored for up to six months under cool dry conditions. Features such as color and usage levels are identical to those of gelatin-based products.

NYSE-listed Ingredient Technology Corporation, with 21 plants throughout North America, is one of the largest ingredients-only suppliers in the United States. The company provides products and services in 65 ingredient categories to many segments of the food processing industry, including the dairy, snack, meat & poultry, beverage, baking and confectionery markets.

**Please circle No. 273
on your Reader Service Card**

New Literature Announcement from EXAC Corporation

Mass Flowmeter Product Brochure - a 6 page color brochure describing the new Model 8300EX Mass Flowmeter is now available from EXAC Corporation. The brochure describes the benefits of measuring mass versus volume and illustrates the concept of Coriolis mass flowmeters. EXAC's Twinloop[™] sensor is described with a detailed discussion of the 8300 transmitter's advanced Coriolis Lock[™] electronics. Special product benefits are presented and particular market applications are identified. The return on investment from the Model 8300EX is supported by actual customer cost-savings messages.

EXAC is a supplier of Coriolis principle mass flowmeters to the Chemical, Refinery, Papermaking, Food and other industrial segments and has supplied over 3,000 of its flowmeters to customers in North and South America, Europe and Asia/Pacific.

**Please circle No. 274
on your Reader Service Card**

Please circle No. 148 on your Reader Service Card

NSI Introduces

the DIGITRON 3000 series of portable digital thermometers.

For precision temperature measurement in a wide variety of applications, this unique range of thermometers provide a reliable and cost effective solution.



Features include:

- 0.1 degree resolution.
- Degrees C or F readout.
- Differential temperature measurement.
- Display hold function.
- Temperature measuring range of -58 to +1999 degrees F.
- Rugged construction.
- Comprehensive range of probes.

For more details,
call or write:

NSI

3 Penns Trail, Newtown, PA 18940 (215) 968-7577

Please circle No. 142 on your Reader Service Card

NEW!

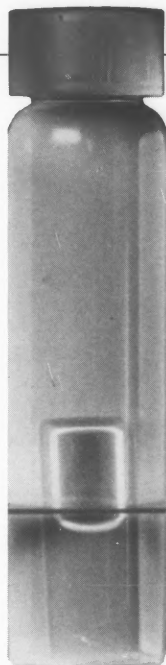
Sulfamethazine test kits

- 10 ppb sensitivity
- Quick results
- Cost-effective
- Easy to use
- ELISA technology

**NELSON
JAMESON
INC**

Nelson-Jameson, Inc.
2400 E. Fifth Street
Marshfield, WI 54449
phone 715/387-1151
FAX 715/387-8746

PHONE TOLL FREE 1-800-826-8302 (1-800-472-8339 in WI)



New 24-Hour Method for E. coli Detection Reduces testing time by more than a week

A new rapid, economical method for detection of *Escherichia coli* uses 4-methylumbelliferyl-8-D-glucuronide (MUG) reagent. *E. coli* produces glucuronidase, which hydrolyzes MUG to yield a fluorogenic product. Rapid confirmation of *E. coli* is possible by incorporating as little as 55 µg/mL MUG into Lauryl Tryptose (LT) broth, incubating for 24 hours, and examining under long-wave ultraviolet light for fluorescence.

Use MUG Reagent for . . .

- Rapid, economical *E. coli* identification
- Superior detection of heat and chlorine-injured *E. coli*

- Convenience of prepared media tubes and pre-mixed dehydrated media
- Single test determination of coliform bacteria and *E. coli*
- Selectivity for *E. coli* even when a large number of competitive organisms are present
- Detection of non-gas producing (anaerogenic) strains of *E. coli*

Hach Company supplies MUG crystals, convenient, easy-to-use prepared MUG media tubes, and all reagents and equipment needed to complete the 24-hour *E. coli* test.

For more information, request literature number 3149-3109.

Method approved by the
Association of Official
Analytical Chemists
(AOAC) for *E. coli* detection
in chilled and frozen foods.

HACH

HACH COMPANY
P.O. Box 389
Loveland, CO 80539-0389
800-227-4224

Please circle No. 121 on your Reader Service Card

DAIRY AND FOOD SANITATION/NOVEMBER 1988 605

Food and Environmental Hazards To Health

Viral Gastroenteritis South Dakota and New Mexico

The following reports describe two outbreaks of viral gastroenteritis associated with contaminated water.

South Dakota. An outbreak of diarrhea occurred among the 331 participants in an outing held at a South Dakota campground on August 30 and 31, 1986. During the event, in which participants hiked 10 or 20 km, water and a reconstituted soft drink were available at rest stands. The State Department of Health conducted a survey of 181 participants: 135 (75%) of these persons reported a gastrointestinal illness. Symptoms most frequently reported were diarrhea (69%), explosive vomiting (55%), nausea (49%), headache (47%), abdominal cramping (46%), and fever (36%). None of the participants required hospitalization. Attack rates by sex and age of patients were virtually equal. Onset of illness occurred 35 hours (mean) after arrival at the campground, and duration of illness was about 33 hours.

A biotin-avidin immunoassay performed at CDC yielded a fourfold rise in antibody titer to Norwalk virus in seven of 11 paired human serum specimens. No pathogenic bacterial or parasitic agents were identified from stool samples. Illness was strongly associated with the consumption of water or the reconstituted powdered soft drink made with water. No other foodstuff were implicated. The implicated water came from a well at the campground. A yard hydrant was located next to a septic dump stations, where sewage from self-contained septic tanks and portable toilets in the park was collected. Water from this hydrant had been used to fill water coolers and to prepare the powdered soft drink. Laboratory analyses of remaining water and reconstitute soft drink samples showed bacterial contamination (fecal coliforms >1,600 cfu/100 ml). Chlorine was stored in a tank and then drawn directly into the water system by a pump without a monitoring system. Water samples obtained from various locations in the campground had excess coliforms when the chlorination system was not operating. Fluorescent dye injected into a 5,000-gallon septic tank situated uphill from the well confirmed that the well was contaminated with sewage.

This campground was closed immediately and voluntarily by the owner. Corrective measures included relocating the well, installing an alarm system to detect malfunctions in the chlorination system, reconstructing the chlorination system to ensure that chlorine remains in contact with water in a storage tank for 30 minutes before the water is distributed, maintaining a daily log on chlorine residuals and sample collection points, and posting the yard hydrant as a nonpotable source of water.

New Mexico. An outbreak of gastroenteritis occurred among the 92 guests and staff at a cabin lodge in northern New Mexico over the Labor Day weekend in 1986. The

guests arrived Friday, August 29, and provided their own food for the weekend. The first persons to become ill developed diarrhea on Saturday morning, within 24 hours after arrival. By Wednesday, 36 of the guests and staff members reported symptoms: 34 had diarrhea; 9, vomiting; 14, fever; 22, abdominal cramps; and 1, bloody stools. There were no deaths or hospitalizations.

A questionnaire was administered to all 92 guests and staff to ascertain risk factors for gastroenteritis. Guests consisted of unrelated groups, and they stayed in 18 separate cabins. All 36 of the patients and 37 of the 56 unaffected attendees had drunk water at their cabin. A dose-response relationship was demonstrated between the amount of water consumed and the attack rate. No illness occurred among the persons who did not drink water; 33% of those drinking 1-2 cups and 59% of those drinking > 3 cups became ill. Five of the 18 cabins were unaffected; three of these belonged to families who were residents or frequent visitors at the lodge.

Assuming guests were exposed upon arrival or when they first drank water, the median incubation period was 41 hours (range = 7-110 hours). Symptoms lasted 2-17 days, with a median of 5 days.

The cabins were supplied with water taken from a stream and processed through a small chlorinator and a storage tank that was periodically iodized. A filter had been removed recently from the pipe because it repeatedly became plugged with debris. A severe rainstorm occurred the evening the guests arrived, resulting in increased water turbidity.

Water samples taken at the cabins and the surface stream that supplied the cabins were positive for total coliforms and fecal coliforms. Stool samples from ill patrons were negative for pathogenic bacteria and parasites, except for one sample, from which *Giardia* was isolated. Convalescent-phase sera were submitted to CDC for 13 cases and 26 controls (22 per case), matched for age within 5 years, gender, and city of residence. Controls were selected from health department personnel who had not visited the lodge. No difference in Norwalk titers was found between five cases and five controls.

Under the supervision of state environmentalists, the water system was renovated before the lodge reopened, with particular emphasis on filters, the chlorinator, and the storage tank.

Editorial Note: The two outbreaks of gastroenteritis described above are representative of those frequently reported to CDC. They demonstrate the need for an improved, specific laboratory approach to identify the agents (many of which are presumed to be viral) responsible for these outbreaks. Transmission of these viruses is often associated with fecal contamination of water sources used for drinking, swimming, or producing ice. Additionally, the contamination of coastal water poses a special problem,

since the consumption of seafood is a risk factor for acquiring Norwalk agent infection and other enteric viral agents.

The two best-known enteric viral agents, rotavirus (group A) and Norwalk agent, were first seen in the stools of diarrhea patients by means of electron microscopy in the early 1970s. Both agents have proven to be important causes of gastroenteritis in this country, with rotavirus being the most common agent for diarrhea in young children and Norwalk agent being common in adults. In recent years, enteric adenoviruses, non-group A rotavirus, and several 27- to 32 nm enteric viruses, including other Norwalk-like agents, caliciviruses, astroviruses, and other enteric viral pathogens, reportedly have been associated with gastroenteritis. Recent advances in identifying and diagnosing some of these viruses should make it possible to reduce the number of undiagnosed outbreaks in future investigations. Methods for serologic and antigenic tests are available for some agents, but the examination of stool samples by electron microscopy offers the possibility of identifying agents for which no specific tests are available. The probability of detecting viral particles by electron microscopy is greatest if stool specimens are collected during the early stages of illness, preferably within 12 hours and no later than 48 hours after onset. Some viral particles may be more stable if stool samples are stored at 4°C. The following guidelines are currently recommended for specimen collection specifically for diagnosing outbreaks of viral gastroenteritis.

1. Stool specimens should be collected in bulk volume as soon after the times of disease onset as possible and no later than 48 hours after the onset of symptoms.
2. Stool specimens should be refrigerated, not frozen, and shipped to the laboratory on the same day that the specimen is collected.
3. Paired serum specimens that are collected within 1 week of the disease onset (acute phase) and 3 to 4 weeks after the onset of symptoms (convalescent phase) from both ill patients and controls are required to establish the causal association between agents seen in the stools and the illness.

MMWR 2-12-88

Mercury Exposure in a High School Laboratory - Connecticut

On December 8, 1986, 22 students and a teacher in a Connecticut high school chemistry laboratory were exposed to mercury vapor. The class was conducting an oxidation reduction experiment that called for silver oxide. However, mercuric oxide had been used because silver oxide was not available.

The experiment was performed at eleven work stations; exhaust hoods in the classroom were not turned on. Each experiment used 1.75 g of mercuric oxide to obtain a theoretical yield of 1.62 g of elemental mercury. The mercuric oxide was placed in a crucible and heated over a burner flame for 15 minutes to drive off the oxygen. The teacher stopped the experiment when he learned that the yields were lower than expected, and, therefore, mercury was

being vaporized. He turned on the hoods and had the students clean out the crucibles. The experiment had started at approximately 8:15 a.m.; the students had left the room by 9:00 a.m. The school then called the local fire department and the Toxic Hazards Section of the Connecticut Department of Health Services for assistance in determining the extent of the possible mercury exposure.

The maximum concentration of mercury in the air was estimated at 50 mg/m³ (10.9 g total mercury lost - 219 m³ air volume of room). The mercury saturation point in air at 10°C (68°F) is 15 mg/m³. The excess 35 mg/m³ of mercury that appears to have been lost may be condensed on surfaces in the room. The maximum dose, or body burden, to each student was estimated at 9.3 mg.

Air measurements for mercury were taken in the laboratory after it had been ventilated for several hours. The mercury level was 0.008 mg/m³ with the windows open and hoods on. However, when the laboratory was closed and the hoods were turned off for 25 minutes, the level rose to 0.04 mg/m³. This five-fold increase may have been due to vaporization of the condensed mercury from surfaces in the room. Mercury levels were measured again the day after the incident (December 9), and the school personnel were given instructions for cleanup. On December 12, mercury levels in the air in the room ranged from 0.002 to 0.003 mg/m³. School officials were told they could resume use of the classroom.

On December 11, urine samples were obtained from the 23 persons who were in the classroom during the experiment. Eight persons had urine levels of mercury at or above 30 µg/l. School officials decided to have follow-up testing performed on the remaining 15 persons in the class. The urine mercury level for all but one of these 15 persons had increased from the original value, and some had risen to 30 µg/L or above. The highest level was 72 µg/L. Testing of a control group to determine the normal average urine mercury level for unexposed students at the school was also requested. However, school officials did not allow control samples to be obtained. Additional follow-up testing was conducted on February 24, 1987, and again on March 31, 1987, everyone in the class including the teacher, had a mercury level either at or below 30 µg/L. On March 31, 1987, one student had mercury level of 37 µg/L; all others remained at or below 30 µg/L.

Editorial Note: The biologic half-life for mercury vapor ranges from 35 to 90 days. Immediately after exposure, fecal excretion of mercury is predominant; renal excretion increases with time. Careful behavioral and neurological monitoring is recommended when urine levels are 100 µg/L or greater. Seventy-eight days passed between the students exposure on December 8, 1986, and the test on February 24, 1987, in which all urine mercury levels were at or below 30 µg/L. The fact that one to two biologic half-lives had passed during this time probably explains the decrease in urine mercury concentrations.

Organic mercury, which is predominantly methyl mercury, and elemental mercury pose different risks. These differences result from the greater intake of organic mer-

cury, which is obtained through the diet, and from the intrinsic toxicities of both forms of mercury. High doses of methyl mercury can produce irreversible destruction of neurons in the visual cortex and cerebellum and lead to a permanent narrowing of the visual field and signs of ataxia. The effects of inhaled mercury vapor on the nervous system are usually reversible, particularly if they are milk.

Much of the information on elemental mercury vapor is qualitative rather than quantitative, but good quantitative dose-response data are available for methyl mercury. Since methylated mercury poses greater risk than vaporized mercury, it was considered feasible to use these data in analyzing the possible risk of adverse effects in the Connecticut incident. Methyl Mercury exposure has been shown to cause neurological effects at body-burden levels of between 25 and 50mg. The students' estimated body burden of 9.3 mg was well below these values; therefore, neurotoxic effects were not anticipated. Acute renal effects were not anticipated either because they are generally caused by inorganic mercury salts.

The appropriate method for determining risks associated with toxic chemical exposures is the measure and compare ambient concentrations and body burdens. Such analysis allows for the examination of factors that can affect absorption at different exposure levels. However, as in the incident reported here, such data are not always available. In the absence of good monitoring data, estimated body burden must be used to assess risk.

The problem that occurred at this high school could occur at other schools. Consequently, it is recommended that mercuric oxide not be substituted for silver oxide. In the event of mercury exposure, workers assigned to cleanup should be warned of the danger involved and instructed in safety precautions. Also, students should be trained in the proper use of laboratory safety equipment such as exhaust hoods, goggles, gloves, aprons, and fire extinguishers as well as proper disposal of toxic chemicals that are used in classroom experiments.

MMWR 3/18/88

Toxicology Data

EPA is mailing notices to approximately 2,075 pesticide registrants requesting toxicology data on 304 active ingredient chemicals used in antimicrobial pesticide formulations.

The Agency has determined that more data are needed to assess the potential hazards associated with the use of antimicrobial pesticides. In the past, EPA assumed that human exposure to most antimicrobial pesticides involved only short-term exposure to low concentrations of active ingredients. Therefore, only acute toxicity data were required to register most antimicrobial pesticide products.

Antimicrobial pesticides include products used as disinfectants, sanitizers, sterilants, and commodity preservatives in hospitals, health-care facilities, food-handling establishments, swimming pools, and metal-working fluids.

EPA Journal April 1987.

New York Meat/Poultry Contamination Study

Army Karas, Deputy Director for Legislation & Research, New York Department of Consumer Affairs, reported on a recent study made by the agency on meat and poultry contamination - "a silent public health hazard." The study found consumer hazards at all stages of the cycle of bringing meat from the farm to the consumer.

A survey in New York City of 180 products sampled found that 54% of the raw chicken, 52% of the cooked roast beef, and 17% of the raw ground beef were contaminated at various levels with one or more bacteria known to cause food poisoning. The NYC agency recommended: (1) Federal standards for raw meat and poultry with legal limits on pathogens; (2) USDA prohibition of the use of contamination products in rendered feed; (3) USDA prohibition of the use of vehicles contaminated from previous cargo; and (4) USDA consideration of imposing a requirement that meat/poultry transport trucks must have built-in refrigeration.

Food Processing May 1987


THE NEXT BEST THING TO YOUR DOOR









Creates an invisible air barrier for complete protection against insects, dust and fumes.

SPECIALLY ENGINEERED FOR ALL SIZES OF:

- Warehouse Doors • Refrigerated Rooms
- Receiving/Service Doors • Customer Entrances

ENERGY CONSERVATION

- Maintain Refrigerated Temperatures
- Reduce Humidity and Ice Buildup

UTMOST PERFORMANCE AND QUALITY

- Easy to Install • Immediate Delivery

Send for brochure. Include doorway sizes and specify purpose, insect, refrigeration or heat, for quotation. No obligation, naturally.


14716 S. Broadway, Gardena, CA 90248
(213) 770-1555 Outside CA 1 (800) 421-1266 FAX (213) 324-3030
See us in Sweets Catalog, Section 15875/MAR

Made in U.S.A.

U.S. Postal Service
STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
Required by 39 U.S.C. 3685

1A. TITLE OF PUBLICATION Dairy and Food Sanitation	1B. PUBLICATION NO. 0 2 7 3 2 8 6 6	2. DATE OF FILING 9/30/88
3. FREQUENCY OF ISSUE Monthly	3A. NO. OF ISSUES PUBLISHED ANNUALLY 12	3B. ANNUAL SUBSCRIPTION 75 75 15 Students & Affiliates
4. COMPLETE MAILING ADDRESS OF KNOWN OFFICE OF PUBLICATION (Street, City, County, State and ZIP+4 Code) (Not printed)		
502 E. Lincoln Way, Ames, IA 50010 Story County		
5. COMPLETE MAILING ADDRESS OF THE HEADQUARTERS OF GENERAL BUSINESS OFFICE OF THE PUBLISHER (Not printed)		
502 E. Lincoln Way, Ames, IA 50010 Story County		
6. FULL NAMES AND COMPLETE MAILING ADDRESS OF PUBLISHER, EDITOR, AND MANAGING EDITOR (This item MUST NOT be blank)		
PUBLISHER (Name and Complete Mailing Address) INTERNATIONAL ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC. 502 E. Lincoln Way, Ames, IA 50010 PO Box 701		
EDITOR (Name and Complete Mailing Address) Kathy R. Hathaway, PO Box 701, 502 E. Lincoln Way, Ames, IA 50010		
MANAGING EDITOR (Name and Complete Mailing Address) Kathy R. Hathaway, PO Box 701, 502 E. Lincoln Way, Ames, IA 50010		
7. OWNER (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given. If the publication is published by a nonprofit organization, its name and address must be stated.) (Item must be completed.)		
FULL NAME INTERNATIONAL ASSOCIATION OF MILK, FOOD & ENVIRONMENTAL SANITARIANS, INC.		
COMPLETE MAILING ADDRESS PO Box 701, Ames, IA 50010		
8. KNOWN BONDHOLDERS, MORTGAGEES, AND OTHER SECURITY HOLDERS OWNING OR HOLDING 1 PERCENT OR MORE OF TOTAL AMOUNT OF BONDS, MORTGAGES OR OTHER SECURITIES (If none are owned, so state)		
FULL NAME None		
COMPLETE MAILING ADDRESS		
9. FOR COMPLETION BY NONPROFIT ORGANIZATIONS AUTHORIZED BY MAIL AT SPECIAL RATES (Section 432.12 OMB only) This portion, function, and major status of the organization and the exempt status for Federal income tax purposes (Check one)		
<input checked="" type="checkbox"/> 101 HAS NOT CHANGED DURING PRECEDING 12 MONTHS <input type="checkbox"/> 102 HAS CHANGED DURING PRECEDING 12 MONTHS (If changed, publisher must submit explanation of change with this statement)		
10. EXTENT AND NATURE OF CIRCULATION (See Instructions on reverse side)		
		AVERAGE NO. COPIES EACH ISSUE DURING PRECEDING 12 MONTHS
		ACTUAL NO. COPIES OF SINGLE ISSUE PUBLISHED NEAREST TO FILING DATE
A. TOTAL NO. COPIES (After Press Run)		
		4300
B. PAID AND/OR REQUESTED CIRCULATION		
1. Sale through dealers and carries, street vendors and counter sales (Not include mailings)		0
2. Mail Subscriptions		3523
C. TOTAL PAID AND/OR REQUESTED CIRCULATION (Sum of 10B1 and 10B2)		3523
D. FREE DISTRIBUTION BY MAIL, CARRIER OR OTHER MEANS (Samples, complimentary, and other free copies)		
		34
E. TOTAL DISTRIBUTION (Sum of C and D)		3266
F. COPIES NOT DISTRIBUTED		1034
1. Office use, left over, unsent, spoiled after printing		0
2. Return from News Agents		0
G. TOTAL (Sum of E, F1 and 2 - should equal net press run shown in A)		4300
11. I certify that the statements made by me above are correct and complete		SIGNATURE AND TITLE OF EDITOR, PUBLISHER, BUSINESS MANAGER, OR OWNER <i>Kathy R. Hathaway</i> Editor

PS Form 3526, Dec. 1985

Audio Cassettes of the IAMFES 75th Annual Meeting

Convention Recordings International Inc., have audio cassettes available for sale of the Annual Meeting July 31 - August 4. The cost is \$8.50 per cassette including shipping. For more information write or call: Convention Recordings International Inc., 13030 Starkey Rd., Suite 5, Largo, FL 34643, 813-581-2196.

This brush makes cents.

Item #9190W
\$8.60 ea.



It's Braun's EXCLUSIVE super sanitary epoxy molded Utility Scrub. It will outwear Traditional wood block or look alike plastic scrub brushes by years. You save Big money on replacements! The Secret? Durable dupont tynex nylon bristles carefully hand-fused into a molten epoxy base on a one piece poly propylene handle. Call or write today for Braun's complete catalog of ultra-sanitary food processing brushes. Designed for those who care enough to use the very best.

Call Toll Free: 1-800-645-4111



Better Built by Bruan Since 1875

Braun Brush Co.

43 Albertson Avenue Albertson, N.Y. 11507

In New York Call (516) 741-6000

Authors Wanted

Dairy and Food Sanitation is looking for individuals interested in writing articles for our journal. If you are interested, please contact IAMFES for more information, P.O. Box 701 Ames, IA 50010 Attn: Margie Marble

75TH IAMFES ANNUAL MEETING REPORT



Combine three outstanding days of educational sessions, networking with colleagues, seeing old friends and making new ones, table top exhibits, social events, committee meetings, along with all the people involved and you have another successful IAMFES Annual Meeting.

Attendance was once again over 800 at the beautiful facilities of the Hyatt Regency Westshore, July 31 - August 4 in Tampa, Florida.

The following is a complete summary of the 75th IAMFES Annual Meeting. If you weren't able to attend, plan now for the 76th in Kansas City, Mis-



Florida Local Arrangements



Leon Townsend, IAMFES President



Presidents Reception



Early Bird Reception



Ron Schmidt, Local Arrangement



Archie Holliday, Past IAMFES President



Opening Session

“DIAMOND JUBILEE CELEBRATION”

souri, August 13-17, 1989 at the Hyatt Regency Crown Center. All meeting and hotel registration forms will be in the February issue of both journals. Look for the Preliminary Program in the spring issues! If you haven't submitted an abstract for your presentation at the Kansas City meeting, check your October issue for the blue Abstract forms. Deadline for abstracts is January 1, 1989.

A special thanks goes out to the Florida Local Arrangements, the IAMFES Board, the Program Committee and the Ames Office for all of their hard work and devotion. The meeting was a great success.

See you in Kansas City!



Exhibit Hall



Mr. and Mrs. R. F. Jolley



(L to r) Ron Schmidt, Gainesville, Florida and Don Bechtel, Manhattan, Kansas

*Robert Gravani,
Incoming IAMFES
President*



PRESIDENTIAL ADDRESS

*As Presented During the 75th Annual Meeting of the
International Association of Milk, Food &
Environmental Sanitarians, Inc., Tampa, FL*

Leon Townsend

**Milk Control Branch, Dept. of Health Services,
275 East Main St., Frankfort, KY 40601**



Bob Gravani and Leon Townsend

It's great to welcome you from the sunshine state.

IAMFES has many close ties with Florida, being one of our stronger affiliates. They have done a marvelous job of hosting our annual meetings on past occasions and as you see, are doing an outstanding job again this year.

This is the 75th Annual Meeting of IAMFES, our Diamond Jubilee. We've had an outstanding year. I realize fully that no one stands alone. It's impossible to thank all of you who have helped and guided me this past year.

Mark Twain said it best -- "Grief can take care of itself; but to get the full value of joy, you must have someone to divide it with". It's this joy -- the joy of being your 1988 President and accomplishments of the Association, this past year, which I want to share with you today.

First, I want to recognize Damien Gabis, Silliker Laboratories, Chicago, Illinois, as your incoming secretary. His background will certainly give the Executive Board a broader area of knowledge.

The old adage that you never want to replace a winner certainly was laid to rest this year. Dr. Lloyd Bullerman's replacement of Dr. Elmer Marth as Editor of the *Journal of Food Protection* was made without a flaw. I personally thank Elmer for his effort in making the transfer so painless. I also thank Lloyd for his taking on this tremendous task and doing it so well. Our two publications are the life blood of the association.

Currently, we mail 3,399 copies of the *Dairy and Food Sanitation* monthly, up 304 from last year. Additionally, we send out 3,355 copies of the *Journal of Food Protection* - monthly, an increase of 213 over 1987.

A major effort was begun last year by Bob Gravani to direct and assign specific goals to our committees. This effort has been continued by your Vice President, Ron Case. After a brief abolishment, the Applied Laboratory Methods Committee has been reestablished. The Dairy Farm Methods Committee (our largest committee) has been renamed the Dairy Quality & Safety Committee with expanded goals. Another new committee is the FDA Food Service/Retail Market Interpretations Committee. Homer Emery, U.S. Army, was recently appointed to chair this committee. Several new committees formed in 1987 have reported to the Executive Board for the first time during the committee chairperson breakfast Monday morning. As begun last year, committee reports will be spaced throughout the program this week, which will give each committee chairperson the opportunity to report on their activities. Additionally, full committee reports will be published in the DFS publication within the following months.

The Long Range Planning Committee, under the able leadership of Dr. Mike Wehr, submitted a lengthy report to the Executive Board in March. The board also met for some time with the committee on Sunday evening. The board feels very strongly that recommendations and ideas being generated by this committee will have a positive impact on the future of the association. Their task has just begun and will continue for some time. Closely related and partly because of early recommendations of the Long Range Planning Committee, I have recently appointed a Constitution and By-Laws Study Committee - Dr. Richard Brazis will chair this committee.

The Awards Committee chairman, Roy Ginn, has worked hard at seeing that awards are made to worthy candidates in all categories this year. I'm pleased to announce there will be awards presented at the Awards Banquet Wednesday evening for each category.

Your program chairman and President-Elect, Dr. Robert Gravani has, what I believe, developed the most comprehensive, timely program for this meeting. Submitted papers received this year out numbered all expectations and surpassed any previous year. In fact, so many papers of outstanding quality were received, an additional session "Food Microbiology" was added on Monday afternoon. Some 150 technical presentations will be made during the meeting. There are 11 technical sessions and 9 symposiums. Also, for the first time, an affiliate will present a program for a cracker barrel section. The Texas affiliate, TAMFES, will demonstrate their high temperature short time training equipment. Due to the need for training, TAMFES took the lead in the state of Texas and solicited support from industry to develop this sophisticated training aid. I believe we'll be very pleased to see what they present to us.

This is the third year for the student paper competition. Both the number of papers and the number of universities represented have increased this year. The developing scientist awards for these winning presentations will be presented during the awards banquet, Wednesday evening. The monetary contribution for these awards comes from our Foundation Fund, which is supported by Sustaining Members.

For the third year, exhibits are a part of our annual meeting. This decision by your Executive Board, 4 years ago, although criticized by a few, has been very successful. Not only from a monetary standpoint, but also had added another educational dimension to the meeting. Over 50 table top exhibits are on display this year.

Although exhibits are solicited and managed by the Ames office staff, one-third of the income is provided to the local arrangements committee up-front as seed money. This has been very beneficial to local arrangements by giving them some early working capital.

For those who felt once exhibits were started, they would become too large and unmanageable, you should, after three years, be at ease. The Executive Board is committed to maintain them on a small table top basis as you see this year.

You may have noticed, we are filming several presentations this week. This is being funded through the Foundation Fund and the film will become a part of materials offered to the membership through the audio-visual library at the Ames office.

For the third year since its inception, an outstanding presentation was given by the recipient of the Ivan Parkin Lecture Award. Funded through the Foundation Fund, this recipient receives a \$500 honorarium, a plaque plus travel expenses. Again, thanks to Dr. Michael Foster for his contribution to the program.

The Executive Board to date has been successful keeping our meeting in one facility. However, it is becoming more difficult. We do apologize for the crowded conditions of some meetings and social functions. The growth we are experiencing the last few years is going to dictate that we can only accept meeting invitations from large facilities.

Our capable Executive Manager Kathy Hathaway, will detail the Ames office activities during her Executive Manager's report later during the business meeting. However, I do want to acknowledge the fine dedicated staff Kathy has put together to manage the day-to-day affairs of our association.

Although the advertising goal fell short, advertising revenue was at an all-time high with over \$107,000 received. Sustaining memberships remained the same as last year with a few prospects close at hand.

A substantial increase was made in both members and subscribers. Our current total as of June 1 was over 4,400. Over 800 new members have been received this year.

Two new affiliates will be chartered this year **Nebraska** and **Alabama**. Hats off to both.

An increase was also noted in student members this year. In regard to student members and to make our association more attractive to them, the Executive Board voted to give a student member a choice of journals. Obviously many who are involved in research prefer the *Journal of Food Protection*.

In closing, I want to express a heartfelt word of thanks to the Florida Association for hosting our 75th annual meeting. More specifically, thank you to Ron Schmidt, Sonya Gambrel and my friend of many years, Dick Jolley, for their leadership in making this an outstanding meeting.

It is my hope that IAMFES members 75 years from now will see an Executive Board and office staff with the same dedication and loyalty as today. And health professionals will hold the same, or even greater, respect for IAMFES and its publications. Having served on your Executive Board since 1979 -- three years as affiliate council chairman prior to being elected to the board, I am proud of our past success and particularly the accomplishments of this past year. However, before we become too smug, we must always remind ourselves that regardless how great we are, how great we think we are or how great others think we are -- the number of people attending our funeral will depend largely on the weather. Thank you so much for your making my tenure as President so very pleasant. It's an experience I'll always cherish. May God bless you and IAMFES.



IAMFES EXHIBITORS F IAMFES ANNUAL

NAMA NATIONAL AUTOMATIC MERCHANDISING ASSOCIATION

DIFCO LABORATORIES

FUNKE DAIRY SUPPLIES, INC. ENCINO, CA

CONTEXT ONE INC. WASHINGTON, DC

THE PROCESSORS MACHINE & SUPPLY ASSOCIATION

GUARDIAN PROTECTION PRODUCTS, INC. MODESTO, CA

AQUAFINE CORPORATION WILMINGTON, DE

QUANTUM PROTECT

CAPITOL VIAL CORP. WINDY, VA

QUANTUM ASSOCIATES WINDY, VA

WEBB TECHNICAL GROUP, INC.

ACCESS ANALYTICAL SYSTEMS GRANFORD, CT

ENVIRONMENTAL TEST SYSTEMS, INC. ELAND, VA

Strahman

R.L. ROSS MARKETING APOLLO BEACH, FL

THE SINKER CO. DANVILLE, VA

SMITHKLINE BEECHAM PHILADELPHIA, PA

NASCO WHIRL-PAK FORT ATKINSON, WISCONSIN OR. M

MUNOX BIC Microfilm

MORAY CORPORATION SPECIALTY PRODUCTS KANSAS CITY, MO - Insecticides for use in institutional and restaurant facilities.

R. L. ROSS MARKETING/THIELMANN APOLLO BEACH, FL - Aseptic transport and processing containers.

DTR COMPANY LTD. MODESTO, CA - Disposable temperature recorders, solid state temperature recorders, and electronic thermometers.

MICROBIE TECHINICS SARASOTA, FL - Bacterial inoculant for wastewater treatment enhancement and improved grease-trap maintenance.

KIRKEGAARD & PERRY LABS GAITHERSBURG, MD - Immunoassays and antibodies used to detect Salmonella, E. Coli 0157:H7, and Listeria.

FOSS FOOD TECHNOLOGY CORP. EDEN PRARIE, MN - Compositional analysis of milk and dairy products.

J.T. EATON & COMPANY, INC. TWINSBURG, OH - Rodenticides, glue traps (roaches, rats, mice & fleas), Pest catchers, and Bait stations.

HACH COMPANY AMES, IA - Microbiological systems for analysis of water and foods.

STRAHMAN VALVES, INC. FLORENCE, VA - Washdown and clean-up equipment.

REITMAN MANUFACTURING CO. OAKLAND, CA - Anti-siphon float valve approved by USDA and FDA.

NASCO FORT ATKINSON, WI - Sterile Whirl-Pak sampling bags, and other sampling equipment.

EDUCATIONAL TESTING SERVICE PRINCETON, NJ - Food Protection Certification Program - Test of knowledge to prevent foodborne illness.

SPARTA BRUSH COMPANY, INC. SPARTA, WI - New Tri-Zone Color Coated Brush Program designed to control cross-contamination.

WEBER SCIENTIFIC/NDL EAST WINDSOR, NJ - Specializing in butterfat and bacteria count supplies to dairy laboratories.

STRANCO - activity, chlorine

SAMPLING - fluid sampling

AQUAFINE - violet steriliz liquid sweete

MICRO - Tetra salmon plates.

THE SCHE - traviolet Purifi ment.

SUMMIT - LABS, Making sales of products.

CHARLES - Food Protecti

KLINGAD - Sanitation p

SMITHKLI - Clear, PA - otic Residue detection test

SWAGEL - tings, valves,

ABC RESI - Comprehensive mental analy

AMPCO P - used solely fo tons.

TIME PRO - Sanitation ch beverage and

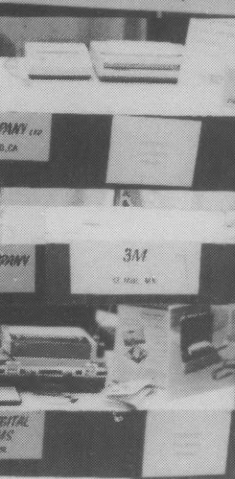
AGRICULT - of Contamin

MAAG AGROCHEMICALS, INC. VERD BEACH, FL

OXOID USA, INC. COLUMBIA, MO

ADARSH FOODS CO.

bay Corporation
Quality Products Group



FROM THE 75TH ANNUAL MEETING

ANCO, INC., Grudley, IL -- Stranol pH, conduc-
tivity, and dechlorination controllers.

AMERICAN DIV. OF AQUAFINE CORP., Valen-
cia, CA -- SampleTech: a unique, fast, accurate in-line
sampling system from Aquafine.

AQUAFINE CORPORATION, Valencia, CA -- Ultra-
sonication disinfection equipment for water and
sweeteners.

BIOMICROBIOLOGY PRODUCTS, St. Paul, MN --
Salmonella test kits and Purifitin SH and VBB
filters.

SCHLUTER COMPANY, Janesville, WI -- UI
Purification Equipment and Sanitation Equip-
ment.

LABORATORY SUPPLY INC./DEIBEL, Madison, WI -- Laboratory testing and consul-
tancy services; laboratory supplies and research-toxin
kits.

HELIUS ASSOCIATES, Leesburg, VA --
Protection Educational Materials.

KLONZADE, DIV. OF ECOLAB, INC., St. Paul, MN --
Industrial products, systems, and services.

TIKLINE ANIMAL HEALTH PRODUCTS, West
Conshohocken, PA -- PENZYME[®] and PENZYME[®] III Anti-
biotic Screen Test for Milk; EQUATE[®] rapid
on test for salmonella in food.

WAGLOCK COMPANY, Solon, OH -- Tube fit-
ting valves, and fluid system components.

RESEARCH CORPORATION, Gainesville, FL --
Chemical, microbiological and environ-
mental consulting services.

WACO PUMPS, Milwaukee, WI -- Centrifugal pump
systems for pumping cleaning and/or sanitizing solu-
tions.

WATSON PRODUCTS, INC., Atlanta, GA -- Designers
of chemical, microbiological and chemical feed systems for
pulp and paper processing industries.

WATKINS SYSTEMS, Portland, ME -- Diagnostics
for salmonella.

MAAG AGROCHEMICALS, INC., Vero Beach, FL --
NYTEK[®] 645 - a ready-to-use penicillin scaler & fungus
inhibitor.

JORGANON TEKNIKA, Durham, NC -- Salmonella
test systems, as well as New Listeria-Tek - detects Listeria
with results within 48 hours.

FRISTAM PUMPS INC., Middleton, WI -- Sanitary
design centrifugal pumps.

FUNK DAIY SUPPLIES INC., Cincinnati, OH --
Process filtration products.

ENVIRONMENTAL TEST SYSTEMS INC., Elkhart,
IN -- Dip and read test systems for the detection of
microbiological and sanitizers.

BRIDGEMAN MICROBIOLOGY SYSTEMS
(BMS), Cockeysville, MD -- BBI[®] Dehydrated Culture
Media: for a wide variety of testing applications in the
processed food and dairy industries.

CHICOPEE, Norcross, GA -- Industrial and institu-
tional wiping products.

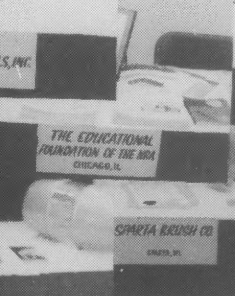
FOOD PROCESSING MACHINERY & SUPPLY AS-
SOC., Alexandria, VA -- Inviting food and beverage
processors, as well as scientists and academe to attend the
1988 International Exposition for Food Processors,
Anaheim, CA, Jan 19-Feb 1.

CONFERENCE FOR FOOD PROTECTION, Orlando,
FL -- Promotion of this meeting being held Oct 15-19,
1988, Grosvenor Resort at Walt Disney World Village,
Orlando, FL.

SILIKER LABORATORIES, Chicago Heights, IL --
Video used to train the food and dairy industries.

ACCESS ANALYTICAL SYSTEMS, Bradford, CT --
ColiAlert[®] - Breakthrough in coliform testing.

ADOPHI COORS COMPANY, Golden, CO -- Package
with a unique self-pressurizing system for dispensing
flowable products.





(l to r) Scott Wells, Julie Heim, Dee Buske and Margie Marble from the Ames Office accompany Ron Schmidt of Gainesville, FL in a "Florida Welcome".

By R. H. Schmidt, Poet Lariat

(Presented at opening session during the IAMFES Annual Meeting)

**A FLORIDA WELCOME
from
the Local (We certainly are)
Arrangements
Committee.....**

(The following rap is to be read while clapping hands and dancing)

Tampa is a city that's by the bay.
A city where you want to come and play.
So all you folk's now don't be nerds,
& hop upon those silver birds.

You will find there with great expediency,
a place they call the Hyatt-Regency.
You'll meet old friends and new I guess
that's the way it is at IAMFES.

There will be plenty of time for sasparilla
at the celebration they call the "Gasparilla".
Let me tell you about Ybor square,
and all the fun you can have over there.

Listen closely to all the speeches,
But allow some time for the Florida Beaches.
And don't forget, "I beg your pardon",
to visit that place they call Busch Garden.

There is also time for awards, my friend.
A nice finale at meeting's end.
Informed, educated to every foible,
You should reflect on this meeting as most enjoyable.

COMMITTEE REPORTS

If you wish to serve on a committee, please contact this office so that we may put you in contact with the committee chairperson. 800-525-5223 or 515-232-6699.

Water Quality & Waste Water Committee

The purpose of the "Water Quality and Waste Water Committee" is to encourage interest in food processing "Waste Management". In line with this goal, our committee chairman accepted an invitation to be on an executive planning committee setting up the program for a 1990 International Symposium of Agricultural and Food Processing Wastes to be held December 17-18, 1990 in Chicago, Illinois. The symposium is sponsored by The American Society of Agricultural Engineers with additional co-sponsors.

A membership list of the Executive Committee of Program Committee appears in Addendum 1 to this report.

Dr. Loehr from the University of Texas will consider agricultural and food processing wastes from an *environmental perspective*. Dr. White from Clemson University will consider *production* agricultural waste management. Dr. Zall from Cornell University will consider *food processing* waste management.

A specific mission for the program is to develop a structure for co-sponsoring societies with appropriate program topics. The symposium name has been changed to reflect the increased emphasis on food processing wastes.

The success of this program would be enhanced by having people in different groups react and interact with other groups with similar interests in other professional organizations.

To this end, this committee put into action a motion to affiliate IAMFES people with an ASAE (American Society of Agricultural Engineers) committee staff working on



Dr. Foster delivered the Ivan Parkin Lecture.

food processing waste management and utilization. Your chairman is a member of the ASAE Food Processing Engineering Group 707.

The ASAE 707 Committee has as its goal to encourage interest in food processing waste management and utilization which includes in-plant waste reduction, water use reduction, waste water treatment, by-product processing and utilization.

As you can see, we are working for the same objectives. In our opinion, it's better to seek cooperative ventures in this area than for IAMFES to do it alone for we will attempt to reinvent the wheel. We will bring to the table a list of expertise different than skills used by traditional engineers.

It's reasonable to believe that together we exert synergistic value to each other. We are already working together. In fact a paper, "In-plant Management to Reduce Dairy Plant Wastes", was presented by members of ASAE Food Processing Waste Management and Utilization Committee for the DFISA Workshop in Chicago in conjunction with Food and Dairy Expo a year ago September 1987. This committee was represented by R. Zall who was a co-author of the paper.

It is the recommendation of this committee that IAMFES become a co-

sponsor of the upcoming 1990 Symposium. If the experience proves to be worthwhile then consider working together with ASAE people to develop joint sponsorship for future symposia of this nature. Additional information appears in Addendum 2.

Addendum 1 The Executive Committee of Program Committee: Ms. Donna Hull, Dr. R.C. Loehr, Dr. R.K. White, Dr. R.R. Zall and Dr. L.M. Safley, Jr.

Addendum 2 Potential Co-sponsors - ISAFPW-90

ISAW-85 Sponsor/ISAFPW-90: American Society of Agricultural Engineers

ISAW-85 Co-sponsors: American Dairy Science Association, American Institute of Chemical Engineers, American Society for Microbiology, American Society of Agronomy, American Society of Animal Science, Canadian Society of Agricultural Engineering, International Commission of Agricultural Engineering, National Cattlemen's Association, National Food Processors Association, National Pork Producers Council, Poultry Science Association, Soil Conservation Society of America, Soil Science Society of America, USDA-CSRS, USDA-Extension Service, USDA-SCS, Water Pollution Control Federation, Environmental Protection Agency

Possible Additional ISAFPW-90 Co-sponsors: International Association of Milk, Food and Environmental Sanitarians, Inc., Institute of Food Technologists, American Meat Institute, Dairy Research Incorporated, National Broiler Council, Tennessee Valley Authority, Sierra Club, North America Lake Management Society, National Wildlife Association, American Water Resources Association, National Marine Fisheries, International Dairy Federation, Dairy Food Industry Supply Association, American Society of Civil Engineers, American Association of Environmental Engineering Professionals

Respectfully Submitted,
Robert R. Zall

3-A Sanitary Standards Committee

The Ad-Hoc Meeting was for the purpose of a review of items for future 3-A Meetings; T20-15, T605-30, T690-00, T603-05.

The regular 3-A CSP meetings covered fifteen items. The following were completed for Signature, T-05-14, T-08-17H, T20-15, T24-02, T25-02, T37-01, and T-605-30. The remaining eight (8) were studied and returned to Task Committees for further study. Details of the action taken is recorded in the attached 3-A Progress Report.

The 3-A Steering Committee has made two suggestions to clarify and expedite our completion of items on the agenda.

The 3-A Steering Committee Highlights will provide insight into future considerations for our Committees.

Future meeting dates for the 3-A Sanitary Standards Committee through 1990 are listed.

An updated list of 3-A CSP Committee members is attached. Please note that a new member to CSP, Norris Robertson's name was inadvertently omitted from Progress Report page 3 under International Association of Milk, Food and Environmental Sanitarians.

I wish to thank and commend Ms. Kathy Hathaway and her staff at IAMFES for their friendly help during the year.

The same appreciation is extended to Thomas M. Gilmore, 3-A Secretary and his staff at DFISA for their cooperation and assistance, they too are a friendly team. And without the support and assistance of the staff and secretaries at the Mississippi State Department of Health, I would not be able to properly fulfill by responsibilities as Chairman of 3A CSP.

This year the 3-A was very productive, and much credit goes to the work of Robert L. Sanders and his staff in providing such substantive comments on the material on the agenda for consideration.

It has been a real pleasure, as Chairman of the 3-A CSP committee, to serve with Bob Sanders as a Co-Chairman on PHS-CSP.

Thank you CSP for your participation, response and dedication to an important activity.

Respectfully submitted,
Dick B. Whitehead, Chairman
Committee on Sanitary Procedures

IAMFES BISSC Committee

From the very inception of the Baking Industry Sanitation Standards Committee (BISSC), IAMFES has participated in all meetings of BISSC offering Public Health and Sanitation counsel to specific Task Committees and at all general sessions of BISSC.

The chairman of the IAMFES BISSC Committee serves as a consult-



IAMFES Committee Chairperson Breakfast Meeting



Dairy and Food Sanitation Committee Meeting

ant to the BISSC Office of Certification on an alternate basis with two other sanitarians representing public health associations.

The 1988 Winter meeting of BISSC was held at the Chicago Marriott Hotel on March 4, 1988.

Since the meeting in February, 1987, only one request was received for the BISSC Committee to consider the formulation of a new standard, or to modify an existing standard, and that was to cover a Dough Extruder/Divider used in bread production. It was the consensus of the BISSC General Committee that equipment of this type was adequately covered by Basic Criteria and Standards previously adopted.

The remainder of the general meeting was devoted to discussions directed to formulating plans to promote the activities of BISSC in the Baking Industry and precipitate partici-

pation of Public Health Regulatory Agencies in the activities of BISSC.

An Office of Certification meeting convened at the end of the general session to consider to requests for the review of two pieces of equipment, an electric motor and a power transmission, presented for approval in accordance with BISSC Standard #29.

Being the only Sanitarian Consultant in attendance at this meeting, I was requested to act as counsel to the Office of Certification in the review of these pieces of equipment. Neither of the units reviewed met the criteria of Standard #29, and the following recommendations were made to bring them into compliance:



Committee Chairperson Breakfast Meeting

A. MOTOR (General Electric)

- 1) The recessed areas at the bolt holes were uncleanable and should be sealed.
- 2) The backside of the bolt lug must be sealed.
- 3) The conduit box must be integral or sealed to the housing.
- 4) Redesign the base (foot) to provide access for cleaning between the bolt and the motor housing. The motor housing must not rest on the floor.
- 5) Eliminate the recesses at the bolts on the fan housing.
- 6) Replace the domed cover on the conduit box. A flat cover without recesses is required. Use hex bolts instead of slotted screws.

B. POWER TRANSMISSION (Sumitomo Machine Corp. of America)

Redesign the shelf type area to provide a taper to the back and thereby eliminate a flat horizontal shelf upon which soil would easily accumulate, creating a difficult cleaning problem.

A BISSC slide presentation is now available, without charge, to members of IAMFES upon request. Requests for use of the slide presentation, as well as copies of all BISSC Standards and information booklets should be addressed to the BISSC Administrator:

Ms. Bonnie Sweetman,
Administrator
Baking Industry Sanitation
Standards Committee
111 E. Wacker Dr.
Chicago, IL 60610

We urge all Sanitarians and members of IAMFES to acquire a set of these Standards and adopt them as guidelines and subscribe to the principles of the BISSC Standards and Criteria.

The IAMFES BISSC Committee extends a standing invitation to all sanitarians and members of IAMFES to make every effort to attend the next BISSC meeting. The 1989 BISSC Winter meeting will be held in Chicago. The exact dates will be published in all major trade journals later this year.

Respectfully submitted,
Martyn A. Ronge, Chairman

Applied Laboratory Methods Committee

The meeting of the Applied Laboratory Methods Committee was held on July 31, 1988. Twenty-six members were in attendance. The meeting was chaired by Helen Carr.

During the year several projects encouraged by the committee have been accomplished or set into motion and are as follows:

1. A paper entitled "Rapid Methods and Automation in the Microbiological Examination of Foods" by Dr. Fung was published in the Dairy and Food Sanitation in June of 1988.
2. The comparison study on the extended incubation of LST and BGLB is underway and expected to be completed this year. An update was given by Charles Davidson.
3. A paper on the Preliminary Incubation Count has been completed and is being presented at this conference by J. Russell Bishop.

Concerns from the meeting last year such as coliforms in glycols, drugs used in livestock, effectiveness of penicillinase in differentiating *B. lactams* from other inhibitors in the *B. stearothermophilus* disc assay confirmation test, udder washes efficacy against pathogens, comparing somatic cell counts in milk from goats using optical counting (Foss) and the green stain, false positives in goats milk on the antibiotic test were discussed. The current need for a solution to each concern was identified and will be acted upon.

New problems discussed were:

1. A method to replace mouth pipetting of raw milk.
2. The need for standardization of methods for meat microbiology.
3. Use of the center area of plastic petri dishes for the antibiotic disc assay test when the center is concave.

A recommended method to replace mouth pipetting will be submitted to Dr. Bob Marshall, SMEDP editor before the end of 1988 by Michael Brodsky of the Ontario Food Protection Agency and Ann Draughon of the Univ. of

Tenn. as requested by Ron Case.

Standardization of methods for meat microbiology will be facilitated by M. Brodsky with AOAC.

The committee favors the appointment of Helen Carr as Chairperson, J. Russell Bishop as 1st vice Chairperson and Michael Brodsky as 2nd vice chairperson. In ensuing years the 1st vice chairperson will become the chairperson and the 2nd vice chairperson will become 1st vice chairperson and so on. This will provide experienced leadership and stability. The committee requests that the Board approve these appointments.

The goals of the committee were adequately met this year. The enthusiasm and support expressed this year by committee members has already established a network to accomplish during the next year the solutions to problems currently identified.

Respectfully submitted,
Helen J. Carr
Chairperson

Committee of Food Equipment Sanitary Standards

The Committee's objectives continue to include cooperation with other public health agencies and organizations in the development and review of uniform food equipment standards, interpretations and educational materials for the fabrication, installation and operation of food equipment and food vending machines; to cooperate with the food industry and health agencies in promoting uniform application of these standards and guidelines; and, to keep the IAMFES membership informed of new and changing standards.

The IAMFES Equipment Sanitary Standards Committee provided the National Sanitation Foundation (NSF) review and comment on new and updated food equipment standards.

Comments were submitted to NSF on the following proposed food equipment standard revisions: Standard 2, Food Service Equipment -- sink drain-board dimensions and requirements; Standard 6, Dispensing Freezers -- development of requirements for dispensing freezers using a heat treatment process to maintain acceptable micro-

biological quality; Standard 29, Detergent-Chemical Feeders for Commercial Spray-Type Dishwashing Machines -- tightening the uniformity of output tolerance +/- 20 percent to +/- 10 percent and requirements for a signal for depletion of supply and delivery for all feeders; and Standard 26, Pot, Pan and Utensil Washers -- to improve the quality of requirements and retain specifications.

The US Food and Drug Administration's proposed Food Protection Unicode was received and distributed for review and comment. Reviews and comments are being prepared by the Committee members and will be forwarded to the Interpretations Committee.

During the past year IAMFES was represented at the annual meeting of the NSF Joint Committee on Food Equipment and NAMA's Health Industry Council.

The 31st Annual Meeting of NAMA's Health Industry Council met in Philadelphia on October 30, 1987. A vending machine evaluation program report was presented. Forty machine manufacturing companies participate in the evaluation program. The participating companies are divided into two groups; those called General Vendors who make a variety of vending machines customarily found in the industry, and, Specialty Vendors manufacturing one type of machine such as water vending, French fry vending, cotton candy, etc. There were no particular problems reported and manufacturer's cooperation remained excellent.

The NAMA Council members were provided with a description of training programs covering a variety of public health topics available to vending machine operators. The Health/Industry Group requested that more training materials be available, not only on public health, but, also on safety aspects of the industry. Suggestions were made to develop a vending Inspection Manual for health officials, sue video tapes for training and work with the FDA Training Branch to develop a training module.

The NSF Joint Committee on Food Equipment met on April 21, 1988 and

reviewed proposed revisions to a number of equipment standards.

- * Specific problems encountered with the use of water line check valve systems placed on carbonated beverage equipment were reviewed. There is a history of reported backflow incidents resulting in copper poisoning when carbonated water backflows into copper pipes. The major problem appears to be lack of adequate maintenance of check valves. It was recommended that a Task Group review the various anti backflow devices and recommend installation guidelines.
- * An FDA proposal was submitted concerning the variable factors affecting chemical sanitizing agent efficacy. The Joint Committee recommended that Table 2 of the FDA letter be placed in the proposed Standard 3, Commercial Spray Type Dish-Washing Machines update and review Task Group review.
- * A review was provided on the proposed revisions to NSF Standard 6 for dispensing freezers using a heat treatment process to maintain acceptable microbiological quality. The Committee emphasized the need for the operation and cleaning manual to be considered part of the NSF evaluation of equipment listed under the standard.
- * An equipment manufacturer presented an appeal to a violation called on their listed product by NSF regional staff. The violation consisted of an unsealed seam on a double bracket for shelving. The Joint Committee supported the NSF staff position that the seam was not in compliance with the standard.
- * An NSF ballot on proposed revisions to Standard 2, Food Service Equipment, Item 4.48, concerning sink drainboard dimensions resulted in the following motion: "Drainboards, if provided, shall not be sized less than the smallest dimension (left to right) of the sink bowl". The NSF Council of Public Health Consultants will review and ballot this issue.
- * There was a proposal to change

the current 16 mesh screening requirements on blower openings for vending machines to 12 mesh. This issue will be discussed with the National Automatic Merchandising Association.

- * The Joint Committee recommended that the maximum temperature requirements of 175°F for hot holding cabinets be removed as long as the 150°F minimum is maintained.
- * The current requirements for hot dog push carts, Standard 59, are in conflict with FDA recommendations. The Joint Committee requested that hot dog push carts need to be evaluated and tested under the requirements for potentially hazardous foods.

Committee Meeting 7/31/88

The following items were reviewed for the 1988-89 program year:

1. Review of Food Equipment Sanitary Standards Committee objectives were endorsed along with addition of providing representation and input to the Interpretations Committee.
 2. The Committee should ask NSF to continue its efforts to develop standards for shellfish display tanks used to display clams, oysters and mussels. Presently there are manufacturers distributing shellfish tanks without established construction and operational standards and there are public health concerns with the wet storage of the shellfish intended for retail sale.
 3. The committee suggested that NSF be asked to consider developing a basic manual for sanitarians to use when evaluating equipment design and installation.
 4. Comments on the FDA proposed Unicode will be developed and forwarded to the Interpretations Committee for submittal to FDA.
- The timing of the Committee meetings this year was good which was shown by increased attendance and discussion; and, the creation of additional food committees has stimulated new interest in retail foods and food safety.

Respectfully submitted,
Duain B. Shaw, Chairperson

IAMFES Constitution and By-Laws Committee

This committee was appointed by IAMFES President Leon Townsend on April 20, 1988.

The Long Range Planning Committee met in February 1988 and suggested changes in the Constitution and By-Laws to the IAMFES Executive Board. The report of the committee was reviewed by the Constitution and By-Laws Committee prior to its on-site meeting on July 31, 1988, at the IAMFES Annual Meeting in Tampa, Florida.

An updated copy of the Constitution and By-Laws, reflecting previously passed amendments at the IAMFES meeting in 1987, was distributed to Committee members for the review and comments. All members of the Committee did respond with pertinent comments which were discussed at the meeting Tampa.

Considerable time was taken to review the recommendations of the Long Range Committee and the Intra-Committee comments. The Objectives (Article II) of the Constitution were thoroughly reviewed and necessary changes made to reflect the current status of IAMFES and the membership.

Initially, it was thought by some Committee members that the review and revision could be resolved very easily. However, the members decided that it should meet again on October 26, 1988, in Milwaukee, Wisconsin, to thoroughly discuss and hopefully finalize Committee actions on all Articles and Sections of the Constitution and By-Laws.

The Chairperson believes that Committee action on the Constitution and By-Laws should be completed and presented to the IAMFES Executive Board at their Spring Meeting in Kansas City, Missouri. If this schedule is followed and the Executive Board approves the changes, the Executive Manager will notify the membership that revised Constitution and By-Laws will be discussed at the Annual Business Meeting of IAMFES, in Kansas City, Missouri.

Committee Membership includes five Past Presidents of IAMFES and two members of the current IAMFES Executive Board:

Henry Atherton, William Kempa, Ron Case, Robert Sanders, Harry Haverland, Earl Wright and A. Richard Brazis.

Respectfully submitted,

A. Richard Brazis, Chairperson

Journal of Food Protection Management Committee

The committee met at 3:30 p.m. July 31, 1988 in Tampa, Florida. Members present were J. Frank, P. Pace, L. Leudecke, E. Todd and R. Marshall. Others present were JFP Editor L. Bullerman, Managing Editor K. Hathaway, Dairy and Food Sanitation Editor H. Bengsch, Board Representatives D. Gabis, R. Case (Vice President) and L. Townsend (President) and interested member A. Draughon.

Minutes of the 1987 meeting of the committee were distributed and approved.

Notice was given that the Copy Editor had written asking to be relieved of her duties. After considerable discussion of the duties and activities of the Copy Editor, the committee recommended that a single person be hired to do all the copy editing and related communications work and furthermore, that the Scientific Editor and Managing editor prepare a job description for the new employee.

A motion was made to approve of the Editors request for expenditure of approximately \$325 to attend an editor's seminar provided at no fee by Allen Press of Lawrence, KS. Motion seconded and carried.

The committee by comment consent asked Editor Bullerman to consider the recommendations made at the 1987 meeting that abbreviations used in a manuscript that are not commonly understood be cited on page 1 of the respective manuscript.

A motion was made to publish a notice in Instructions for Authors that authors provide keywords with each manuscript so they can be published

with the respective papers. Seconded and carried.

The committee discussed the need for installation of a postage meter for use by the Scientific Editor. The committee expressed the feeling that such matters were the purview of the Scientific Editor and the Managing Editor.

The committee reviewed the Scope of the Journal as published in Instructions to Authors, leaving the working unchanged and giving advice to Editor Bullerman regarding some titles of papers for which he had questions of whether they fit within the scope.

The committee reviewed the matter of waiver of page charges and affirmed current practices of the Scientific Editor which include the following: (a) publishing notice of page charges in Instructions to Authors, (b) reminding authors of charges for publication in letter accompanying manuscripts when first returned to authors, (c) explaining reasons for page charges to authors who request waivers, and (d) referring to the IAMFES office the need to collect page charges of any papers for which fees are not waived.

The subject of copywrite release was discussed. Marshall has solicited information from the Journal of Dairy Science regarding their practice and will report in writing to the editors and committee members regarding this.

A motion was made to delay action regarding the proposed publication of a 5-year moving index in the December issue of the journal so the Scientific Editor can have a chance to consider the mechanism and implications of the process. Seconded and carried.

A motion was made that the committee express its confidence in Editor Bullerman and its belief that his request for an increase in his monthly stipend to \$500 is reasonable. Seconded and carried.

The meeting was adjourned at 5:20 p.m.

Respectively submitted,
Robert Marshall

Dairy Quality and Safety Committee

(formerly the Farm Methods Committee)
1988 Report

At the August 3, 1987 meeting of the Farm Methods Committee, Chairman Maynard David disbanded all existing subcommittees except three which were to complete specific tasks prior to being disbanded.

This was done so that a new more flexible committee structure could be implemented.

A subcommittee consisting of Terry Mitchell, Sid Bernard, Pat Lawless, Helene Uhlman, Jim Petit and Charles Price (chairman) were asked to prepare a mission statement and key activities. Mr. Steven Sims, assistant Farm Methods Chairman, was also asked to work with this group. In addition to their assigned task, this subcommittee provided a suggestion for a new name. Their recommendations included:

New Name Dairy Quality and Safety Committee

Mission Statement: This IAMFES Committee works to improve quality and safety in production, processing and distribution of dairy products from farm to consumer.

Key Activities are to:

- Identify needs of the dairy industry
- Develop procedures and recommendations which address those needs.
- Disseminate information to appropriate dairy industry groups.

At the Executive Board Meeting following the August 1987 IAMFES Meeting Chairman David presented this name, mission statement, and key activities to the IAMFES Board along with the concept of a new structure. He also tendered his resignation and suggested Mr. Steven Sims as his replacement.

Both of these proposals were accepted by the Board.

At the October 24 Board Meeting more detail as to the new structure was presented.

Mainly that the Dairy Quality and Safety Committee would retain a farm methods section and explore this development of a plant methods sec-

tion. The goal was to move from permanent rigid farm subcommittees with specific titles and limited focus to task oriented working groups which would be formed to resolve specific problems and disband when a particular project was complete. Thus freeing the task force members to respond to other developing concerns.

The Dairy Quality and Safety Committee, met on February 9, 1988 in conjunction with the National Mastitis Council Meeting.

There was a unanimous vote to accept the new structure, name, mission statement and key activities. It was noted that the majority of members present were interested in farm issues. A subcommittee consisting of Ken Kirby, Lowell Allen and Henry Atherton was asked to suggest leaders for the farm methods section.

They suggested six, five of whom have agreed to serve, Terry Mitchell, Joseph Scoloro, Gary Trimmer, John A. Scheffel and Ted Hickerson. These names were submitted to and accepted by the Executive Board at their March meeting prior to the individuals being asked to serve. Still needed in this leadership cadre are representatives from regulatory and academia.

To date the position of Farm Section Chairman remains vacant. At the February meeting it was also decided that a notice should be placed in *Dairy and Food Sanitation* explaining the changes in this committee and announcing the July 31, 1988 plant meeting. It was also suggested that note be placed on the cover of this issue of the magazine. This was also cleared at the March Executive Board Meeting and appeared in the May, 1988 issue of *Dairy and Food Sanitation*.

A representative of the Executive Board attending the February committee meeting expressed a desire to have more specific information presented to the Board at their March meeting regarding the types of projects which the farm methods section would tackle.

A group consisting of Don Breiner, Randall Daggs, John Scheffel, Charles Price and Terry Mitchell (chairman), volunteered to accomplish this task. Their report was submitted directly to the Board.

They listed as examples:

1. Contamination of ground water supplies.
 2. Preparation of educational materials on aseptic milk sampling techniques.
 3. Predipping practices and current PMO language.
 4. Development of recommendations regarding cleaning and sanitizing of large milking systems.
- Additionally we expect to deal with at least two carry over projects from farm methods subcommittees.
1. Recommendation for voluntary use of uniform pictograms for farm cleaning compounds, sanitizers, udder washes, teat dips, etc.
 2. Publication of a recommended guidelines for pipeline installations.

On Sunday, July 31, 1988 at 10:00 a.m. the farm section met again. At 10:50 the same day the plant section met for the first time.

Twenty-four members and attendees participated in the farm section. Two new task groups were formed to complete the carry over projects from the farm methods committee.

The project recommending the voluntary use of uniform pictograms for farm cleaning compounds, sanitizers, udder washes, and teat dips will be chaired by John Scheffel from the leadership cadre. Members will include those individuals who were actively working on this issue with the farm methods committee as well as others to be selected by Mr. Scheffel.

Joseph Scoloro from the leadership cadre was selected to be in charge of publication of a recommended application for pipeline installations. He will select his task members including those who have worked on this project under the old farm methods committee.

Two new task forces were also formed to deal with issues presented to the board in March.

The task group on gathering and/or preparing educational materials on aseptic milk sampling will be led by Gary Trimmer and Ted Hickerson. They will select their task group members.

The task force on predipping and

current PMO language was expanded to include several issues involving udder preparation and related potentials for residues in the milk. This group will be led by Terry Mitchell and John Scheffel. They will name other farm methods members to complete their task group. These will include liaison people who are also members of Northeast Dairy Practices Council, National Mastitis Council and other groups working in this area so that efforts by this group will not duplicate work already being done.

It was also decided that the membership of the old farm methods committee will be polled to see how many wish to be retained in the farm section of the Dairy Quality and Safety Committee. The farm section agreed to meet again in conjunction with the February National Mastitis Council meetings.

Fifteen members and attendees participated in the plant section meeting. Because this was the first time this group has met, much was discussed about the history of how the group came to be formed as well as the groups mission and goals. The primary accomplishment was the recommendation of seven individuals for the plant section leadership cadre. Some of the members present were asked to speak to selected individuals to determine if they were willing to serve on the leadership group. As a result, three others were added to the recommended list. Names of these 10 individuals were submitted to the August 4th Executive Board meeting. This leadership cadre as approved by the Executive Board will meet in conjunction with the National Conference on Interstate Milk Shipments to plan how best to get this section of the Dairy Quality and Safety Committee fully operational during our next annual meeting in August 1989.

It was also decided that letter should be sent to all IAMFES members to tell them about this new group, explain its mission and goals as well as to solicit participation by those who are interested in working with this plant oriented group.

Respectfully submitted,
Steve Sims, Chairperson

Committee for the International Dairy Federation

Since our last report, the United States National Committee of the International Dairy Federation (USNAC) has been very active. The highlight of this period was the holding of a Quality Assurance Seminar by USNAC and IDF in cooperation with DFISA. This was a two day seminar held during the DFISA Expo and was highly successful. There were more than 300 participants and 45% were from 18 countries outside the U.S. The proceedings will be published by IDF and should be ready for distribution this fall.

Another seminar is proposed for 1989, again in conjunction with the DFISA Expo. The theme, tentatively titled "Material Handling & Packaging Frontiers," will bring together a number of IDF groups in a joint venture. A draft program is in preparation and as soon as a tentative one is ready it will be sent to the editor of one of the IAMFES journals for publication.

IDF has asked USNAC to delve into the possibility of hosting an Annual Session in 1992 and a study group was created to investigate it. Their report will be reviewed at the next meeting of USNAC on August 11, 1988.

For the first time, a joint meeting called the Tripartite Week was held together with the American Dairy Science Association at their meeting in Edmonton in July. The large number of participants indicated that this may be developed into a permanent arrangement.

USNAC is pleased to announce a publication of proceedings of two Seminars which it sponsored. One, in conjunction with DFISA, entitled "New Dairy Products Via New Technology" and the other, in cooperation with the American Dairy Products Institute, "Trends in Whey Utilization." These publications can be obtained from the Secretary of USNAC.

USNAC's major problem is the lack of financial support and attempts have been made to obtain grants or funding from various sources. A considerable amount of discussions

were held with the National Dairy Board but due to reasons unknown to USNAC, the NDB rejected the request. At this point USNAC is again looking for financial support to keep this worthy program going. Obviously, new members are welcome since they are the basis of the organization. At present, there are 48 members, representing all phases of the dairy industry and we welcome participation, particularly from members of IAMFES.

Many IAMFES members are active in IDF and USNAC Groups of Experts. Recently a new group was formed on a worldwide basis, "Detection & Enumeration of *Listeria monocytogenes*." Dr. M. Doyle of the University of Wisconsin is Chair and members are Dr. C. Donnelly of the University of Vermont, Dr. R.M. Twedt, and Dr. D. Archer of FDA.

Dr. R. Zall of Cornell is going to be one of the key speakers at a seminar sponsored by IDF, entitled "Recombination of Milk & Milk Products" to be held in Alexandria, Egypt, November 12-16.

USNAC has prepared an annual report of approximately 200 pages that is a comprehensive review of the activities of the 1987 IDF Annual Sessions. This report describes the activities of all IDF Commissions, Analytical Standards, Laboratory Techniques and finally, the Commission on Science & Education. Copies of this report are available from the office of the USNAC Secretary, 464 Central Avenue, Northfield, IL 60093. There is no charge for this publication.

The next meeting of USNAC will be held on August 11, 1988, at the Dairy Center, in Rosemont, Illinois. All IAMFES members who are interested in the programs of USNAC and the International Dairy Federation are invited to participate. Please call the Secretary for additional information.

Respectfully submitted,
Harold Wainess
312/446-2402

Foundation Fund Committee Report

This year we are assessing the status of the programs being supported by the Foundation Fund before attempting to introduce new activities. Currently the Foundation Fund is supporting four (4) activities:

1. The Ivan Parkin Lectureship - The subject lectureship was established in 1986 with an over-all budget not to exceed \$700. This year, in response to the Executive Board, the over-all budget was increased by \$500 annually. A part of the budget, the honorarium, was increased from \$200 to \$500.
2. The Developing Scientist Awards (Graduate Students Papers) -The awards were established in 1986 with an over-all budget not to exceed \$925. This recognition is slowly gaining momentum and competition is becoming keener and more challenging to the Selection and Awarding Committee. We would like to see more Colleges and Universities involved in the competition.
3. The Loaning Library - The Loaning Library was established in 1987 to provide a resource for training materials to IAMFES members. The Foundation Fund provided \$6,000 through 1989 to start the Library. As of late May, 1987 only \$1,681 had been utilized. Also we were advised that there was a long waiting list to obtain materials. A large percentage of the materials available are in the milk area. We recognize the importance of milk in our Association, but feel that the Library should have a well balanced number of training materials in the areas of milk, food and environmental sanitation. We are confident that the Library is providing a service and this will expand in the years to come.
4. Video Taping of Selected Presentations at the Annual Meeting - This is the most recent activity being supported by the Foundation Fund and is being initiated at this meeting. Most of the topics

presented at the Annual Meetings are on the "Cutting Edge" of technology and making this information available through video cassettes is a valuable service to our membership. The cassettes will be available through the Loaning Library. A budget not to exceed \$2,500/year has been established.

For clarification, monies in the Foundation Fund are not general funds of the International Association of Milk, Food and Environmental Sanitarians, Inc. These monies are derived, in part, from the Sustaining Members. A list of these members is published in the Journal(s) you receive. They are our friends and supporters. Currently there are 79 Sustaining Members.

Current Foundation Fund \$36,124.
Respectfully Submitted,
Harry Haverland, Chairman

FDA Interpretations Committee

The IAMFES Executive Board appointed Homer C. Emery, R.S., as Chairman of the FDA Interpretations Committee on August 1, 1988. Committee activity during 1988 has been limited due to FDA's attention on drafting the new Food Protection Unicode. Review of the Unicode is underway by other IAMFES Committees and consultants. IAMFES members interested in reviewing and commenting on the proposed Unicode and other FDA actions are requested to contact the Committee Chairman, Homer C. Emery, PO Box 1832, Frederick, Maryland 21701.
Respectfully submitted,
Homer C. Emery, Chairperson

Scientific Program Development Committee

I would like to suggest to the Executive Board that the Scientific Program Development Committee be changed to the Program Advisory Committee. The Program Advisory Committee would serve in an advisory capacity to the Board and the Program Chairman in the development of the annual meeting. The Scientific Program Development Committee now

functions after the program has already been developed. It seems to me that changing its actions to assist in the planning rather than critiquing of a program already developed would be in the best interest of the Association and would help in the continued development of meaningful annual meeting programs. The interests of our membership are becoming so diverse that, in my opinion, additional input is needed to continue having annual meeting programs that interest the membership.

The function of the Program Advisory Committee would be to assist the program chairman, e.i., vice-president, in the planning of the annual meeting and the program format, to suggest and evaluate symposia suggestions, to recruit high quality speakers, to review submitted papers and abstracts, and to assist the program chairman as necessary to develop an annual meeting that meets the needs of the members. The committee would meet twice each year; once at the annual meeting to plan for the forthcoming year, and once in mid-year to review and plan the annual meeting. If members of the committee are unable to pay for their own travel, the committee would take care of their travel expenses. A central location, such as Minneapolis, could be used as the meeting site.

The committee should have 12 to 14 members, with the editors of the journals servings as ex-officio members. The chair would be in addition to that number. Vice-chair would be appointed the year prior to taking the chair and would assist the chair in the management of the committee. Committee appointments would be for three years with four members rotating off each year. Initially, we would have to appoint members for one, two, or three years. Each interest group within the Association will have representation on the committee. The chair of the committee will be selected from the committee membership and may serve a fourth year in that capacity. The president of the Association will be responsible for committee appointments and for selection of the vice-chair and chair each year.

I believe the development of a Program Advisory Committee would be an exciting opportunity for members to serve the Association and it would have a significant impact on the quality of the program for the annual meeting. Your consideration of the proposal is appreciated.
Respectfully submitted,
Edmund A. Zottola, Chairman

Committee on Communicable Diseases Affecting Man

Ten-thousand copies of the fourth edition of "Procedures to Investigate Foodborne Illness" have been sold, and a second printing was demanded. Prior to the printing parts of the manual were updated and revised. Specifically, two of the forms on statistical procedures were realigned and enlarged. The listing of foodborne diseases was updated and other minor corrections were made throughout the manual. The new printing is denoted by the insertion of (Revised & Updated - 1988) on the cover. The manual is being translated to French and Italian for use in Canada and Italy. The manual remains the bargain of the decade for only \$3.50. Everyone working in a food safety program or teaching the subject should have and use a copy.

The Committee is currently engaged in developing a manual on the hazard analysis critical control point approach, which is a timely subject and if used it should substantially reduce risks of foodborne diseases. This approach is applicable for all food products at any and all levels of the food chain. It consists of identifying hazards and assessing their severity and risks (probability of occurrence), determining critical control points, establishing preventive and control measures and specifying criteria for control, monitoring critical control points, and taking immediate action when results of monitoring indicate that the criteria are not met.

Persons presently engaged in this activity are: Frank L. Bryan, Charles A. Bartleson, K.J. Baker, O.D. Cook, Perry Fisher, John J. Guzewish, Keith H. Lewis, Richard C. Swanson, Ewen

C.D. Todd, Paul Venugopal and Robert B. Gravani.
Respectfully submitted,
Frank L. Bryan

Long-Range Planning Committee

Present: M. Wehr, J. Kozak, L. Roth and D. Welde. Regrets: S. Hibberd, E. Marth, G. Much, M. Wagner and K. Hathaway. Guests: L. Townsend, B. Gravani, R. Case, B. Sanders, R. Ginn, D. Gabis and M. Marble.

The long-range planning committee (LRPC) met with members of the IAMFES Board of Directors to discuss the recommendations of the long-range planning committee developed during its February 18 and 19, 1988, meeting in Ames, Iowa. The discussion clarified and delineated those items thought by the board to be appropriate elements of the long-range plan. Major discussion points in the review of the recommendations were as follows: Note: A long-range plan has been formulated from the results of the February and July meetings. Aspects of this plan may require further discussion and action. The Board of Directors may elect for the long-range planning to address these items or the board itself may assign them to other committees of the association.

Association Objectives

Need to clarify the narrowing of the term "environment". Discussion indicated that the desire for this term to relate to environmental issues related to the food and dairy field, including processing plant operations. The intent is not to broaden the term to include the "pure" environmental issues of soil, air and water quality per se. It was the thought of the committee that the association should review its role in the environmental area and focus its attention on those aspects that it has the most expertise in and are not currently better handled by other organizations.

Membership

Need to clarify the role of the membership committee, recognizing that the executive manager and staff

implement the membership development program. The concept was recommended that the membership committee could prepare a proposed telemarketing information for use by staff when contacting potential members. Additionally, coordinate meeting symposia/technical sessions with the need of targeted membership development groups and use this as a sales tool.

Publications

Discussion occurred on the need for an alert publication. Initial thinking by members of the Board of Directors indicated a lack of support for this concept; however, final thinking during this meeting was to keep this item in the plan since similar items by other organizations either do not quite meet the needs of IAMFES or are not sufficiently timely.

The following items were items to be looked into:

Annual Meeting

1. Recognize the importance of maintaining a high quality, high interest technical program content as has been developed over the past three years.
2. Establish a mechanism to ensure high quality programs. Recommend establishing a formal program committee to develop program content. Committee to be chaired by the president-elect with membership to include IAMFES staff, host local affiliate (if applicable), and representatives from the milk, food and environmental areas.
3. Retain program flexibility to add late breaking symposia topics to ensure high meeting attendance. Suggest reserve holding one symposium session time open for this purpose.
4. Increase staff involvement in annual meeting planning. Establish position of professional convention/conference coordinator within staff (suggest at the moment utilizing existing staff with training as necessary). Duties of the position would include site planning, meeting publicity, handling pre-meeting registration, site management during meeting.

5. Recommend national office handle pre-meeting registration.
6. Recommend continuance of local affiliate involvement when appropriate (see below), but decrease meeting planning and registration role to ensure a professional handling of these meetings areas (see 2, 4 below). Affiliates would handle registration activities on site, audio visual activities on site, companion programs, hospitality and related activities.
7. Exhibits - policy satisfactory as is and should be continued.
8. Reception, banquet, award presentation, committee reports - satisfactory as is and should be continued.
9. Pre/post-meeting short course - recommend considerations. If implemented, establish short course committee to carry out.
10. Meeting length - satisfactory as established for 1988.
11. Reimbursement for speakers. Recommend payment for speakers, as necessary, for success of meeting. Payment to be obtained from general revenue sources (registrations, exhibits, sustaining membership sources, etc.) and not from specific sponsorships.
12. Site selection - site selection should be controlled from the Executive Board/staff level rather than from affiliate organizations. Primary criteria for site selection should be attractiveness/interest to meeting attendees. Secondary criteria should be availability of local affiliate to host. Nearest affiliate (even if not actual local) could serve as host.

Officers and Executive Committee

1. Recommend retain executive board size as present.
2. Recommend eliminating secretary's position and converting position to a "junior board member". Transfer secretarial duties to staff. Staff can adequately handle, is an appropriate function, and should expedite preparation of minutes.
 - a. Retain succession of junior board member to president.
 - b. Assign to the president duties of executive manager (Re: Ar-

ticle 2, Section 4 of bylaws). This assignment is more appropriate for the president (as opposed to the current secretary) if the executive director position is temporarily vacated.

3. Remove requirement in Article 4, Section 2 of the Constitution, stating that a majority of the executive board shall be comprised at all times of members who are officially connected with government or academia. Replace with a statement that says that government, education and industry must be presented on the executive board. Retain concept that this mix must be maintained if employment status of executive board member changes.

Affiliate Organizations

Need to enhance communications between IAMFES and the affiliates noted. Especially noted was the need to have officers of IAMFES visit affiliates. The concept of affiliates versus regional sections was discussed. Affiliates are viewed as more independent groups with regional sections more closely tied to the parent organization. IAMFES should consider what they want out of associated groups and consider a move toward regional sections if a closer tie is desired.

Budget/Finance

1. Recommend establishment of budget/finance committee to provide stronger advisory base for the association in areas of budget, investment and accounting.
2. Establish a reserve fund with a goal of obtaining an operating reserve equal to one year's operating budget.
3. Long-range planning committee expressed concerns over the following areas:
 - a. Chronic over-expenditure - 1986, 1987, 1988 (proposed).
 - b. Actual annual meeting net income appears low.
 - c. Actual advertising net income appears low.
 - d. Lack of professional accountant on staff.

The committee expressed serious concern over the lack of adequate budgeting and accounting controls

leading to a lack of clear knowledge of the exact financial situation of the association, exacerbating the deficit situation. This is a key area for attention.

Relationship to Other Organizations and 3/A Standards Council

1. There appears to exist significant potential for co-sponsorship of activities with other North American and international organizations, including other professional scientific organizations as well as trade organizations. Co-sponsorship of such activities as training courses, publications and the like are appropriate and should be pursued.
2. Involvement with the politically-related organizations or political activity appears generally inappropriate, although potential for association with the Council on Agricultural Science and Technology (CAST) may be helpful. CAST prepares position papers for and responds to requests for technical assistance from federal and state legislative bodies.
3. Liaison to the professional scientific societies to the use of specific individuals assigned as liaisons does not appear to be a particularly effective process.

Based on the recommendations of the February 18, 1988, LRPC meeting, and this meeting, a draft long-range plan was developed. Many of the items in the long-range plan will require additional consideration by the Board of Directors or committees within the association. Some of these items the Board of Directors may wish to assign to a continuing long-range planning committee or submit to other committees of the association for action. The board may wish to discontinue the long-range planning committee at this time following completion of its activity to develop a long-range plan and reestablish it at some date in the future when additional review of the association's activities is appropriate. The LRPC met twice during 1988.

Respectfully submitted,
Michael Wehr, Chairperson

Food Service Sanitation Committee

PURPOSE: To assist the sanitarian and food service operator to effectively address food safety involving the service and sanitation issues to protect the customer's health.

Accomplishments - This new committee of one year has...

1. Formed a sub-committee of interested individuals to improve the food safety in "temporary" food service establishments. Goals are: (A) To develop practical guidelines to assist the sanitarian in managing the environmental health problems associated with temporary food service establishments. (B) To develop for distribution by the sanitarian to food service operators a series of guidelines to assist them to plan and safely conduct the temporary food service activity. Designed sub-committee chairman, Charles Otto.
2. Proposed a resolution on the prevention values of single service to the resolutions committee. This is a 1988 revision of an IAMFES resolution dated August 13, 1975. In addition we would like to have individuals either in landfill or waste minimization entities in next year's meeting as this is a growing national concern.
3. Targeted a potential need to explore the areas of distribution and transportation of foods as a means to assuring the safety of foods to the user at the food service outlet.

The committee has discussed a number of potential sources of information and will be soliciting through various journals, reports, and a mail campaign to both regulatory agencies and industry associations for copies of rules, brochures, and other educational materials that can improve food safety through food service sanitation.

Committee members: Larry Eils,

Charles Felix, Larry Hayes, Charles Otto, Duain Shaw, Wayne Helms, and Bennett Armstrong.

Respectfully submitted,
Bennett H. Armstrong, Chairperson

Affiliate Council

July 31, 1988, Tampa, Florida

Chairperson, Bill Coleman, Minnesota, called the meeting to order at 12:30 p.m. Eighteen of 27 affiliates were represented. Also present were members of the IAMFES Executive Board, Ames Office personnel and guests.

Minutes from the 1987 Affiliate Council meeting were approved as distributed.

Executive Board Report

Leon Townsend: President

Leon explained that may Affiliates collect their yearly dues at their annual meeting, which does not occur at a uniform time with all Affiliates. Consequently, the IAMFES office has had a recurring problem of having to mail out backissues. Therefore, to eliminate this problem the IAMFES office will discontinue operating on a calendar year and will be flexible and work with the affiliates. The mailing label on the journal will show when the individual's membership expires.

Affiliates membership has reversed the downward trend and increased this years.

Shogren Award will be given this year.

Bill Coleman represented the Affiliate Council at all Executive Board meetings and participated in the decision making process.

Bob Gravani: Program Chairman and President-Elect was introduced.

Kathy Hathaway emphasized that she was confident the new 12 month membership would be successful.

Old Business

None

New Business

1. Bill Coleman further explained how

the membership renewal plan will operate. Dues notices will be sent out with a December 31 renewal deadline. Those who renew after the deadline will have their membership run from the time is renewed, for example, January to January, etc. The IAMFES will return affiliate dues every two months as they are collected.

2. Several affiliate representatives asked if the IAMFES office could prepare membership renewal forms that showed the affiliate dues in bold print. Too often the affiliate dues are overlooked and the members end up being dropped from the affiliate membership list.
3. Nebraska and Alabama are new affiliates.
4. Question was raised concerning who in the affiliates received information concerning the Affiliate Council meeting. IAMFES sends information to both the affiliate president and the affiliate representative. Affiliates need to keep the IAMFES office up-to-date on officer names and who should receive the information.
5. At the 1987 annual meeting the Constitution and By-Laws were changed (Article 4, Section 4). Whenever Affiliates fail to maintain at least ten International members for two years, the Council is required to determine if the affiliate charter should be revoked.

Several Affiliates have not maintained ten International members. These were: Connecticut, seven; Mississippi, two; Idaho, zero; Wyoming, seven; South Dakota; seven; Kansas, six.

Affiliate representatives from South Dakota and Kansas were surprised because their records show membership at ten or more. Discussion led to the following motion by Sid Barnard: A letter from either the Affiliate Council President or IAMFES office will be sent to persons with state regulatory agencies. IAMFES members at education institution and at least someone other than the person receiving the annual affiliate report with number of members, names and ad

dresses. A letter should also be sent to all affiliate members who are also members of the International. Motion passed.

An amendment to the motion was made: IAMFES office will notify all members in those states with less than ten members, plus the president of the Affiliate, that they need at least ten members to retain their charter. Amendment passed.

Jim Steele would like to receive, at least once a year, a summary of names and number of International members. Several other representatives also expressed an interest in receiving a summary.

6. Audio-Visual Library - Sid Barnard reviewed the current status of the AV library.
 - a. Eight sets of slides with explanation tapes are available.
 - b. Ten video tapes are available. These have been used 72 times and 32 requests are on the waiting list. These have been available for only seven months.
 - c. List of materials available can be picked up at the IAMFES exhibit table.
 - d. The AV materials are available for meetings. Explanation script may not be appropriate for plant training and classes.
 - e. Please return promptly after meetings and comments about materials. Duplicate copies will be made available of those materials that have a backlog of requests.
 - f. Tapes of selected symposia at annual meeting will be made available.

Election of Officers of Affiliate Council for 1989

Bill Coleman was elected president.

Lloyd Luedecke was elected secretary.

Affiliate Reports

Pennsylvania - Linda Knotwell, President of the Pennsylvania Dairy Sanitarians and Dairy Laboratory Analysts

Association. Recent merger (May 1987) resulted in 275 members and about 75 belong to the International. Stronger organization resulted. Annual meeting was held in May at Penn State. Provide two \$500 scholarships for food science students and hope to have three next year. Not much contact with students to encourage them to join IAMFES. Several committees are utilized to help involve members. Publish newsletter.

Ontario - Mike Brodsky. Currently have about 160 members. Turnover of officers has resulted in a lack of continuity with IAMFES office. President usually attends IAMFES annual meeting. Established a board of directors to provide some continuity. Offer three scholarships, one is a \$1,000 award, two \$200 awards. Encourage students to become members of the Affiliate by making memberships available for \$2.00. Spring workshop run for three days on HACCP. Over 75 attended and the fee was \$300 per person. This helped to increase membership to 160 which is almost double from last year. Annual meeting will be held in Toronto in conjunction with Food and Beverage Exposition. Theme is on "Right to Know".

Texas - Janie Park. Currently have about 300 members. Affiliate has been responsible for developing a pasteurization short course that utilizes programmable equipment to provide "hands-on" training. Short courses have been successful and over 350 have gone through the training program. Information about IAMFES is handed out at the short course and this has helped to increase membership. Plans are to start offering scholarships. Annual meeting was attended by 275 and included a "hands-on" laboratory training session. Also have table exhibits at the annual meeting.

Kentucky - Dale Marcum. Publish a newsletter twice a year and send out about 500 copies with a membership form for the Affiliate and the International. Currently have 21 International members. State is divided into seven

regions and for each 25 members if a region, a director is elected. Directors are encouraged to seek new members and if they are not actively participating, a new director is elected. One \$500 scholarship is provided, but support and funds are short for the fund. Industry support has been lacking. Tried a raffle to raise money, but they lost money. To be successful, the merchandise must be denoted for the raffle. Annual conference has a \$25.00 fee for the two days. Most environmentalists have not jointed, but efforts are being made to bring them into the Affiliate.

Tennessee - Ruth Fuqua. About 83-87 members. Plan to do more student contact to attract them to the Affiliate and International. Utilize an education session that travels to different areas of the state. Annual meeting is held in May.

Illinois - Terry Mitchell. Plan to utilize the tapes from the International meeting to emphasize the importance of the International. Students are becoming involved because the spring meeting is held with the Dairy Tech Association. Reduced membership fee to students, Spring meeting included speakers on controversial topics. This helped to stimulate interest. Will hope the 1990 International meeting. Have about 50 members.

New York - Joe Davidson replace David Bandler. No report available.

Alberta - Jim Steele. Have had a decrease in membership. Having three meetings a year may have been too much, so only two meetings will be held in the future. Have fewer, but better meetings. Spring workshop was primarily for the environmentalists and selection of landfill sites. Annual meeting will pertain to packaging and irradiated foods. Joint sponsor of a scholarship to a food science student. Loss in membership may be due to problems in membership billings. Attempts are being made to increase membership. Tried using a brochure to promote IAMFES, but response has been "luke-warm".

Michigan - Angela Traser. No report available.

Indiana - Helen Uhlman. A \$10.00 annual membership fee plus a \$5.00 penalty fee if more than one month late. Have a \$10,000 trust fund for scholarships. Contact universities and colleges and invite students to attend meetings and do not charge them. Education conference in September.

Florida - Ron Schmidt. Usually have a spring education conference. This will probably be a joint meeting with NEHA next year. Scholarships are provided to the University of Florida. Need to increase student participation.

Kansas - Don Bechtel. Currently have 138 affiliate members and growing. Will host the 1989 meeting. Difficult to obtain travel funds to attend Affiliate annual meeting and to send a representative to the International meeting. Have not had much contact with students. A scholarship will be offered next year.

Respectfully submitted,
Bill Coleman



Past Presidents' Dinner



Doug Marshall at the Presidents' Reception



Wine and Cheese at the Early Bird Reception

Executive Managers Report

by K. R. Hathaway

Welcome to the 75th Annual Meeting of IAMFES. In preparation for the meeting the Ames office compiled photos throughout the history of IAMFES which are on display by the registration desk. Many photos were photo copied from past journals and in doing so we found some interesting historical facts on IAMFES that I would like to share with you.

In 1912 when the Association was founded there were 35 members. It wasn't until 1941 when membership surpassed 1000. Members were in 43 states and 7 foreign countries. Today there are 4518 members and subscribers.

The JOURNAL OF FOOD PROTECTION, began in March of 1938 as the JOURNAL OF MILK TECHNOLOGY with a circulation of 328. Today's circulation of the JOURNAL OF FOOD PROTECTION is 3366. The JOURNAL story is interesting. Previous to its origination, a REPORT series was published which were the papers reprinted from the Annual Meeting. There were sold at \$5 each, the same as the dues of the members. In 1931 Bill Palmer suggested the idea of the journal. The idea went to special committee. After several years of trying to "sell" the Association on the idea, they took the initiative and went ahead on their own. Palmer took a batch of them to the Louisville meeting in 1937. The association authorized its adoption and by 1938, with 350 circulation, the journal was operating in the black.

DAIRY AND FOOD SANITATION was first published at the request of the affiliates in 1980 with total circulation now at 3468.

The first Annual Meeting was held in October 1912 in Milwaukee (because of the Annual meeting cancellation, 1988 is the 75th Anniversary). Total income in 1912 derived from membership dues was \$70. Expenditures were \$68.26 leaving a cash balance of \$1.74 for the infant association.

This year many projections and

goals were met. A gross gain of 844 was achieved, with a net increase of 500.

Sustaining Memberships are presently at 80.

Procedures to Investigate Foodborne Illness, 4th Edition needed to be re-ordered after selling 10,000 copies of the 4th edition.

3-A Standards remain strong with a healthy increase in sales.

Members and subscribers will not see an increase in dues and subscriptions this year. Due to the postage increase however, foreign postage charges for journals were increased from \$10-12 which almost covers the postage cost to most countries.

The financial picture is also good with monies in reserve. Ideally, enough monies in reserve to carry the association for one year if needed is something we continue to build. We have been and continue to be solvent, remaining in the black again this year. Copies of the June financial statement are available to members upon request for specific details.

52 exhibits are featured this year. Many exhibitors are returning from last year as well as new exhibitors, many of which are Sustaining Members. Each Sustaining Member's table top exhibit is marked to denote their Sustaining Membership support. We appreciate the confidence the exhibitors have placed in us and feel positive that they will feel this meeting was productive for them. I encourage each of you to visit each exhibitor and learn about their product or service. Visit each exhibitor and return your exhibitor list blue sheet completed to the IAMFES exhibit for special prizes to be awarded during the Awards Banquet Wednesday night.

Recently a FAX machine was added after numerous requests this past year. In the short few months we have had it, it certainly has saved in overnight delivery charges for both the association and those people sending to us as well.

Overall, each year there continues to be stronger support from the membership affiliate, advertisers, exhibitors, Sustaining Members with an overall positive thrust towards con-

tinuing to climb to obtain the goals we are all reaching for. With good leadership from your Executive Board, a strong program yearly, your enthusiasms and ideas, the IAMFES Committees and your Ames staff . . . we'll continue to grow. See you at the Hyatt Regency Crown Center in Kansas City next year - August 13-17.

We'd like to give special thanks to the following people: Local Arrangements, The Ames Office, The IAMFES Board and The Program Committee.



A Collection of Pictures of Past IAMFES Meetings



Early Bird Reception



Gathering before the Awards Banquet

IAMFES Awards Presented . . .



Kirmon Smith receives the Sanitarians Award sponsored by Klenzade Division of Ecolabs, Diversey Wyandotte and H. B. Fuller.

Sanitarian's Award Presented to Kirmon Smith

The 1988 Sanitarian's Award consisting of a plaque and a \$1,000 check from the sponsors; Klenzade Division of Ecolabs, Diversey Wyandotte and H.B. Fuller, Co., was presented to Kirmon Smith of the Division of Milk and Dairy Production, Texas Department of Health.

Kirmon, who is a native born Texan, is a 1966 graduate of Texas A&M University in Animal Science. After two years in the family run Agriculture Transportation business, he was employed in 1968 by the Texas Health Department as a milk sanitarian. In 1977 he was promoted to Chief Sanitarian, and in 1978 he was appointed Chief, Milk Sanitation Surveillance Officer. In 1980 he was selected to be Director of the Division of Milk and Dairy Products, a position he currently holds.

Kirmon is an active member and participant in the National Conference on Interstate Milk Shipment. He serves as the Voting Delegate from Texas, on several committees and was Chairman of Council III since 1984. He was elected to its Executive Board for a 6 year term in 1985. A long time member of the board of the Texas affiliate of IAMFES. His leadership was influential in establishing and carrying out the basic and advanced

pasteurization training courses jointly sponsored by the Texas affiliate and the Texas Department of Health.

As director of the Milk and Dairy Products Division his contributions have been many. Some of the more notable contributions are:

1. Implementation of a uniform milk sanitation program on a statewide basis when the state legislature moved all milk sanitation operations from city/county control to a statewide program within the State Health Department.
2. Implementation of a uniform frozen dessert sanitation program.
3. Developed an effective automated data processing system for enforcement and regulation of milk and milk products plants and farms.
4. Implemented statewide uniform sediment testing program.
5. Developed and implemented statewide programs for testing for pathogenic bacteria in pasteurized dairy products and aflatoxin in raw milk for pasteurization.

In 1986, he was presented with the Dallas/Fort Worth Dairy Technological Society's Distinguished Service Award. He has long been active in charitable organization activities including the Alzar Shrine Temple, the Masonic Blue Lodge, Church, PTA and 4-H Club activities.

Kirmon and his wife Inez are proud parents of two sons, Kenneth and Michael. The family resides at their ranch in Dripping Springs, Texas.

The 1988 Ivan Parkin Lecture

This year we are privileged to honor another outstanding scientist who has dedicated his professional career to food protection.

Let me tell you about this outstanding individual.

Professor Edwin "Mike" Foster was born on New Year's Day many years ago in the great state of Texas. He grew up on a farm in East Texas. He was graduated from North Texas State College with a B.A. degree in biology. He then received both an M.A. and Ph.D. degree from the University of Wisconsin.

He taught bacteriology at the University of Texas before going into the U.S. Army. After returning from service, he became an Assistant Professor of Bacteriology at the University of Wisconsin.

He has had a long and distinguished academic career at Wisconsin and rose through the professional ranks.

During his tenure, Professor Foster studied the bacteriology of cheese, meat, silage and the dairy cow rumen. He is internationally recognized for his expertise in food borne disease, particularly botulism and salmonella, and has had a long-term interest in food microbiology and public health.

Mike is currently an emeritus professor of food microbiology and toxicology at the University of Wisconsin and was the director of the university's Food Research Institute from 1966 until his retirement last year.

He has been an active member of several professional and scientific societies.

Professor Foster has served on numerous committees and boards for the National Academy of Sciences-National Research Council, the U.S. Food and Drug Administration, the U.S. Department of Agriculture, the World Health Organization and other groups. He also served as president of the American Society for Microbiology and

the American Academy of Microbiology and has been a long time IAMFES member.

He has also received many awards recognizing his outstanding contribution to the field of food microbiology. Some of these include:

- The Nicholas Appert Award--Institute of Food Technologists
- The Pasteur Award--Illinois Society for Micro
- The W.O. Atwater Lecture--United States Department of Agriculture
- The Carl R. Fellers Award--Institute of Food Technologists
- Distinguished Fellow of the Toxicology Forum

Tonight we are pleased to honor Professor E.M. Foster who will present the 1988 Ivan Parkin Lecture entitled:

"A Half Century of Food Microbiology--and a Glimpse at the Years Head!"

The 1988 IAMFES Educator Award Presentation

Dr. Edmund A. Zottola

The recipient of the 1988 IAMFES Educator Award was born in Gilroy, California into a food processing family. His family owned and operated several successful cheese manufacturing plants and as a young lad, he worked in and around these facilities.

At the tender age of 8, he moved to Oregon where the family continued to operate several cheese plants.

All of this exposure to the dairy and food industry stimulated our award winner to pursue an education in dairy and food science.

He received his B.S. Degree in Dairy Technology from Oregon State University. Our educator then became a research assistant at Oregon State and received his M.S. degree.

He travelled eastward to St. Paul, Minnesota and became a research fellow in the Department of Dairy Industries at the University of Minnesota. He was a laboratory supervisor, instructor, evaluated thermal processes



IAMFES Past Presidents

and did research in food microbiology.

After receiving his Ph.D., he went to work as a research bacteriologist at Kraft Company in Chicago.

After some additional food industry experience, he became an assistant professor and extension food microbiologist in the Department of Dairy Industries at the University of Minnesota.

He has risen through the professional ranks and is now Professor of

Food Microbiology in the Department of Food Science and Nutrition.

Our recipient excels in all three areas of responsibility at the university.

His many accomplishments and achievements are due to his keen knowledge of:

- the principles of food science,
- the practical understanding of food industry practices,
- his outstanding leadership and communication skills.



Dr. Edmund Zottola receives the Educator Award which is sponsored by the Milking Machine Mfg. Council of the Farm and Industrial Equipment Institute.

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 in Minneapolis. This year five students were honored at the annual meeting in Tampa for the papers they presented. The students and the awards they received were as follows: 1st Place, A. A. Airoidi, University of Minnesota, St. Paul, MN, \$500 and a plaque; 2nd Place, Stephen Ingham, Cornell University, Ithaca, NY, \$200 and a certificate; 3rd Place, Douglas Marshall, University of Florida, Gainesville, FL, \$100 and a certificate; 4th Place, B. J. Overdahl, University of Minnesota, St. Paul, MN, \$50 and a certificate; 5th Place, P. K. Cassidy, University of Georgia, Athens, GA, \$50 plus a certificate. This award is made possible through the IAMFES Foundation Fund.

Eligible graduate students are encouraged to enter the competition and present papers at the 1989 annual meeting in Kansas City. 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. 581 for details).

Certificate of Merit

The Certificate of Merit Award is presented to those affiliate members who are active within their state/province affiliate group and IAMFES. This year the award was presented to Albert Bowers of Middleton, WI and Sonya Gambrel of Orlando, FL.



Sonya Gambrel receives the Certificate of Merit from Roy Ginn.



Developing Scientist Award Winners (l to r) A. A. Airoidi, Doug Marshall, B. J. Overdahl and P. K. Cassidy.



Samuel J. Crumbine Award presented by Charles Felix.



Membership Achievement Award presented to Florida Affiliate.

Membership Achievement Award

The Membership Achievement Award is presented yearly to the affiliate with the largest increase of IAMFES members. That award was presented this year to the Florida Association of Milk, Food and Environmental Sanitarians, Inc.

Harold Barnum Industry Award

The Harold Barnum Industry Award is presented to an individual who through their work has forwarded the goals of IAMFES. The 1988 recipient of this award is an industry person who is best known as an educator. He is not associated with any university but is quite involved in helping others learn better ways of managing milk supplies, controlling mastitis, sanitation and general milk quality. He routinely makes presentations on any or all of these subjects to groups of sanitarians, educators, farmers and dairy plant representatives throughout the world. He is at his best on a one-to-one situation on a farm helping a producer with specific problems. His group presentations and on farm calls are made in the spirit of improving the industry rather than as a sales representative for a specific company.

As a long term member and officer of the Wisconsin Association of Milk and Food Sanitarians, he has helped strengthen committees and improve the quality of their programs. He is an enthusiastic active IAMFES member and has worked on association committees to improve milk quality.

The recipient has served thirty-five years on his local town board and has been very active in boat safety. In addition to all his other activities, he also holds a second job. He says of this job - he is never wrong and always trying to improve. He is a baseball umpire and has umpired high school through major league games.

The 1988 recipient of the Harold Barnum Industry Award is Kenneth Kirby of Edgerton, Wisconsin, a farm specialist with Henkel Corporation.

Citation Award

The Citation Award this year was presented to Dr. Carl Vanderzant of College Station, TX, for many years devotion to the ideals and objectives of the association. Vanderzant was presented with a plaque.



(L) Kenneth Kirby receives Harold Barnum Award which is presented and sponsored by NASCO.



Paul J. Pace of Milwaukee, WI receives the Honorary Life Membership.



The Citation Award was presented to Dr. Carl Vanderzant of College Station, TX, for many years devotion to the ideals and objectives of the association. Vanderzant was presented with a plaque.

Honorary Life Membership

Honorary Life Membership was presented to two individuals this year, which entitles them to life membership with IAMFES including the JOURNAL OF FOOD PROTECTION and DAIRY AND FOOD SANITATION, and a plaque. Kenneth W. Whaley of Hermitage, TN and Paul J. Pace of Milwaukee, WI were the recipients.



Kenneth Whaley of Hermitage, TN receives the Honorary Life Membership.

. . . next year come & see

The Best of Kansas City

by

Rebecca Christian

When visitors come to my town, they often put a new twist on the clinched response to New York: It's a nice place to visit, and they would want to live here.

That's Kansas City: clean, safe, and inviting. The stockyard smell is long gone (though an inferiority complex about the city's cowtown reputation lingers on) and the visitors bureau brags that we have more boulevard miles than Paris and enough fountains to rival Rome's. Proof lies along the curving, leafy parkways where plump bronze cherubim cavort and sensuous bronze mermaids spew forth arches of spray.

All aspirations to European elegance aside, we serve up some pretty mean baseball and barbecue, too. And, tanks to our jazz heritage, most visitors hit Kansas City International Airport humming, "Goin' to Kansas City, Kansas City here I come."

Yet despite our colorful history and considerable size - 1.5 million people live within its sprawling 316 square miles - confusion remains about where and what we are. Is Kansas City just an overgrown small town or a sophisticated city?

To me, it's a little of both. It's said that author Frank Baum had Kansas City in mind when he wrote the Oz stories. Visitors understand why when they see Kansas City's skyline of steel and reflective glass rising like a vision from the fields.

The hub of a seven-county area, this two-state railway and industrial metroplex lies at the heart of the country's geographic and population centers. With St. Louis, it was one of

the original "gateways to the West"; in the last three decades it has become a destination in itself. A state line bisects the metro area into two Kansas Cities, the large one is Missouri and the other, with its burgeoning corporate settlements, in Kansas.

To get their bearings, many visitors start with a bird's-eye view from Lewis and Clark Point, a panoramic overlook on the northern edge of downtown. From this wide bend in the river, the city skyline stretches to the south and the deep brown Missouri bends lazily eastward. When night falls, a paddle-wheeler cruises the waters, its triple decks lit up like a layered birthday cake. Groups frequently reserve the Missouri Queen for floating meals and receptions.

One the west bottoms lies Kemper Arena, a setting for sports events and concerts that looks as if it were constructed from sparkling giant white Legos and jumbo tinker toys. It's here that the mammoth American Royal, at 90 years old one of the world's longest-running livestock, rodeo and horse shows, is held for three weeks in November, the only time we celebrate our cowtown origins.

South of downtown lies Crown Center, a luxurious complex of shops, restaurants and hotels that functions as a "city within a city." Still farther south is my favorite area, elegant Country Club Plaza, a 14-block outdoor shopping district modeled after Seville, Spain (see sidebar). A bright red trolley links downtown with these two premiere sightseeing areas for a \$2 fee fare that includes two reboarding passes good at numerous stops.

Down the hill a few blocks from Lewis and Clark Point is the old Garment District where, when the wind is right, the smell of fresh-roasted coffee from the Folgers plant fills the air. Here old buildings with fierce gargoyles and curlicued cornices have been converted into condos and lofts.

Nearby is Quality Hill, where restored 19th-century showpieces and new townhouses hug the hills. My kids always get a kick out of driving by the one-time headquarters of the American Hereford Association to see the giant cow perched on top. Legend has it that when the monument was built, neither Kansas to the west nor Missouri to the east wanted the rear end positioned its way. The cow's considerable haunches point south instead.

I'm surprised that the visitors bureau hasn't added "as much live theater as London" to its Kansas City sales pitch, since there is always an extraordinary number of shows to see here. In addition to theaters scattered throughout the area, the downtown district includes the Folly Theater, a one-tie burlesque house; the Midland Center for the Performing Arts, featuring Broadway shows and concerts; the Lyric Theatre, home to the State Ballet of Missouri; the Kansas City Symphony; the all-in-English Lyric Opera, and the Kansas City Music Hall. Not far from downtown is the popular Starlight Theatre, an outdoor amphitheater in Swope Park, also home of the city zoo.

To me, though, the real stars of downtown are the restaurants. As *New Yorker* food writer and hometown boy

Calvin Trillin put it, "Not all the best restaurants in the world are in Kansas City—just the top four or five."

One of my favorites is the wonderful old Italian Gardens, a trattoria where the matronly waitresses fret if customers don't eat all their pasta. Kansas City people argue over barbecue as fervently as Milwaukee native do over beer. I wouldn't buy a used car from anyone who doesn't think that Arthur Bryant's at 17th and Brooklyn is the best. Here an order for the barbecued beef sandwich prompts a tattooed cook to smash a piece of white bread down on enough beef to feed a family of six and to hurl it over the formica counter with a grunt. Forget amenities when the food is this good.

For a polar opposite—and great seafood—I like the turn-of-the-century Savoy Grill with its dark wood paneling, whisper-quiet atmosphere and stained-glass windows that stretch from the floor to the 20-foot ceiling.

For the start to a perfect Saturday, try one of the big breakfasts at Cascone's, a sweatshirts-and-bluejeans place in the bustling City Market at 5th and Walnut. As customers gorge on hashbrowns, their pets can wander outside among produce stalls overflowing with broccoli and tomatoes, freshly picked. A familiar sight here are the long black habits of the Little Sisters of the Poor bobbing amidst the bright colors, as the nuns ask vendors for whatever they can spare. On Saturdays only, the market is included on the trolley circuit.

It always makes me a little sad to drive through the now-rundown area of 18th and Vine, where the Duke and Count Baise used to jam. What does remain, fortunately, is a hot pink bungalow at 18th and Highland. This modest frame house is a National Historic Landmark and home to the Mutual Musicians Foundation. Musicians still jam here on the weekends.

True blue jazz aficionados can step into the footprints of heroes like Mel Torme in the Jazz Walk in front of the Allis Plaza Hotel on 12th Street, to which Scott Joplin paid tribute in "12th Street Rag." The Barney Allis Plaza across the street is a lovely setting for receptions. On St. Patrick's Day,

celebrated here with one of the country's largest parades, its pretty waterfall flows green.

My favorite spot for jazz is the City Light, a restaurant with its own orchestra, which has an inimitable smoky, sexy sound. In September, the Kansas City Jazz Festival fills Volker Park, just south of the Nelson Atkins Museum, with the sounds of national performers playing KC-style jazz-heavy on background riffs with a lot of sax.

Don't stop on the steps of the Nelson, through. Inside this impressive columnae building is one of the country's finest exhibits of Oriental art. If the Chinese Temple Room doesn't induce a state of bliss, try the excellent buffet at the Rozelle court, a Renaissance-style courtyard at the museum's core.

One odd and little-known spot is "the caves" on West 31st Street. These are underground storage docks that one friend likened to the tunnel world on the television show "Beauty and the Beast." Underneath the city traffic, these quiet and eerily pretty caves are used to both storage and office space. A few imaginative meeting planners have held receptions amid the white limestone pillars.

Crown Center

Just a ten-minute drive from downtown is one of the city's proudest attractions, Crown Center, a huge, glitzy complex still undergoing development. This 85-acre urban community is Hallmark Cards' \$500 million gift to the city. It seems that whenever something good happens here—like the new Henry Moore sculpture garden at the Nelson—the Hall family is behind it.

The real challenge in visiting Crown Center is deciding where to begin, since it features an office and residential community, luxury hotels, a retail center with more than 70 one-of-a-kind shops and restaurants, a six-theater cinema, a live theater and a children's theater.

My favorite hangout is the center's landscaped central square and outdoor cafe, where free concerts by big-name performers draw throngs in

summer, and skaters twirl on the ice terrace in winter. And I always celebrate by birthday with a big piece of chocolate whiskey cake at the very good and very expensive American Restaurant, where I can watch the tip of the Kansas City Power and Light Building light up the night with a mesmerizing glow.

First-time visitors generally greet the lobby in the Westin Crown Center with oohs and ahs. Terraced into a rocky hillside at street level, it features a lush tropical garden with a 60-foot waterfall. Its L-shaped guest tower reaches 15 stories high above the hill. The Westin's sibling rival is the \$50-million Hyatt Regency-Kansas City, vying for attention with its own 40-story guest tower and 60-foot lobby. Also newly restored, the Hyatt has three levels of meeting and recreation facilities, two lounges, and three restaurants.

To me, though, the high point of Crown Center is Hallmark Visitors Center, where visitors can follow a glass-enclosed timeline of Americana from 1910 to today. Every time I look at it, I see something new, whether it's a newspaper headline from the Wall Street crash, or one of the silly paper dresses of the '60s. Kids walk away from Kaleidoscope, a free art workshop for children, with excited voices and a big bag of surprisingly grown-up projects.

Not many visitors find out about the small but stunning art collection in the lobby of Hallmark headquarters across the street. Here, big black-and-white photos of artists, from a pensive-looking Picasso to a contented Grandma Moses in lace cuffs, hand next to examples of their work.

About a 15-minute drive from Crown Center is brassy Westport. Once a wild and woolly outfitting point for the Santa Fe, California and Oregon trails, Westport has the city's oldest buildings and nightlife that rivals the days when liquor flowed in crude wooden buildings and cowboys brawled on muddy trails.

On weekends, the crowds are big enough to stop traffic. With its trendy new Manor Square complex of shops and eateries in an old bread company,

its comedy clubs and roof-top bars, Westport is the young, fun place to see. Here the trendsetters sport cocktail hairdos and earrings from plastic facsimiles of the Eiffel Tower.

The courtyard in back of the Prospect Restaurant may be the prettiest place in town to have a drink. But don't miss Kelly's, with its sloping wooden floors. It's the oldest building in Kansas City, and visitors who sample the vast selection of beer here can easily imagine themselves in a frontier town. Fuzzy's Sports Bar and Grill in Westport is best sports bar in the city, full of pennants and autographed photos, not to mention ballplayers bellying up to the bar.

Those who would rather see the real thing than watch it on the giant screen at Fuzzy's go to the dual Harry S. Truman Sports Complex, home of Chiefs football and Royals baseball, not to mention NBA basketball's Kings, the NAIA and Big 8 basketball tournaments, Comets indoor soccer and NAIA track meets, all in Kemper Arena.

Much more awaits those who venture outside Kansas City proper. Longview Farm in nearby Lee's Summit is newly restored for meetings and parties, down to the Tiffany chandeliers in its horse arena. And McCormick Distillery in Weston, the oldest and smallest distillery in the

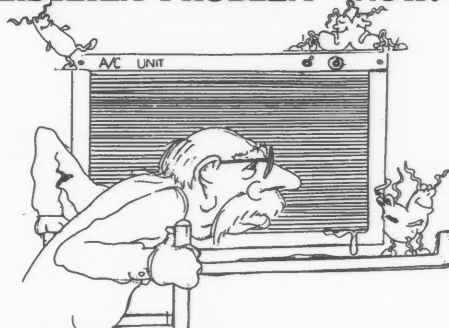
country, has been making whiskey that brings tears to visitor's eyes since before the Civil War.

My personal favorite is the humble Independence home of Harry Truman, where give-'em-hell Harry's coat and hat still hang on the tree in the hall. That Bess and Harry's tastes were simple is evidenced by the linoleum floor and formica table in a kitchen with the breathtakingly ugly color scheme of lime green and bright red.

I can see why Harry came back here to live out his remaining days. For both visitors and residents, Kansas City is a good place to come home to.

Reprint from Meeting Destinations/July 1988.

**IS "SINISTER LISTERIA" BUGGING
YOUR FOOD OPERATION???**
**IF SO - LET
CHEMLAND HELP SOLVE YOUR
LISTERIA PROBLEM - NOW!**



LISTERIA PROGRAM - NOW IN FORCE
MEETING THE NEEDS OF
THE FOOD PROCESSING INDUSTRY

CHEMLAND

CHEMLAND, INC.-1298 SOUTH WALNUT-P.O. BOX 2999-TURLOCK, CA 95381-TELEPHONE 209-668-4405

Tennessee Plant-1792 LATHAM STREET-P.O. BOX 161323-MEMPHIS, TN 38116-TELEPHONE 901-775-1010

Please circle No. 136 on your Reader Service Card



N.M.C.

NATIONAL MASTITIS COUNCIL

Follow These Recommendations When Predipping

Recently, there has been much progress in the area of premilking teat dipping. Studies show that predipping can control environmental mastitis and the practice is being widely used by dairy producers. The National Mastitis Council Teat Dip Residue Task Force was formed to address the question of milk residue from both pre- and post-teat dipping. Of particular concern to the committee is drainage of excess teat dip, when used premilking, into the milking unit.

Predipping does not necessarily mean that teat dip residue will be in the milk. When done properly, predipping can be of great importance to herd health while minimizing the risk of contaminating milk with teat dip residue.

Here are some tips for predipping:

1. Use only a teat dip which is listed with the Food and Drug Administration and has predipping instructions on the label. Information about a product can be obtained from the manufacturer, veterinarians, university personnel, and the National Mastitis Council.
2. Follow proper application procedures:
 - Preclean teats as necessary.
 - Forestrip (may be done before or after applying teat dip).
 - Apply teat dip. Allow for manufacturer's contact time.
 - Dry teats with single service paper towels.
 - Attach milking unit.

Milking predipped teats that have been properly dried has many benefits:

- * Reduces the possibility of residues in milk from surface drainage of excess teat dip.
- * Sanitizes the teat prior to milking.
- * Reduces environmental mastitis.
- * Minimizes liner slippage.

Proper drying of the teats is essential in maintaining the safety of our milk supply.

This article is one of a continuing series made available by the National Mastitis Council.

1840 Wilson Blvd.
Arlington, VA 22201
703-243-8268

CIP Systems

No Strings Attached

You want to be self sufficient. And when you need a CIP system, you want high quality and easy maintenance.

Custom Control Products Inc. develops CIP systems that meet your needs. All these systems feature commercially available, Solid state programmable controllers.

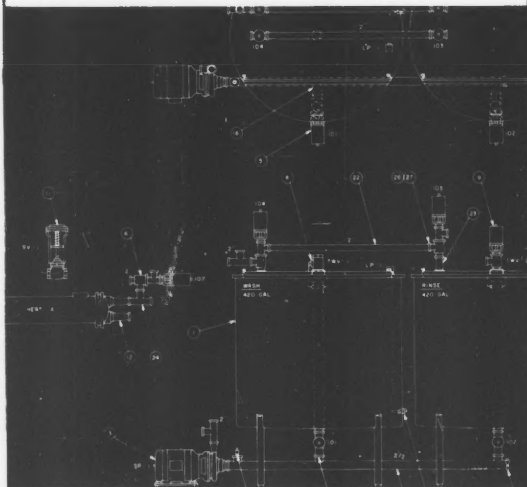
Custom Control Products Inc. believes your concerns are our concerns. Our staff of engineers is always available to answer simple questions or help you solve complex problems.

So don't get tripped up in the strings attached to home grown systems. Avoid equipment that is high in service calls and low in productivity. Call Custom Control Products for a system that is truly self sufficient.



Custom Control Products Inc.

Call us at 414 637 9225. We'll answer your questions and get you in touch with a distributor from our nation-wide network. New distributor inquiries always considered.



International Association of Milk, Food and Environmental Sanitarians Committees

Committee and Chairperson

APPLIED LABORATORY METHODS

Helen Carr
Mich. Dept. of Agric.
1615 S. Harrison Rd.
E. Lansing, MI 48823
517-337-5065

AUDIO VISUAL LIBRARY

David Z. McSwane
Indiana Univ.
801 W. Michigan St.
Indianapolis, IN 46202
317-274-2918

BAKING INDUSTRY SANITARY STANDARDS

Martyn Ronge
Martyn Ronge and Associates
2400 Farnsworth Lane
Northbrook, IL 60062
312-272-7626

BUDGET

Robert Sanders
PHS/FDA
200 C St. S.W.
Washington, D.C. 20204
202-485-0138

COMMUNICABLE DISEASE

Frank Bryan, Ph.D.
2022 Lavista Circle
Tucker, GA 30084
404-938-8094

CONSTITUTION AND BY-LAWS

A. Richard Brazis
1006 Martin Dr. West
Bellevue, NE 68005
402-292-5649

COUNCIL OF AFFILIATES

Bill Coleman
Minnesota Dept. of Agriculture
90 West Plato Blvd.
St. Paul, MN 55107
612-296-1586

DAIRY AND FOOD SANITA- TION

(publication committee)
Harold Bengsch
Springfield Health Dept.
921 W. Turner
Springfield, MO 65803
417-864-1000

DAIRY QUALITY AND SAFETY

Steven T. Sims
USFDA
585 Commercial St.
Boston, MA 02109
617-223-5526

EDUCATION AND TRAINING

Joel Simpson
Dobbs Houses Inc.
5100 Poplar Ave.
Memphis, TN 38137
901-766-3978

and

Ulfert Esen
United Airlines - Food Service
Laguardia Airport
Flushing, NY 11371
718-476-4963

FDA INTERPRETATIONS

Homer Emery
US Army
P.O. Box 1832
Frederick, MD 21701
301-663-2036

FOOD EQUIPMENT SANITARY STANDARDS

Duain B. Shaw
Food Service Facilities
Division of Environmental Re-
sources
P.O. Box 2357
Harrisburg, PA 17120
717-787-9037

FOOD SERVICE

Bennett Armstrong
P.O. Box 205
Gainesville, VA 22065
703-347-3465

FOUNDATION

Harry Haverland
FDA Training Facility
12013 Cantrell Dr.
Springdale, OH 45246
513-851-1810

JOURNAL OF FOOD PROTECTION

(publication committee)
Bob Marshall
Dept. of Food Science & Nutrition
Room 101, T-14

University of Missouri
Columbia, MO 65211
314-882-7355

LONG RANGE PLANNING

H. Michael Wehr
Lab Services Div.
Oregon Dept. of Ag
635 Capitol St. N.E.
Salem, OR 97310
503-378-3793

MEMBERSHIP/SUSTAINING

K. R. Hathaway
IAMFES, Inc.
P.O. Box 701
Ames, IA 50010

515-232-6699

NOMINATING

Elmer H. Marth
Dept. of Food Science
Univ. of WI/Babcock Hall
1605 Linden Dr.
Madison, WI 53706
608-263-2004

RETAIL FOODS

Thomas L. Schwarz
FDA, 200 C Street, SW
Washington, D.C. 20204
202-485-0140

SANITARY PROCEDURES

Dick B. Whitehead
304 Forest Point Drive
Brandon, MS 39042
601-354-6552

SCIENTIFIC PROGRAM CONTENT

Ed Zottola
Univ. of Minnesota
262 Food Science & Nutrition
St. Paul, MN 55108
612-624-9274

WATER QUALITY AND WASTE DISPOSAL

Robert R. Zall
Dept. of Food Science
Stocking Hall
Cornell University
Ithaca, NY 14853
607-256-3112

New IAMFES Members

Alabama

Walter Creighton
State of Alabama
Mobile

Arkansas

Harold R. Russell
Osceola Foods, Inc.
Osceola

California

Ronald Fleming
McCormick
Salinas

Elizabeth Korn
Bridgford Foods
Anaheim

David M. Theno
Foster Farms
Livingston

Sam Scoleri
San Bernardino Co.
Alta Loma

Colorado

Frank Loverde
Bonjour de France
Littleton

Connecticut

James Kinch
Agri-Mark Inc.
Plainville

District of Columbia

Cleve B. Denny
National Food Processors Assoc.
Washington

Florida

Elizabeth L. Andress

Univ. of Florida
Gainesville

Alfred A. Bentley
H.R.S., O.C.H.D.
Orlando

Karen Brooks
USAF
Fort Walton Beach

Alfred R. Fain, Jr.
ABC Research
Gainesville

Paul R. Fell
Flagler Public Hlth Unit
Bunnell

Phoebe C. Fisher
USAF
Shalimar

Mark Frederick
Superbrand Dairy Products, Inc.
Plant City

Dianne P. Higgins
Univ. of Florida
Lake Alfred

Dave Linten
Superbrand Dairy Products, Inc.
Plant City

Charles E. Luther
Volusia Co. Hlth Dept.
Deleon Springs

Bradley Mierau
Innova Pure Water, Inc.
Clearwater

Richard T. Smith
Tropicana Products, Inc.
Brandenton

Jeff Stephens
Publix Super Markets, Inc.
Lakeland

Maura V. Sweeney
Pasco Co. Hlth Dept.
Lutz

Peter D. Thornton
Volusia Co. Hlth Dept.
Daytona Beach

Jack Towle
DARS
Ormond by the Sea

Thomas Watson
Hillsboro Co. Hlth Dept.
Brandon

John N. Winters
HRS Public Hlth Unit
Naples

Chuck Wright
Superbrand Dairy Products, Inc.
Plant City

Ted Young
Superbrand Dairy Products, Inc.
Plant City

Georgia

George A. Gibson
Dairymen Inc.
Eatonton

Norman Stern
USDA-RRR
Athens

Idaho

Marv Patten
ID Dept. of Agric.
Boise

Illinois

Tim DonLevy
Silliker Laboratories
Chicago Hts.

Lou Fatta
Kraft Foods
Glenview

Charles H. Hackl
Cook Co. Hlth Dept.
Maywood

M. Wade Jones
Ole' Country Barn
Louisville

Cynthia E. Lyons
Preferred Med Systems
Elk Grove Village

Fred A. Soderstrom
Jacobs Suchard
Downers Grove

Carol J. Temple
Net Midwest, Inc.
Chicago

R. Bruce Tompkin
Swift-Eckrich, Inc.
Oak Brook

Indiana

Ted Alexander
IN State Brd of Hlth
Indianapolis

L. Anderson-Mausser
Miles, Inc.
Elkhart

Thomas D. Black
West Lafayette

Sulma Mohammed
Purdue Univ.
West Lafayette

Iowa

Charles Bogoard
Leighton Processed Meats, Inc.
Leighton

Lloyd Doane
IA State Dept. of Hlth
West Des Moines

Kansas

Vince Matisko
Tony's Pizza Service
Salina

Kentucky

Daniel L. Boyle
Colorado State Univ.
Mayfield

Gary E. Coleman
Pike Co. Hlth Dept.
Pikeville

Massachusetts

Sam Chan
Gene-Trak Systems
Framingham

Michigan

Fay Cross
Wyeth-Ayerst Laboratories, Inc.
Mason

Debra Foti
Pure-Pak, Inc.
Walled Lake

Douglas McDougall
MI Dept. of Agric.
Lansing

Patricia Spinrad
MI Agric. Lab.
Lansing

Greg Winters
Gerber Products
Fremont

Minnesota

Sami Azar
ARAMCO
St. Louis Park

Mary M. Bulthaus
Superior Dairy Fresh Milk Co.
Minneapolis

Lisa Ramacher
Watertown

Missouri

Ruth E. Birch
Creve Coeur

Ron Johnson
McDonnell Douglas-Vitek
Hazelwood

Randy McGinnis
Mid-America Dairymen, Inc.
Springfield

Jack G. Padley
Mid-America Dairymen, Inc.
Kansas City

Nebraska

John M. Irvine
Omaha

Larry Noelle
Mid-America Dairymen
Norfolk

Tom Tieso
NE Dept. Agric.
Lincoln

New Jersey

Dennis Tillwell
State of New Jersey
Trenton

New York

David Burch
Dairylea Coop
Oneida

North Carolina

Marvin Speck
Raleigh

Ken Swartzel
NC State Univ.
Raleigh

Ohio

Paul W. Dylkowski
Miami Margine Co.
Cincinnati

A.E. Olverson
Cincinnati Hlth Dept.
Cincinnati

Pennsylvania

Wallace C. Jackson
Milk Marketing, Inc.
Renfrew

South Carolina

Frank M. Terlizzi
Cryovac Div.
Duncan

South Dakota

Roger Scheibe
SD Dept. of Agric.
Pierre

Texas

Geraldine Elias
USAF
San Antonio

Paula Sullivan
Pace Foods
San Antonio

Paul B. Thomson
Foods & Drug Admin.
Los Fresnos

Virginia

Jeff Bloom
E.S.S. Laboratory Svcs.
Culpepper

E.M. Extract
The Tintometer Co.
Williamsburg

Wisconsin

Dick Cobus
Dairy Systems Div.
Galesville

Steve Gostisha
Galloway Co.
Neenah

Glenn Steffen
WI Dept. of Agric.
Mt. Horeb

Canada

Michael H. Brodsky
Ont. Min. Hlth
Toronto, Ontario

Mariette D'Souza
Canada Packers, Inc.
Toronto, Ontario

D. Haner
Dairyland Foods
Vancouver, B.C.

Anthony Pavel
Canada Packers, Inc.
Toronto, Ontario

Carol A. Reid
Sun-Rype Product Ltd.
Kelowna, B.C.

Ken J. Waldon
Dept. of Agric.
Wetaskiwin, Alberta

England

Michael Jacob
Dept. of Hlth & Social Svcs.
London

Germany

Martin Jaeger
MARS
Viersen

Mexico

Martha E. Diaz Deaguayo
CIAD A.C.
Hermosillo, Sonora

Luz Vazquez-Moreno
CIAD A.C.
Hermosillo, Sonora

Saudi Arabia

Naji Nasser
Arabian American Oil Co.
Abqaiq

South Africa

L. M. Van Niekerk
Welkom Yeast
Welkom

We know how tedious developing an immunoassay can be.

So we made it easier.

Kirkegaard & Perry Laboratories' BacTrace® line of affinity purified antibodies to food-borne pathogens is designed to make your job easier. BacTrace® antibodies are affinity purified to assure you of **high sensitivity and minimal cross-reactivity**. They are available unlabeled or labeled with peroxidase, phosphatase or fluorescein, by the vial or in bulk quantities. In addition to KPL's technical support, we have positive controls and complementary products e.g. substrates, buffers - all designed to make it easy.

KPL's BacTrace® antibody line includes:

- **Salmonella**
- **E. coli 0157:H7**

to be continued...



Kirkegaard & Perry Laboratories Inc.
2 Cessna Court
Gaithersburg, MD 20879
301-948-7755 800-638-3167

Call us for more information and we'll tell you how easy it can be.
See our catalog for a complete list of affinity purified antibodies and complementary products.

Business Exchange "Classifieds"

Equipment For Sale

• FREE CATALOG

The Supply Corporation invites you to Send for their New Catalog featuring a full line of processing supplies. Write to The Supply Corporation, P.O. Box 112, Lake Geneva, WI 53147 or call Toll Free 1-800-558-2455, in Wisconsin Call... 1-800-242-5929. FAX#1-414-248-9530

CIRCLE READER SERVICE NO. 348

HOMOGENIZERS FOR SALE

Manton Gaulin 200E & 300E.
Manton Gaulin K6, 500 GPH.
Manton Gaulin KF24, 750/1500 GPH w/ ball valves.
Manton Gaulin MC45 3,000 - 4,000 GPH.
Manton Gaulin Pump MC18, 5400 GPH.
Manton Gaulin E-12, 1250 GPH.
Manton Gaulin DJF-12, 1200 GPH.

EISCHEN ENTERPRISES INC.

P.O. Box 6136
Fresno, CA 93703
(209) 251-6038

CIRCLE READER SERVICE NO. 313

Tired Of Brine Contamination Complaints?

Let us overhaul your ice cream stick novelty moulds.
Call Carl for Gram & Vitaline mould overhauling.

Top Quality Workmanship

AMERICAN MOULD SERVICE

6701 Eilerson St. Clinton, MD 20735
(301) 868-1273 Carl Hornbeak

CIRCLE READER SERVICE NO. 304

1-1,000 Gal. Cone Bottom Processor
1-Gaulin MC18
1-Gaulin MF75
-Assorted Homogenizers
125-6,000 GPH
1-Federal Half-Gallon Filler
-All size Sanitary Positive and Centrifugal Pumps
-All size Storage and Processor Tanks

Dairy Engineering Co.
2730 S. Tejon
Englewood, CO 80110
303-762-0163

CIRCLE READER SERVICE NO. 329

RECONDITIONED

Sterilizers
Glassware Washers
Incubators and Related
Laboratory Equipment
Call us for our current listing.



8255 Brentwood Industrial Drive
St. Louis, Missouri 63144

314-781-3220

CIRCLE READER SERVICE NO. 352

BENTLEY INSTRUMENTS, INC.

Milk Testing Equipment

New and rebuilt milk analyzing equipment for fat, protein, lactose and solids testing. Installation, training, parts and service available.

Call for more information
(612) 448-7600

Bentley Instruments, Inc.
P.O. Box 150
Chaska, MN 55318

CIRCLE READER SERVICE NO. 330

TOP QUALITY MILK & ICE CREAM EQUIPMENT SINCE 1951

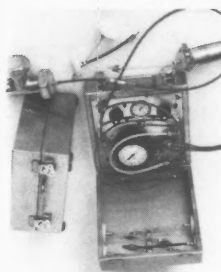


Post Office Box 630 • 816 Adams Street
Winnsboro, Louisiana 71295

KELLY MARTIN

Inside LA: (318) 435-4581
Outside LA: 1-800-652-2532

CIRCLE READER SERVICE NO. 335



Model III s.s.

The CDT Test Device**

For all differential controls on H.T.S.T. pasteurizers
now ••• testing and servicing is easier and more precise •••



THE CROMBIE COMPANY
521 Cowles Avenue
Joliet, IL 60435-6043
815/726-1683

*US Pat 4,380,166 - *Reviewed by PHS/FDA

CIRCLE READER SERVICE NO. 339

Services / Products

**COMPLETE
LABORATORY
SERVICES**

Ingman Labs, Inc.
2945-34th Avenue South
Minneapolis, MN 55406
612-724-0121

CIRCLE READER SERVICE NO. 315

Grouting of Floors

Epoxy high acid resistant re-grouting of quarry tile and brick floors. Also tile replacement where required, with special fast set epoxy — also fiberglass walls and floors installed.

M&W Protective Coating Co.
912 Nunn Ave. • Rice Lake, WI 54868
Ph. (715) 234-7894

CIRCLE READER SERVICE NO. 294



Certified
Laboratory
since 1949

Northland Food Laboratory
1044 Parkview Rd.
Green Bay, Wisconsin 54304
414-336-7465 FAX 414-336-0647

Dairilab Service, Inc.
2415 Western Avenue
Manitowoc, Wisconsin 54220
414-682-7998

CIRCLE READER SERVICE NO. 289

For Food Plant Operations

**Employee
Training
Materials**



- GMP & GSP booklets, slides and video tapes in English & Spanish

L. J. BIANCO & ASSOCIATES
(Associated with L.J.B. Inc.)

FOOD PRODUCT QUALITY CONTROL AND
ASSURANCE CONSULTANTS
850 Huckleberry Lane
Northbrook, IL 60062
312-272-4944

Over 40 years Food Operation Experience

CIRCLE READER SERVICE NO. 297

**Nasco's bar-coded
bags for milk sampling**

Nasco's Whirl-Pak® bags with bar codes make sample identification and recording easy. Let Nasco do the printing, or print your own bar code labels. For FREE copy of our Sampling Equipment Catalog, call or write Dept. WL-8811. Free Phone Order Service 1-800-558-9595.

Nasco Fort Atkinson, WI 53538
Modesto, CA 95352

CIRCLE READER SERVICE NO. 332

**EPA
SUPER
FUND**

\$ CAN BE YOURS \$

- GOVERNMENT DICTATES CLEANUP OF DUMPSITE & ALL WASTE PRODUCERS
- NEW PRODUCT CAN SAVE WASTE GENERATORS MILLIONS OF DOLLARS
- FROM THE DRY CLEANERS, GAS STATION, PAINT SHOP TO BIG DUMP-SITE
- HELPS WATER CLEANUP

WE SUPPLY

- TRAINING SCHOOL
- RECOGNIZED PRODUCT
- APPROVED TECHNOLOGY
- LABORATORY BACKUP
- TOTAL ENGINEERING

AREAS ARE LIMITED
LEAD SOURCES PROVIDED

**GET YOUR PART OF
THE \$8,000,000,000
SUPER FUND**

INVESTMENT REQUIRED
FINANCING AVAILABLE

**ECOLOGY
RECOVERY CO.**

16787 BEACH BLVD.
HUNTINGTON BEACH, CA 92647 U.S.A.
- CALL (714) 536-0757 -
FAX: (714) 960-9728

CIRCLE READER SERVICE NO. 285

**COMPONENT SAMPLES FOR CALIBRATION
OF INFRARED TESTERS**

Samples are also designed to be used as daily performance checks.*

1 set of 12 in duplicate	\$72.00
Add. sets same week/same address	\$48.00
Skim sample	\$ 6.00
E.S.C.C. controls	\$27.00

*1 set equals 2 calibration or 4 daily checks

Call for more information (612) 484-7269

DQCI Services, Inc.

2353 No. Rice St., St. Paul MN 55113

CIRCLE READER SERVICE NO. 356

Employment

•Ops Manager-IC	\$40	to	50K
•Maintenance Manager ..	\$30	to	40K
•Plt. Mgr. Milk & IC	\$30	to	32K
•Q.C. Mgr.-IC Mix	\$30	to	32K
•I.C. Supt.	\$28	to	32K
•Technical Sales Rep.	\$28	to	32K
•Prod. Supv. Milk & IC	\$22	to	29K
•Vault Supv. IC	\$25	to	30K
•Shipping Supv.	\$26	to	32K

Dunhill. Please call or write:
Mr. Dana S. Oliver - Pres.
OF SOUTHEAST FORT WORTH
P.O. Box 6397
Fort Worth, TX 76115-0397
817/926-7284

CIRCLE READER SERVICE NO. 288

CHEMLAND, INC.

GROWING CALIFORNIA CHEMICAL MANUFACTURER HAS NEED FOR SALES/TECH REPRESENTATIVES WITH CREAMERY/CHEESE PLANT EXPERIENCE. CHEMICAL SALES BACKGROUND WITH PROGRAM C.I.P. SYSTEM EXPERIENCE DESIRED. FULL BENEFITS, EXCELLENT COMMISSION PLAN, EXPENSE ALLOW. SEND RESUME TO: CHEMLAND, INC. P.O. BOX 2999, TURLOCK, CA 95381-2999 ATTN: J. FOLINO

CIRCLE READER SERVICE NO. 323

IAMFES Manuals

3-A SANITARY STANDARDS

The Complete Dairy Sanitary Standards Booklet is available from the IAMFES Office, P.O. Box 701, Ames, IA 50010. 515-232-6699

- 3-A DAIRY SANITARY STANDARDS \$33
- 3-A DAIRY AND EGG SANITARY STANDARDS \$48
- 3-A EGG STANDARDS \$28

5-year updates on the above \$44

All prices include postage. Payment must accompany order. Master Card and Visa accepted.

Call 800-525-5223 or 515-232-6699, ask for Scott.

CIRCLE READER SERVICE NO. 358

IAMFES MANUALS

- * Procedures to Investigate Foodborne Illness — *New 4th Edition*
- * Procedures to Investigate Waterborne Illness
- * Procedures to Investigate Arthropod-Borne and Rodent-Borne Illness

These three excellent manuals are based on epidemiologic principles and investigative techniques that have been found effective in determining causal factors of disease outbreaks.

Single copies are available for \$5.00 ea.; 25-99 copies \$4.75 ea.; and 100 or more copies are \$4.25 ea.

Call 800-525-5223 or 515-232-6699, ask for Scott.

International Association of Milk, Food and Environmental Sanitarians Inc.

P.O. Box 701 - 502 E. Lincoln Way - Ames, Iowa 50010 - (515) 232-6699 - 1-800-525-5223 (outside Iowa)

CIRCLE READER SERVICE NO. 359

Your
Message
Could
Be
Here
Call an
Advertising Sales
Representative
Today!
(800) 525-5223
515-232-6699

IAMFES

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

MEMBERSHIP/SUBSCRIPTION APPLICATION

MEMBERSHIP

- Membership with BOTH journals \$58
(*Dairy, Food and Environmental Sanitation* and the
Journal of Food Protection)
- Membership with *Dairy, Food and Environmental Sanitation* \$33
- Check here if you are interested in information on joining your
state/province chapter of IAMFES

SUSTAINING MEMBERSHIP

- Membership with BOTH journals \$375
Includes table top discount, July advertising discount, company
monthly listing in both journals and more.

STUDENT MEMBERSHIP

- Membership with BOTH journals \$29
 - Membership with *Dairy, Food and Environmental Sanitation* \$17
 - Membership with the *Journal of Food Protection* \$17
- *Student verification must accompany this form*

SUBSCRIPTIONS

for agencies, libraries, associations, institutions

- BOTH journals \$137
- Dairy, Food and Environmental Sanitation* \$75
- Journal of Food Protection* \$100

**POSTAGE CHARGES: Outside the U.S. add \$12 per journal ordered.
U.S. funds only, drawn on U.S. Bank.**

3-A Sanitary Standards

- 3-A Sanitary Standards**
- Complete set 3-A Dairy Stds ea \$33
- Complete set 3-A Dairy & Egg Stds ea \$48
- 3-A Egg Stds ea \$28
- Five-year Service on 3-A Sanitary Standards
- 3-A Dairy & Egg Stds Five years \$44

"Procedures" Booklets

- Procedures to Investigate Waterborne Illness ea \$5.00
- Procedures to Investigate Foodborne Illness - **new 4th Edition** ea \$5.00
- Procedures to Investigate Arthropod-borne and Rodent-borne Illness ea \$5.00

Multiple copies available at reduced prices. Prices include postage.

PRINT OR TYPE ... ALL AREAS MUST BE COMPLETED IN ORDER TO BE PROCESSED

Name _____ Company Name _____

Job Title _____ Office Phone # _____

Address _____

City _____ State/Province _____ Country _____ Zip _____

Renewal _____ New Membership/Subscription _____

MAIL ENTIRE FORM TO:

IAMFES DEPT. S
P.O. BOX 701
AMES, IA 50010

OR USE YOUR CHARGE CARD 1-800-525-5223
515-232-6699
FAX 515-232-4736

____ PAYMENT ENCLOSED
____ MASTER CARD
____ VISA
____ AMERICAN EXPRESS:

CARD # _____

EXP. DATE _____

YOUR SIGNATURE _____

U.S. FUNDS

Coming Events

DECEMBER

- **5, Pesticide Applicator Certification Seminar**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.
- **5, Microbiology and Engineering of Sterilization Processes**. Given at the University of Minnesota, St. Paul, Minnesota Campus. This intensive lecture-problem course is for degreed scientists and technical managers involved in the research, development and manufacture of sterilized food, pharmaceutical products and medical devices. The course is designed to develop an understanding of both the microbiology and engineering of sterilization processes. For further information contact: Dr. William Schafer, Department of Food Science & Nutrition, 1334 Eckles Avenue, St. Paul, MN 55108 612/623-4793.
- **6-7, Pests Associated With Food Industry and Environmental Sanitation Seminar**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.
- **8-9, Advanced Course on Pest Recognition and Food Industry Problems**, Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.
- **8-9, Starch: Structure, Properties and Food Uses**, sponsored by AACC to be held in Chicago, Illinois. Information can be obtained by contacting: AACC Short Course Program, 3340 Pilot Knob Rd., St. Paul, MN 55121, 612/454-7250.
- **1-2, Ninth Annual Food Microbiology Symposium**, University of Wisconsin-River Falls. Current Concepts in Foodborne Pathogens and Rapid & Automated Methods In Food Microbiology. For further information, contact: Dr. P. C. Vasavada, Animal & Food Science Department, University of Wisconsin-River Falls, River Falls, WI 54022 715/425-3150.

1989

JANUARY

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

Clark, Chapman College, Food Science and Nutrition Dept., Orange, CA 92666 714/997-6869.

FEBRUARY

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

MARCH

- **12-15, American Cultured Dairy Products Institute Annual Meeting and Conference/Cultures and Curds Clinic/International Cultured Dairy Products Evaluation Session**, Marriott River Center, San Antonio, Texas. For more information, contact Dr. C. Bronson Lane, ACDPI, PO Box 547813, Orlando, FL 32854-7813 407/628-1266.
- **22-24, Michigan Environmental Health Association**, Holiday Inn, Holiday & Conference Center, Ann Arbor, MI. For more information, contact: Ike Volkers, MDPH, 3500 N. Logan, Lansing, MI 48908 517/335-8268.
- **28-30, Western Food Industry Conference** to be held at the University of California, Davis, CA. For more information, contact: Robert Pearl 916/752-0981 or Shirley Rexroat 916/752-2191.
- **29-30, The Center for Dairy Research at the University of Wisconsin-Madison will be holding its annual Cheese Research and Technology Conference** at the Holiday Inn East, Madison, WI. For more information, contact: Sarah Quinones 608/262-2217.

APRIL

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

JUNE

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

From the Ames Office . . .



Kathy R. Hathaway

This issue, of DAIRY AND FOOD SANITATION features the "Annual Meeting Report." You'll find a full detailed report of the 75th IAMFES Annual Meeting which was held July 31-August 4 in Tampa, Florida. If you weren't able to attend this year, plan now for Kansas City, August 13-17, 1989.

In addition to the President's Speech, IAMFES Award Winners and Developing Scientist Award winners, you'll also notice the Committee Reports. Take special note of the progress of each committee this year. A list of all IAMFES Committee and Chairpersons are also included in this issue. If you have questions on the Committees, or would like to become involved with one, don't hesitate to call or write the Chairperson listed.

Renewal notices are out! If you wish to remain on a January-December basis, please renew no later than mid-December. American Express has been added

to Master Card and Visa due to requests from the membership. You may call in your renewal and use your charge card. 515-232-6699 * 800-525-5223 or FAX 515-232-4736.

Exhibits will again be a part of the IAMFES Annual Meeting in Kansas City, August 13-17, 1989. Table top exhibit space assignments are being taken on a first come, first serve basis. For more information contact the Advertising Department at IAMFES.

Those interested in writing articles for DAIRY AND FOOD SANITATION are encouraged to request INSTRUCTIONS FOR AUTHORS from the Ames office. Once an article is submitted, it is sent to two reviewers before being accepted for publication. Contact Margie Marble for more information.

The IAMFES Executive Board met in Ames for the fall board meeting this past October. This column will include details of that meeting in the December issue.

Hope you all have a nice Thanksgiving.

Until next time,

Kathy R. Hathaway
Executive Mgr.
IAMFES

To receive
information
on membership
with IAMFES
Circle 360
on this card

IAMFES

International Association of Milk, Food and Environmental Sanitarians Inc.

DFS
11/88

Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

Name _____	Title _____
Company _____	
Address _____	
City _____	State/Prov. _____
Country _____	Zip _____
Phone Number _____	

Please send information on items circled below: Deadline 60 days from issue date

101	114	127	140	153	166	179	192	205	218	231	244	257	270	283	296	309	322	335	348
102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

IAMFES

P.O. Box 701
502 E. Lincoln Way
Ames, Iowa 50010

Place
Stamp
Here



**This
publication is
available in
microform.**

University Microfilms International reproduces this publication in microform: microfiche and 16mm or 35mm film. For information about this publication or any of the more than 13,000 titles we offer, complete and mail the coupon to: University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48106. Call us toll-free for an immediate response: 800-521-3044. Or call collect in Michigan, Alaska and Hawaii: 313-761-4700.

**University
Microfilms
International**

Please send information about these titles:

Name _____

Company/Institution _____

Address _____

City _____ State _____ Zip _____

Phone () _____

If you're not running a Charm, you're running a risk.

You're looking at a partial list of the antibiotics you can catch with the Charm test.

You are also looking at a partial list of antibiotics other tests can't detect.

So if you want to take a chance on somebody else's test, good luck.

But if you want to be sure, be sure you run a Charm.

Penicillin Assays Inc.

36 FRANKLIN STREET, MALDEN, MA 02148 TEL. (617) 322-1523

Partial list of antibiotics detectable with:

- ◆ CHARM TEST
- CHARM TEST II
- CHARM FIELD TEST

BETA-LACTAMS (P)

- ◆■ Penicillin BT
- ◆■ Penicillin G.
(benzylpenicillin)
(benzathine)
(potassium)
(procaine)
(sodium)
(benethamine)
(calcium)
- ◆■ Penicillin O
- ◆■ Penicillin S
- ◆■ Penicillin N
- ◆■ Methicillin
- ◆■ Nafcillin
- ◆■ Ticarcillin
- ◆■ Penicillin V.
(benzathine)
(hydrabamine)
(potassium)
- ◆■ Oxacillin
- ◆■ Cloxacillin
(benzathine)
- ◆■ Dicloxacillin
- ◆■ Flucloxacillin
- ◆■ Ampicillin
(trihydrate)
- ◆■ Amoxicillin
(trihydrate)
- ◆■ Piperacillin
- ◆■ Hetacillin
- ◆■ Carbenicillin
- ◆■ Cephalothin
(Cephaloglycin)
- ◆■ Cephalirin
- ◆■ Cephalirin Benzathine,
- ◆■ Cephhradine
- ◆■ Cephacetrile

- ◆■ Cephalexin
- ◆■ Cephaloridine
- ◆■ Cefazolin
- ◆■ Cefoxitin
- ◆■ Cefaclor
- ◆■ Cefadroxil
- ◆■ Cefamandole
- ◆■ Cefatrizine
- ◆■ Cefazedone
- ◆■ Cafmenoxime
- ◆■ Cefmetazole
- ◆■ Cefonicid
- ◆■ Cefoperazone
- ◆■ Ceforanide
- ◆■ Cefotaxime
- ◆■ Cefotetan
- ◆■ Cefotiam
- ◆■ Cefroxadine
- ◆■ Cefsulodin
- ◆■ Ceftazidime
- ◆■ Ceftazole
- ◆■ Ceftizoxime
- ◆■ Ceftriaxone
- ◆■ Cephalosporin C
- ◆■ Cephamycin A
- ◆■ Cephamycin B
- ◆■ Cephamycin C
- ◆■ Cephapirin Sodium
- ◆■ Cephhradine

TETRACYCLINES (T)

- Tetracycline
- Choritetracycline
- Oxytetracycline
- Demeclocycline
- Methacycline
- Doxycycline
- Minocycline

AMINOGLYCOSIDES (ST)

- Dihydrostreptomycin
- Streptomycin sulfate
- Neomycin
- Kanamycin
- Amikacin

- Gentamicin
- Tobramycin

MACROLIDES (E)

- ◆■ Troleandomycin
- ◆■ Erythromycin
Erythromycin Stearate
Erythromycin Estolate
Erythromycin Gluceptate
Erythromycin
Lactobionate
Erythromycin Phosphate
- ◆■ Spiramycin
Erythromycin Thiocyanate
- ◆■ Oleandomycin
- ◆■ Tylosin
- ◆■ Lincomycin
- ◆■ Clindamycin

SULFONAMIDES(SM)

- ◆■ Sulfamethazine
- ◆■ Sulfadimethoxine
- ◆■ Sulfabromomethazine
- ◆■ Sulfadimthoxine
- ◆■ Sulfamethoxyypyridazine
- ◆ Hydrochlorothiazide
- ◆ Chlorothiazide
- ◆ Furosemide
- ◆ Trichloromethiazide
- ◆ Dexamethasone
- ◆ Sulfasuxidine
- ◆ Dapsone
- ◆ P-Aminosalicylic acid
- ◆ Trisulfapyrimidine
- ◆ Sulfamethoxazole
- ◆ Phthalylsulfathiazole
- ◆ Sulfachloropyridazine
- ◆ Sulfanitran
- ◆ Sulfaquinoxaline
- ◆ Sulfathiazole
- ◆ Sulfomyxin
- ◆ Thiabendazole
- ◆ NOVBIOCIN (N)
- ◆■ CHLORAMPHENICOL (C)

