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Dairy and Food Sanitation

A Publication for Sanitarians and Fieldmen

- Milk Safety — A Historical Overview
- Cleaning and Sanitizing Operations
- Food Surveillance and Salvage Following Disasters
- Wastewater Pretreatment for the Dairy Products Processing Industry

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

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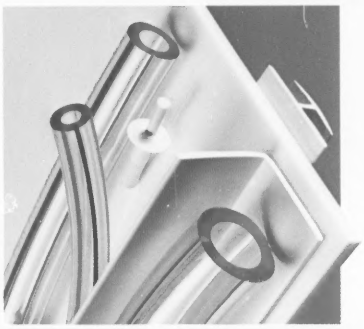

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The new IAMFES magazine, *Dairy and Food Sanitation* addresses many of the same concerns as does the *Journal of Food Protection. Dairy and Food Sanitation*, however, provides articles of immediate interest and application to the work of the practicing sanitarian, fieldman, and quality control person.

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In addition to articles, *Dairy and Food Sanitation* contains departments formerly included in the *Journal*, but they're expanded in the new magazine to offer readers more complete information about news, events, and others in the field. Among the expanded departments are news about IAMFES affiliate members, meetings, and events; Association events; new product news; excerpts from such publications as the Center for Disease Control's "Morbidity and Mortality Weekly Report," and the Federal Register. New 3A and E-3A Sanitary Standards and amendments to existing standards are also included in *Dairy and Food Sanitation.*

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Dairy and Food Sanitation

August, 1981

REGULATORY REASONS FOR WATER PRETREATMENT

Communications with persons in regulatory agencies, municipalities, consultants, and others produces no specific definition of "pretreatment" as it applies to the dairy industry. The reason for this lack of definition stems from two seemingly contradictory statements. First, no specific pretreatment standards for the Dairy Products Processing Point Source Category were named in the Federal Register of February 11, 1975. For example, for the Fluid Products Subcategory, Part 405.24, no specific limitations were set on pH, biochemical oxygen demands or BOD, or suspended solids, because these were regarded as all being "compatable pollutants." However, the general exclusions listed as prohibited discharges by EPA in the National Pretreatment Standards still apply. These prohibited discharges were published as "General Pretreatment Regulations for Existing and New Sources of Pollution" in the Federal Register of June 26, 1978. Here, then, is the seeming contradiction to the previous statement, that no specific pretreatment standards were developed for the Dairy Industry.

The *General Pretreatment Regulations* of June 26, 1978, Part 403.5, p. 27747, states: "pollutants introduced into Publicly Owned Treatment Works (POTW) by any source of a nondomestic discharge shall not inhibit or interfere with the operation or performance of the works." The Regulations continue, "the following pollutants may not be introduced into a Publicly Owned Treatment Works;

1) pollutants which create a fire or explosion hazard in the POTW;
2) pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works is specifically designed to accomodate such discharges;
3) solid or viscous pollutants in amounts which will cause obstruction to the flow in sewers, or other interference with the operation of the POTW;
4) any pollutant, including oxygen demanding pollutants such as (BOD) released in a discharge of such volume or strength as to cause interference in the POTW;

WASTEWATER PRETREATMENT FOR THE DAIRY PRODUCTS PROCESSING INDUSTRY: REGULATORY AND ECONOMIC ASPECTS

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5) heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the treatment works influent exceeds 40°C (140°F), unless the works is designed to accomodate such heat."

Items 3 and 4 typically affect the Dairy Industry. Item 3 concerning viscous pollutants could include high concentrations or accumulations of fat into globules that would float or otherwise interfere with operations of the POTW, while item 4 is the major prohibition which requires dairy plants to pretreat prior to municipal discharge: "*Any pollutant, including oxygen demanding pollutants such as (BOD) released in a discharge of such volume or strength as to cause interference in the POTW.*" Considering that the BOD strength of dairy processing waste may be 1,000 to 3,000 mg/l, it is obvious that dairy waste can be of a "strength" as to cause "interference" in the POTW. Considering both the volume of discharge from a dairy plant and its strength, it is quite common that the dairy plant constitutes the major portion of the waste load being received at the municipal plant.

Other discharges of high strength/volume wastes, such as alkaline wastewaters from clean-up of evaporators in dairy plants, constitute a prohibited discharge in many instances. Item 2 prohibits "pollutants which will cause corrosive structural damage to the POTW" and Item 4 prohibits "any pollutant --- released in a discharge of such *volume or strength* as to cause interference in the POTW." Alkaline wastes in high concentrations may be corrosive and/or high strength. The problem with shock loads of alkali discharged to the POTW is that they upset the balance of microorganisms in the biological treatment system typically employed in the POTW. The normal, dynamic mixture of bacteria, fungi, yeast, rotifers, and other microorganisms grows best at median pH values (pH 6-9). When the pH of wastewaters being presented for treatment to biological units such as activated sludge, trickling filter, rotating biological contactor, oxidation ditch, and aerobic lagoon exceeds pH 9-10, the growth and health of the living mixed culture is adversely affected. Depending on the duration and intensity of the high pH discharge, the biological growth may be "wiped out", meaning the unfavorable pH conditions resulted in death, spore formation, and/or population shifts in the mixed culture of microorganisms. Even a short duration (10-20 minutes) of highly alkaline discharge from the dairy to the POTW in the middle of the night when the domestic flow is minimal may "kill the bugs" in the city's POTW, with a result that the muncipality and state invoke EPA's Pretreatment Regulations and cite the plant for a prohibited discharge of excessive strength.

HAZARDOUS WASTES UNDER RCRA (P. L. 94-580)

Alkaline wastes may be regulated by EPA as hazardous wastes. Beyond being of "such volume or

strength as to cause interference in the POTW" (Item 4 above), the corrosive aspects of highly alkaline wastes can be even more consequential to the dairy plant. The Federal Register of May 19, 1980, p. 33122, defines *hazardous alkaline or acid wastes* as having "a pH less than or equal to 2 or greater than or equal to 12.5 ---". The quantity cutoff (p. 33120) is 1000 Kg or 2205 lb/month. "If a person generates, in a calendar month, a total of less than 1000 kilograms of hazardous wastes, those wastes are not subject to regulation---". Thus, if a dairy discharges such a volume of alkaline wastewaters that a pH 12.5 could be measured on a flow of only 264 gal. (1000 Kg) of wastewater, then that plant (person) could be considered to be a generator of hazardous waste and, thus, subject to EPA's Hazardous Waste Management and Consolidated Permit Regulation under the *Resource Conservation and Recovery Act (P.L. 94-580)*. The U.S. EPA is presently handling regulation of such alkaline or acid wastes that meet the criteria of a hazardous waste ($pH \leq 2$ or ≥ 12.5) under a "permit-by-rule" approach. According to the November 17, 1980 Federal Register, p. 76074:

a. The owner or operator must not treat or store a hazardous waste in an elementary neutralization unit or a wastewater treatment unit without having received an EPA identification number."
b. An owner or operator who has not received an EPA identification number may obtain one by applying to the Administrator using EPA form 8700-12.

The National Food Processors Association has petitioned the U.S. EPA to eliminate food processing wastes from its list of hazardous wastes. Action by EPA is still pending on this request.

WHY DOES A MUNICIPALITY REQUIRE PRETREATMENT?

Why does the municipality require a dairy plant to pretreat? The municipality is under permit to the State and Federal Government through the National Permit Discharge Elimination System (NPDES). Typically, the Municipality is required to discharge no more than 30 mg/l BOD and suspended solids in their final effluent.

Biological treatment is the typical choice of treatment by municipalities. For a municipality to meet its effluent permit of 30 mg/l requires 90% removal of BOD and suspended solids from an influent containing an average of 300 mg/l BOD and suspended solids. Any secondary treatment system cannot reliably be expected to give more than 90% reduction of the BOD suspended solids received. So their chances of success, in meeting their permit conditions, are greatly increased if they require their industrial clients to pretreat to the level of 300 mg/l BOD and suspended soilds. The Federal EPA has not specified how industrial pretreatment is to be done in the case of the dairy industry; thus, the state or municipality cannot be expected to be able to tell exactly how to do it either.

ECONOMIC REASONS FOR PRETREATMENT OF DAIRY WASTEWATER

Beyond the punitive reasons for being interested in waste treatment as a result of various environmental regulations, there are compelling economic factors that encourage the dairy plant to take a close look at the cost of installing its own pretreatment system rather than to continue to pay municipal treatment costs on the total wasteload.

The results of a survey conducted in the summer of 1980 of members of the Milk Industry and International Association of Ice Cream Manufacturers (MIF/IAICM), documents the cost of water and wastewater treatment. The survey found that:

1. "The average cost of water purchased from municipalities has increased from $2.50/1000 cu. ft. to nearly $4.50/1000 cu. ft. (nearly doubled in 5 years)."
2. "In 1980 the average cost of wastewater treatment was found to be $1.75/1000 gal.". "Municipalities are now assessing charges, in addition to amount of flow, on the strength of the wastewater such as biochemical oxygen demand (BOD) and total suspended solids (TSS)."
3. "With these increased charges, water reuse, and perhaps waste pretreatment at the plant should be examined."

In the MIF/IAICM survey, the wastewater treatment charges were developed from a data base of 162 plants. The average cost of wastewater treatment was $1.75/1000 gal. The median cost of wastewater treatment was $1.00/1000 gal. because 50% of the plants paid more than $1 and 50% paid less than $1/1000 gal. Ninety (90) plants reported waste treatment charges of less than $4.50/1000 gal. Fifty (50) plants reported wastewater treatment charges ranging from $.56 to $1.72/1000 gal.

TECHNOLOGY OPTIONS FOR DAIRY PRETREATMENT

Only a limited amount of guidance for pretreatment of dairy wastes has been issued by the Federal Government to states and municipalities. General guidance is given in the Federal Guidelines published by EPA in 1977 for State and Local Pretreatment Programs. Six (6) pages of the report, EPA-43019-76-017c, are devoted to a general description of the Dairy Processing Industry. Concerning treatment technology, the report states: "The standard practice for reducing BOD in this industry has been biological treatment, including activated sludge, aerated lagoons, trickling filters and stabilization ponds." It also acknowledges that "pretreatment for compatable pollutants can take a variety of forms." It lists physical/chemical treatment and chemical coagulation as possible forms for treatment. Table 1 shows a comparison of the capital and operating costs of different technologies available for a pretreatment system. Part 2 of this series will deal with the engineering and performance aspects of different pretreatment systems.

TABLE 1. *Comparison of treatment technologies for capital and O & M costs on a 300 GPM (0.43 MGD) plant, 1,500 mg/l BOD.*

Food Category	Capital Costs ($1,000)		Operating and Maintenance ($/1000 Gal)	
Dairy Wastes: Biological Treatment (EPA Data)	1971[1]	1980	1971[1]	1980
Activated Sludge	720	1,462	0.82	1.66
Trickling Filter	780	1,583	0.74	1.50
Aerated Lagoon	235	477	0.42	0.85
Seafood Wastes: Biological and Air Flotation				
(EPA contractor Data[2])				
Aerated Lagoon		730[2]		0.67[2]
Dissolved Air Flotation and Sludge Dewatering		480[2]		0.74[2]
Dairy: Non-Biological Pretreatment				
SPI System		650		0.66

* The SPI Pretreatment System, is a non-biological approach to pretreatment. SPI designs, constructs, and operates pretreatment facilities.

[1]EPA-440/1-74-021-a. Dairy Product Processing. 1971 costs multiplied by 2.03 to estimate 1980 dollars.

[2]Contract No. 68-01-3287. Seafood Processing. E. C. Jordan Co. report to EPA, December, 1979.

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MILK SAFETY

An Historical Overview

LEON TOWNSEND

Milk Control Branch
Division for Consumer Health Protection
Department for Human Resources

Through strict enforcement of sanitary and quality standards by state milk regulatory agencies, foodborne outbreaks involving milk and milk products have been reduced significantly. Milk control program emphasis has shifted from disease transmission to humans of bacterial and related animal diseases to the prevention of milk adulteration with antibiotics, pesticides and other chemical adulterants. Program control, nationwide, has shifted from county and municipalities to state programs.

Milk, nature's most perfect food! No food produced by nature surpasses milk as a single source of the dietary elements needed for proper health, especially in infants, children, and senior citizens.[1] Because of its function, by nature -- nourishment of the young -- it is necessarily complex: it must supply nutrients, minerals, and vitamins in proper form, kind, and amount.

Milk is the lacteal secretion, practically free from colostrum, obtained by the complete milking of one or more *healthy* cows.[2]

Because it is such a nutritious liquid product, milk is a highly perishable food, one that is an ideal medium for bacterial growth. Milk, therefore, becomes a potential disease carrier, to say nothing of its potential for contamination with antibiotics, pesticides, and other adulterants.[3]

The work of the French scientist, Louis Pasteur, led to major contributions in chemistry, medicine, and industry that has greatly benefited mankind. His work with the wine industry led to the discovery that bacteria spread diseases. In approximately 1864 Pasteur discovered that microbes can be killed by applying controlled heat. This process, later known as pasteurization, has contributed significantly to the reduction of foodborne illness from milk and other foods.

In 1895 commercial pasteurization equipment for milk was introduced into the United States[4] from Denmark. This new process was to undergo radical trials and errors over the next several years. The early 1900's saw a dilemma among public health officials and regulatory agencies because emotional objections to pasteurization were numerous, and data for thermal destruction of milkborne pathogenic bacteria was confusing[5]. Many legal definitions of milk pasteurization appeared in the milk regulations throughout the country, and local health officials exercised independent judgment on what should be required. The American Public Health Association's Committee on Milk Supply reported in 1920 that of the some 4,200 pasteurization plants in operation in the United States, none of them afforded full protection against ineffective pasteurization.[6]

Through extensive research by many different individuals standardized pasteurization procedures have now been widely accepted throughout the United States and other countries.

Pasteurization, even though greatly responsible for the reduction of foodborne disease outbreaks from milk, has not eliminated possible public health problems in this area.

Today milk and milk products are readily available and frequently consumed by almost everyone. Milk production has increased from 117 billion pounds in 1970 to 124 billion pounds in 1979; however, per capita

consumption has decreased from 706 to 560 pounds between 1955-1979[7]. Several changes have occurred in per capita sales for milk and milk products. (Table 1).

Kentucky, though not normally thought of as a "dairy state," ranks 13th in milk production with some 2½ billion pounds produced. Approximately 75% of Kentucky's milk production is produced on some 3,500 Grade A dairy farms and 25% of the volume is from 2,700 manufacturing milk farms. Additionally, there are 27 Grade A milk processing plants and 17 manufacturing milk processing plants. With 8 exceptions, all of these plants ship milk and milk products into Kentucky.

"As late as 1938, milkborne outbreaks in the United States constituted 25 percent of all disease outbreaks due to infected foods and contaminated water."

As late as 1938, milkborne outbreaks in the United States constituted 25 percent of all disease outbreaks due to infected foods and contaminated water.[8]

Even though the occurrence of foodborne illness and diseases from milk in the United States has been reduced from 25% in 1938 to approximately 1% or less today, milk related incidents of illness do occur even though stringent milk regulatory programs are in existence throughout the country.

Diseases and foodborne illnesses which may be associated with milk include typhoid fever, paratyphoid fever, scarlet fever, septic sore throat (streptococcus), salmonellosis, staphylococcal infections, bovine tuberculosis, brucellosis, foot and mouth disease, anthrax, Q fever, and dysentery. Mastitis, an inflammation of the udder, may greatly increase the occurrence of staphylococcus and streptococcus organisms in milk.

Most diseases of cattle, such as bovine tuberculosis, brucellosis, foot and mouth disease, and anthrax, have been substantially reduced through eradication programs administered by the United States Department of Agriculture (USDA).

Milk produced for human consumption is required by the 1978 Pasteurized Milk Ordinance and the Interstate Milk Shippers Conference to be from animals located in a modified accredited tuberculosis area and a certified brucellosis free area, as defined by USDA. Dairy cattle located in areas not meeting these requirements must be individually tested annually.

Even with rigid controls from public health and agriculture regulatory officials throughout the United States plus stringent industry quality standards,

TABLE 1.

Percent Change in Per Capita Sales
1969-1979

Plus		Minus	
Yogurt	204%	Ice Milk	1%
Lowfat Milk	156%	Ice Cream	2%
Sour Creams & Dips	91%	Cottage Cheese	4%
Cheese	67%	Butter	9%
Eggnog	52%	Sherbet	19%
Flavored Milk & Drinks	24%	Cream	19%
Skim Milk	4%	Buttermilk	25%
		Whole Milk	29%
		Nonfat Dry Milk	40%
		Evaporated & Condensed	45%

Information from: 1980 Milk Facts published by the Milk Industry Foundation

milkborne illness, even though greatly reduced, still occurs.

In 1971 Wodicka[9] reported that sanitary practices that have spread through the food processing industry in the last generation are largely those developed in the dairy industry in the previous generation. Even now, there are relatively few food processing plants that display the standards of sanitary construction that are found in almost any milk processing plant.

Just recently several salmonella infections occurred in California from Certified Raw Milk.

A resolution recently passed by the Association of State Public Health Veterinarians stated in part that "... the long term occurrences of human salmonellosis associated with the use of certified milk has persisted in California under the American Association of Medical Milk Commission -- Methods and Standards for Production of Certified Milk -- is indicative of the failure of said document ... to protect users of certified milk from milkborne salmonellosis ..." and further stated that bovine salmonellosis constitutes a serious hazard to users of raw milk.

Kentucky regulations adopted by the Department for Human Resources under the authority of the Kentucky Milk and Milk Products Act of 1972 (KRS Chapter 217C) prohibits the sale of raw milk to consumers.[10] However, continuing surveillance by the Milk Control Branch occasionally reveals raw milk being sold in Kentucky, mainly through health food and nutrition stores. Also, occasionally a dairy farmer will decide to offer raw milk for sale. Local health departments have been requested to report any known attempts to sell raw milk in their areas.

The last known foodborne illness from a milk product processed in Kentucky occurred in 1977 from whipped butter processed by Blue Valley/Sugar Creek, Division of Beatrice Foods, Louisville. Several known cases of staphylococcal infection occurred in Kentucky and surrounding states from this butter. Information that a problem existed was first received from Indiana health officials. After this notification a notice was issued by the Milk Control Branch for the plant to be closed for further investigation. A thorough product sampling and inspection of the plant's physical facilities was conducted by state and federal officials. Laboratory analysis of samples collected from the plant were positive for staphylococcal organisms in some lots. The plant inspection also revealed areas of non-compliance with product pasteurization, insanitary handling practices, and improper refrigeration. From this data a nationwide recall was initiated with the assistance of FDA. Some 140,000 pounds of whipped butter was recalled. Further laboratory analysis of the recalled product confirmed positive staphylococcal organisms. After extensive cleaning, sanitizing, screening of employees, and correction of pasteurization and refrigeration deficiencies, the plant was allowed to begin operation with a close sampling surveillance of products produced.

"Even with rigid controls from public health and agriculture regulatory officials throughout the United States plus stringent industry quality standards, milkborne illness, even though greatly reduced, still occurs."

Other incidents of foodborne illness occurs throughout the country from time to time. A few examples include:

- Eight outbreaks of staphylococcal food poisoning in which 1,190 children eventually became ill occurred in England during 1953 from non-fat dry milk.[11]
- Cheddar cheese produced in Missouri was reponsible for an outbreak of staphylococcal food poisoning in 1965 which involved a number of people over a widespread area of the United States.[11]
- Chocolate milk processed in New York which contained *Yersinia Enterocolitica* was responsible for an outbreak of yersiniosis in 444 children under the age of 18 in 1966 in Oneida County, New York.[12]

Due to the significance of milk in the American diet and the public health impact that milk produced under insanitary conditions was having throughout the country,

the 1946 Conference of State and Territorial Health Officers requested the U.S. Public Health Service to Develop a plan for the certification of interstate milk shippers.[13]

Since 1960 over 90% of the milk and milk products consumed in the U.S. are pasteurized. Pasteurization, thought to be a panacea for all milk related illnesses, has contributed significantly to the decreased incidence of foodborne outbreaks related to milk, but certain other factors must be taken into consideration for pasteurized products to be completely safe, including:

1. Raw milk for pasteurization must be produced under sanitary conditions. Work by Zottola, et al., has found that certain strains of bacteria have the ability to survive pasteurization temperatures especially when large numbers of bacteria are present prior to the pasteurization process.[14]
2. Several strains of bacteria associated with milk produce toxins, the resistance of which is such that it is not inactivated by pasteurization.[15]
3. Pasteurization equipment used today is very sophisticated and, therefore, must be checked routinely by the regulatory agency to assure that proper product pasteurization is being accomplished. The regulatory agency is required to affix seals at crucial points throughout the system to prevent tampering or adjustments to settings without detection. Additionally, phosphatase tests are routinely run on pasteurized products by the regulatory agency.
4. Also of importance is the possibility of post pasteurization contamination and improper refrigeration between the time of processing and consumer usage.

In the early 60's public health officials and research technicians became concerned with toxin produced by staphylococcus infections in cow udders. Also, staphylococcal epidermidis frequently causes endocarditis, ventriculitis, and urinary tract infections in man.[16] Staphylococcus and streptococcus infections associated with mastitis in dairy cattle resulted in recommendations from the National Mastitis Council to the Interstate Milk Shippers Conference (IMS) and the development and adoption by the conference of a surveillance and enforcement program for the control of abnormal milk produced from mastitic dairy cattle.

This program increased tremendously the use of drugs and antibiotics by dairy farms and veterinarians. Additional safeguards and increased surveillance of the nation's milk supply was required by the 1978 Grade A Pasteurized Milk Ordinance of the USPHS/FDA recommended for state adoption. This document which was adopted by the IMS Conference effective July 1, 1980, requires all raw milk from producer dairies, commingled raw milk in plants, and pasteurized milk and milk products to be tested for antibiotics a minimum of four times each six months.

Of major concern to public health officials in recent years is the impact on public health of consumers of milk and milk products which contain antibiotics, pesticides, and other chemical contamination.

Toxic and carcinogenic chemicals have become significant not only in milk but in our total food supply and environment. Richard Cooper, Chief Counsel, FDA, recently stated, "The general and strong presumption in food safety policy should be for protection and against freedom of choice. People would rather spend their time and energy on the areas of life where freedom is really important."[17] Cooper further stated, "When Patrick Henry said 'Give me liberty or give me death,' he wasn't talking about the consumption of food."

A balance should exist between consumer choice and government regulation. In some instances Congress has overreacted to what it believed to be a demonstrated danger.[18]

Environmental contaminants in food fall into three categories: synthetic or natural organic chemicals, metals or their organic and inorganic derivatives, and radioactive substances. The FDA Code of Federal Regulations defines environmental contaminants as "added poisonous or deleterious" substances that cannot be avoided by good manufacturing practices and that make food injurious to health. Several factors determine whether and how seriously the environmental contamination of food will affect human health: the toxicity of the contaminant, the amount of the substance

in the food, the amount of the contaminated food eaten, and the physiological vulnerability of the individual consuming the food.

There is considerable evidence of human illness caused by the consumption of food containing various organic chemicals and metals. Incidents of mercury poisoning and "Yusko disease" (a condition marked by acne, eye discharges, headaches, fatigue, liver and menstrual disturbances) from the consumption of food contaminated with PCB's (polychlorinated biphenyls) are documented.[19]

Environmental contaminants which have been found in milk include PCB's, aflatoxin; chlorinated hydrocarbons such as dieldrin, aldrin, heptachlor, endrin; and organic phosphores such as malathion and parathion.

Several samples collected within Kentucky in the past have revealed levels in excess of FDA established tolerances and action levels for PCB's, DDT, and dieldrin.

One producer was suspended from the market for seven months in 1977 for high levels of dieldrin. Approximately 300,000 pounds of milk was required to be disposed. Other instances of milk being disposed in Kentucky has resulted from high levels of DDT, PCB's, and other hydrocarbons.

Adulteration of food is defined by the Kentucky Food, Drug, and Cosmetic Act (KRS 217) as ". . . a food shall be deemed adulterated: . . . (a) if it bears or contains any poisonous or deleterious substance, (b) consists in whole or in part of a diseased, contaminated, filthy, putrid, or decomposed substance, (c) if it has been produced, prepared, packed, or held under insanitary conditions, (d) if any valuable constituent has been removed, or (e) if any substance has been added which increases the volume, weight, or reduces its quality or strength. Each year Kentucky producers lose approximately 250-500,000 pounds of milk because of adulteration.[20]

Trace levels of PCB's were recently reported in three samples of pasteurized milk processed in Kentucky and sold in Indiana. Lack of adequate screening of milk produced and/or sold increases the risk to the health of consumers and also may destroy the credibility of a regulatory program which could prohibit milk produced from being accepted by other states on a reciprocal basis under the IMS Conference agreements. This would economically destroy the dairy industry.

Kentucky's milk inspection program, like many public health programs, has undergone major change over past years.

Prior to 1962 local health departments carried out the milk inspection program entirely on Grade A milk. No regulatory program existed on manufacturing grade milk. Little standardization existed between local ordinances and inspection programs. Some counties required that all milk sold therein be inspected by their personnel, with a majority of the dairy industry being charged a fee for these inspections. Inspectors crossed paths in many instances to inspect dairies shipping milk into their areas. Several local health department inspectors even inspected dairy producers in other states and inspectors from other states came into Kentucky. With the closing of many small processing plants, local health department inspection programs became more and more inefficient and ineffective in providing regulatory programs which would adequately protect public health. Partly because of budget restraints and lack of adequately trained personnel, several local health departments decreased their milk inspection activities and turned to the state for assistance.

Anticipated problems of moving milk into other states and non-standardized inspection programs prompted the dairy industry and the Kentucky Farm Bureau Federation to request that legislation be developed which would place the milk regulatory program within the state under one agency.

In 1972 the Kentucky General Assembly passed the Kentucky Milk and Milk Products Act. This act became effective July 1, 1972, except for the elimination of fees which became effective July 1, 1974. The act provides for uniform state standards, creates advisory committees, designates one state agency (Department of Health) for the purpose of carrying out a statewide program, eliminated the collection of fees and requires the department to adopt separate regulations regarding the production, transportation, processing, handling,

sampling, examination, grading, labeling, standards of identity, and sale of milk and milk products for both Grade A and milk for manufacturing purposes.

The development and coordination of a standardized statewide program and the certification of industry laboratories for the analysis of the majority of the raw milk samples contributed significantly to a more cost efficient program. Also, greater program standardization has been accomplished. Even with inflation factors, program efficiency has allowed budget increases to rise only slightly over the past several years. Very little, if any, additional funds are being spent today than were used prior to the establishment of the state program in 1972-74. This also takes into account that the state is now administering a milk for manufacturing inspection program, a milk hauler/sampling certification program, and a manufacturing milk industry laboratory certification program which was not being carried out prior to the development of the state program.

The goals of the Milk Control Branch will continue to be that of prevention and quality assurance. Maintenance of the program will require additional planning in the future to offer a direct service regulatory program which is cost efficient and effective. The dairy industry must continue to give financial support to the program in the area of sample analysis through their certified laboratories.

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Understanding the need for, and methods of running a sanitary food operation is imperative if the operator wants to achieve little contamination of food, and few chances of disease transmittal. A higher life expectancy of equipment, and increased employee morale and efficiency are also benefits of running a clean foodservice unit. The fundamentals of cleaning, the role of water, cleaning agents, sanitizers and tests for sanitizer strength are discussed.

It's illegal not to run a clean, sanitary food operation.

But that's not the only incentive for running a good, clean foodservice unit. Among other benefits of running a good operation are increased life expectancy of the equipment and building, and increased employee morale and efficiency.

Before proceeding, a clear understanding of some definitions is necessary:

- Cleaning--A process which removes soil and prevents accumulation of food residues which can decompose and support growth of disease-causing organisms or toxin production.
- Sanitizing--A process which destroys disease-causing organisms which may be present on equipment and utensils even after an initial cleaning.
- Soil--A substance which is "matter out-of-place." Grease on a gear, for example, is a lubricant, but that same grease on a table top becomes a soil.

CLEANING AND SANITIZING OPERATIONS

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Water is the primary constituent of all food processing plant cleaners. Basic requirements of water used in all food processing operations are that the water must be free from disease-producing organisms, toxic metal ions, and objectionable odors and taste.

Pure water would be ideal, but no food processing establishment has such a supply. Therefore, cleaning compounds must be tailored to the individual water supply and type of operation.

One water impurity, suspended matter, must be kept to a minimum to avoid deposits on clean equipment surfaces. Soluble iron and manganese salts in concentrations above 0.3 ppm. will produce colored deposits on equipment surfaces. Suspended matter and soluble iron and maganese can only be removed by treatment.

Water hardness due to salts of calcium and magnesium present a major problem in the use of cleaners. A machine's effectiveness is reduced and

surface deposits are formed when such salts are present in the water supply.

Two types of water hardness must be considered. Carbonate hardness (formerly called temporary hardness) is due to calcium and magnesium carbonates and bicarbonates. It can be removed by heating. Noncarbonate hardness (formerly called permanent hardness) is due to calcium sulfates, calcium chloride, magnesium sulfate and magnesium chloride. It cannot be removed by heating.

Water hardness varies considerably from place to place. Generally, surface waters are softer than ground waters.

In terms of savings and effectiveness, the ideal water for general food plant cleaning purposes is completely softened. Such water has 0-3.5 grains of matter per gallon. However, a degree of hardness is often preferable in some food processing operations, such as in some vegetable canning.

Fundamentals of Cleaning

- To bring a cleaning agent into intimate contact with the soil.
- To displace soil from the surface to be cleaned.
- To disperse soil in the solvent.
- To prevent redepositing of dispersed soil on the clean surface.

"Pure water would be ideal, but no food processing establishment has such a supply. Therefore, cleaning compounds must be tailored to the individual water supply and type of operation."

Cleaning agents perform the following functions:

- Deflocculation or Dispersion-Groups or clumps of particles are broken up into individual particles and spread out suspended in the solution.
- Dissolving-Water soluble materials are produced from water insoluble soil.
- Emulsification-Fats are broken up into tiny globules and suspended in the cleaning solution.
- Penetration - Liquids entering porous materials through cracks, pin holes, or small channels.
- Peptization-Physical formation of colloidal solutions from partially soluble materials.
- Saponification - Action of alkali on fats which produces soap.
- Suspension-Insoluble particles are held in solution and not allowed to settle out onto the utensils.
- Rinsability-The surface tension of water in solution is broken so utensils can drain dry.
- Water Softening
  Precipitation-Soften water by precipitating out the hardness.
  Sequestration-An inorganic compound attaches itself to water hardness particles and inactivates them so they will not combine with other material in the water and precipitate out.
  Chelation-The same as sequestration except that an organic compound is used.
- Wetting-Action of water in contacting all soil, helps to reduce surface tension, (wetting agents usually do a good job of emulsification).
- Synergism-A chemical used as a builder with a soap or detergent, which results in a detergency which is greater than the total detergency of the chemical and the soap if they were used independently.

There are several factors which affect cleaning efficiency. Proper selection of the cleaner for the job, cleaner concentration, surface contact time, force or velocity, and temperature are all important for good cleaning.

Each of the variables can be adjusted for individual cleaning problems or plant practices. Factors involved differ in hand cleaning from circulation cleaning and depend on the type and condition of soil to be removed.

Factors work in different ways. A temperature increase decreases the bond strength of soil and surface, as well as viscosity, and increases material solubility and chemical reaction rate.

Velocity, or force, acts in hand cleaning as "elbow grease," though fluid flow is used in some systems as a cleaning force. Increased turbulence provides more effective removal of film from surfaces. Efficiency is less affected by turbulence when the physical-chemical effectiveness of the detergent increases.

The time factor is also important in cleaning. All other factors constant, cleaning efficiency can be increased when cleaning time is increased.

The least effective variable to change is the concentration of the cleaning solution. An increase in concentration increases the reaction rate.

Good cleaners have the following desirable properties:

- Quick and complete solubility
- Good wetting or penetrating action
- Dissolving action on food solids
- Emulsifying action on fat
- Deflocculating, dispersing, or suspending action
- Good rinsing properties
- Complete water softening power
- Noncorrosive on metal surfaces
- Germicidal action
- Economy in use

A certain methodical manner is best to use for cleaning. To remove large food particles, remove loose material before applying cleaning solutions. Flush the equipment surface with either cold or warm water under moderate pressure.

When applying cleaning compounds, many methods can be used. The effectiveness and economy of the methods generally dictates which one will be used.

One method, soaking, involves immersing small equipment, fittings, or valves in a cleaning solution in a sink, while larger vessels such as vats and tanks may be partially filled with a pre-dissolved cleaning solution. The cleaning solution should be hot, and the equipment permitted to soak for 15-30 minutes before being manually or mechanically scrubbed.

A recent approach to soaking is ultrasonic cleaning tanks. Equipment is immersed in a cleaning solution and cleaned by microscopic bubbles whose scrubbing action is caused by high frequency vibrations.

Spray methods allow cleaning solutions to be sprayed on equipment surfaces. Fixed or portable spraying units may be used, with either hot water or steam. Such methods are extensively used in the food industry.

Clean-in-place systems are methods in an automated cleaning system generally used with permanent-welded pipeline sytems. In C.I.P. cleaning, fluid turbulence in pipelines is considered to be the major source of energy required for soil removal.

Abrasive cleaning means abrasive-type powders and pastes are used for removing difficult soil. Complete rinsing is necessary and care should be taken to avoid scratching stainless steel surfaces. Scouring pads should not be used on food-contact surfaces. Small metal pieces from the pads may serve as focal points for corrosion or may be picked up in the food.

Rinsing is the final stage of cleaning. All equipment surfaces should be thoroughly rinsed with clean potable water immediately after cleaning in order to remove all traces of the solution. Very hot water may be desirable for decreased drying time.

Effective sanitizing procedures are used primarily to destroy disease organisms which may be present on equipment or utensils after cleaning, and thus prevent the transfer of such organisms to the consumer. In addition, sanitizing procedures may prevent spoilage of foods or prevent the interference of microorganisms in various industrial processes which depend on pure cultures.

There are a wide variety of known chemicals whose properties destroy or inhibit the growth of microorganisms. Many of these chemicals are not suitable for use on food-contact surfaces because they may corrode, stain or leave a film on the surface. Others may be highly toxic or too expensive for practical use. Therefore, the discussion on chemical sanitizing agents will be restricted to those agents in common use in the food industry.

The first chemical sanitizing agent is chlorine. Chlorine and its compounds combine indiscriminately with any and all protein and protoplasms. Chlorine's mode of bactericidal action is thought to be the reaction of chlorine with certain oxidizable groups in vital enzyme systems. There are inorganic and organic chlorine products.

Two types of inorganic chlorine products are in common use: calcium hypochlorite, generally found in powder form of 70 percent available chlorine; and sodium hypochlorites, generally found in aqueous solution of 2-15 percent available chlorine.

Several characteristics and limitations are evident with use of these products. Inorganic chlorine is an effective sanitizer if high enough residual is used, though organic matter may cause a substantial reduction in bactericidal effectiveness. Also, temperature and pH may exert marked influence on the bactericidal effectiveness.

Inorganic chlorine is relatively unaffected by water hardness. No film is left on its surface, but this product may leave an odor or taste.

There are also two types of organic chlorine products: "Chloramine-T" which comes in powdered form of 25 percent available chlorine; and dichlorocyanuric and trichlorocyanuric acids, which are available in powdered form 70-90 percent available chlorine.

Characteristics and limitations of organic chlorine are that it has slower bactericidal action than hypochlorites, and is affected by similar factors which affect hypochlorites. Organic chlorine is, however, relatively non-irritating to the skin.

The second group of chemical sanitizing agents to consider are iodophors. Iodophors are soluble complexes of iodine, usually loosely bound with nonionic surface-active agents.

These products have rapid bactericidal action in the acid pH range in both cold and hard water. They are less affected by organic matter than hypochlorites, are nontoxic in ordinary concentration, and are noncorrosive, and non-irritating to the skin. The yellow or amber color of an iodophor solution is proportional to its concentration. Iodophors are less effective against bacterial spores than hypochlorites. Does not stain and only minimal taste and odor.

Quaternary ammonium compounds form the third type of chemical sanitizing agent. These compounds are synthetic surface-action agents. The most common ones are the cationic detergents which are poor detergents but excellent germicides.

In these compounds, the organic radical is the cation and chlorine is usually the anion. The mechanism of germicidal action is not completely understood, but is associated with enzyme inhibition and leakage of cell constituents.

The quaternary ammonium compounds include alkyl dimethyl benzyl ammonium chloride and alkyl dimethyl ethylbenzyl ammonium chloride, compounds which are effective in water ranging from 500 to 1100 ppm. hardness without added sequestering agents.

Diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride and methyl dodecyl benzyl trimethyl ammonium chloride are compounds which require sodium tripolyphosphate to raise hard water levels to a minimum of 500 ppm.

The compounds require high dilution for germicidal or bacteriostatic action. They are very selective in the destruction or inhibition of various types of organisms. Also, quaternary ammonium compounds form bacteriostatic film on surfaces after treatment.

Noncorrosive and non-irritating to the skin, they have no taste or odor in use dilutions. The compounds are more stable in the presence of organic matter than are some other chemical sanitizers. Unfortunately, they are incompatible with soap, anionic detergents and inorganic polyphosphate. Too, it is difficult to accurately measure the residuals.

There are many factors affecting the action of chemical sanitizers. In order for a chemical to react with microorganisms, it must achieve close contact with the sanitizer. Also, certain sanitizers are nonselective in their ability to destroy a wide variety of microorganisms, while others demonstrate a degree of selectivity. Chlorine is relatively non-selective. Both iodophors and quaternary compounds have a selectivity which may limit their application.

In general, the more concentrated a sanitizer, the more rapid and certain its actions. Use of increased concentration is usually related to increases in effectiveness, up to a point where there is less effectiveness.

All the common sanitizers increase in activity as solution temperature increases. This is partly based on the principle that chemical reactions in general are speeded up by raising the temperature. However, a higher temperature also generally lowers surface tension, increases pH, decreases viscosity and creates other changes which may enhance germicidal action. Chlorine compounds are more corrosive at high temperatures while iodine tends to sublime at temperatures above 120° F.

The pH of the solution exerts a very pronounced influence on most sanitizers. Quaternary compounds present a varied reaction to pH depending on the type of organism being destroyed. Chlorine and iodophors generally decrease in effectiveness with an increase in pH.

Sufficient time must be allowed for sanitizers to work. The time required will depend not only on the preceding factors, but on microorganism populations and the populations of cells having varied susceptibility to the sanitizer due to their age, spore formation and other physiological factors.

Methods of Sanitization with Chemicals

Chemical Agent	Minimum Concentration (ppm)
Hypochlorites	50
Chloramine–T	200
Q. A. C.	200
Iodophors	12.5

For sanitization of assembled equipment, the solution strength should be checked at the outlet end. When it is in excess of the above minimum concentrations, the solution should be pumped through the entire equipment for at least one minute.

Several field tests exist to measure sanitizer strength. Chlorine sanitizers, for instance, may be tested by three different means. The first, a starch iodide method (iodometric), is a titration test in which chlorine displaces iodine from potassium iodide in an acid solution and forms a blue color with starch. This is decolorized by the addition of standard sodium thiosulphate. This test is generally used to measure high residuals.

Second is the orthotolidine colorimetric comparison. This is a test in which a colorless solution of orthotolidine added to a chlorine solution produces an orange-brown compound with a color proportional to its concentration. It is compared to a standardized color.

The indicator paper test is third. It is a rapid test of limited accuracy in which test papers with a starch-iodide are immersed. The color that develops is compared with a standard.

Several satisfactory tests exist for determing quaternary compound concentration. Some reagents are in tableted form while others use test papers for a color comparison.

Solution pH	Temperature (°F.)	Time (minutes)
7.5-9.5	75 or above	1
7.0 or below	75 or above	2
5.0 or above	75 or above	1/2
5.0 or below	75-120	1

Although iodophors have a built-in color indicator which is usually accurate, color comparative kits and other kits are available for testing.

Heat is a basic physical sanitizing agent. Moist heat can be hot water or steam.

Hot water is an effective, non-selective sanitization method for food-contact surfaces. However, spores may remain alive even after an hour of boiling temperatures. The microbicidal action is thought to be the coagulation of some protein molecules in the cell.

The use of hot water has several advantages in that it is readily available, inexpensive and nontoxic. Sanitizing can be accomplished by either pumping the water through assembled equipment or immersing equipment into the water.

When pumping it through equipment, the temperature should be maintained to at least 170° F. for at least 5 minutes as checked at the outlet end of the equipment. When immersing equipment, the water should be maintained at a temperature of at least 170° F. for 1-5 minutes depending on the size of the equipment.

Steam heat is an excellent agent for treating food equipment. Treatment on heavily contaminated surfaces may cake on the organic residues and prevent lethal heat to penetrate to the microorganism.

Steam flow in cabinets should be maintained long enough to keep the thermometer reading above 170° F. for at least 15 minutes or above 200° F. for at least 5 minutes. When steam is used on assembled equipment, the temperature should be maintained at 200° F. for at least 5 minutes as checked at the outlet end of the assembled equipment.

Dry heat is a more uncommon form of sanitation. Hot air ovens and chambers are not generally used because the method requires longer times and higher temperatures. When such cabinets are used, the temperature must be at least 180° F. for a holding period of at least 20 minutes.

The second basic physical sanitizing agent is ultraviolet radiation. Low pressure mercury vapor lamps which produce effective bactericidal action by the emission of radiation at a wave length of around 2500 A. have had limited use in the food industry. Major application has been with air disinfection. However, installations of lamps have been reported on bread-slicing machines, over open vats in breweries and in chill rooms for meats.

Bacterial resistance will highly influence the lethal exposure time. Moreover, the light rays must actually strike the microorganisms because the rays are absorbed by dust, thin films of grease and opaque or turbid solutions.

Through use of ultraviolet radiation, heat, chlorine and iodophors, chosen for particular applications, comes an effective cleaning and sanitizing operation. Utilization of the best method available for a particular system will give the food sanitarian some peace of mind as he works to set and meet high health standards.

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FOOD SURVEILLANCE AND SALVAGE FOLLOWING DISASTERS

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Even the most prepared communities cannot anticipate sudden, devastating natural disasters. Local authorities must immediately cope with meeting basic needs of the people -- food, clothing, shelter and medical care. The food supply is of special consideration; it must be adequate, safe and available. Contingent disaster plans must provide for the destruction, detention and reconditioning of food. Destruction varies with the type of food product and container it is packaged in. "Questionable" food is detained when authorities don't know if it is safe or not. Reconditioning of food is possible in some cases if damage is not great. All food handling establishments, and their furniture and equipment, must be thoroughly scrubbed and sanitized before resuming normal operations. Local authorities work with the FDA, USDA, and other federal agencies in the relief effort.

May 18, 1980. The spectacular volcanic eruption of Mt. St. Helens spewed hot lava, ash and assorted debris hundreds of miles, killing all plant and animal life in its path.

Mt. St. Helens is an unhappy and dramatic example of a natural disaster. The volcanic eruption created a sudden catastrophe, plunging people into helplessness and suffering. Authorities were forced to deal with the immediate problem of satisfying the most basic human needs--those of food, clothing, shelter and medical care.

Food and water are perhaps the most essential of the basic needs. After disaster strikes, local authorities must be prepared to coordinate activities with the U.S. Food and Drug Administration and appropriate state agencies as they start the inspection of food, supervision of decontamination and control of salvage operations.

Preliminary investigations should include locating all damaged foods and posting quarantine tags. Listing all food handling, storing and transportation establishments such as warehouses, frozen food lockers, restaurants and retail food stores, grain elevators and raw agricultural products in the field, is a great aid, should such a list ever be needed in a disaster.

Judgment is an essential factor in determining safety of foods following a disaster. Some guidelines for field judgment are in the answers to these basic questions: Was the electricity off? If so, for how long? In case of fire, what was used to extinguish the fire? If water -- was it from a potable supply? What is the disposition of salvageable products? Will they be salvaged by a commercial salvage firm or by proprietor? What arrangements have been made to remove "safe" products from the location?

Destroy items that cannot be salvaged, hold those that are considered questionable and recondition those that are salvageable, with close supervision.

Destruction of condemned goods is one of the first items to be completed in a disaster plan. This could include the use of approved types of incinerators, the use of sanitary landfills or both. In many cases it may be necessary to establish temporary sanitary landfills.

Trucking arrangements should also be considered in a disaster plan. Workmen should be at the disposal sites to assist in prompt disposal of the wastes. Guards may be necessary in order to assure that no scavenging or looting takes place.

Records should be kept of disposal of merchandise at the place of business and at the disposal site indicating the number of truck loads, date, and point of origin. This information may be needed for possible reimbursement for disposal and for insurance or tax claims. Reputable dealers and manufacturers want assurance that their products are absolutely destroyed and will not reappear as damaged merchandise.

Many types of merchandise should automatically be destroyed. These types of food in most cases cannot be reconditioned, or have no salvage value.

Produce such as lettuce, celery and cabbage that has been under flood water is included in this category. Most produce is self destructive because of spoilage.

Coffee and tea, flour, meal, cereals, beans, wheat and whole unprocessed grains, confectionery sugar,

and nuts (salted, shelled or shell nuts) should also be destroyed.

Flood water will affect screw top, crimped-cap, and other containers such as beer, wine and whiskey bottles or cans.

Frozen foods with internal product temperatures higher than 10 degrees F will be damaged, as will perishable foods under refrigeration. This includes butter, cheese, milk, milk products, fish and shellfish where temperatures have reached 50 degrees or higher for a period greater than one hour.

Fire will damage all food items in the immediate vicinity. Extreme heat can recook contents of canned goods and harm the contents.

Foods subject to direct contact with non-potable waters are also affected. Paper or cellophane-wrapped goods can collect filth or split at the seems making it virtually impossible to remove or sanitize the contents properly. This includes such items as candy, cereals, bread, cakes and chewing gum.

Frozen eggs in slip-cover type tops found in flood waters cannot be salvaged. Shell eggs should be broken and destroyed, as should all kraut and pickles in the process of manufacturing or in bulk in open barrels.

Experience shows that any bottled foods with cork stopper glass and cork stoppers will be contaminated on the interior when submerged in flood water. Catsups, vinegar, and condiments are among the products that come in these bottles. No type of closure used on glass food containers has been found safe for submersion in flood waters.

Smoke damage to foods is probably the most difficult to assess. Insoluble tars and plastics and their by-products may be suspended in the smoke and are a major concern. All meats exposed to smoke should be disposed of unless salvaged under the guidance of the Department of Agriculture for use as tankage for animal feed.

Chemical contamination of food can occur by chemicals used in fire fighting or explosions. It can also occur in broken containers of insecticides, rodenticides, and household cleaning items. Any indication of chemical contamination makes food unsalvageable.

The types of containers syrup and molasses are packed in are usually of such character that it is necessary to destroy the contents. Syrup, molasses and honey may be used as denaturing material for feeding stuffs.

Manufactured tobacco products in paper or cans must be destroyed. In large quantities they have salvage value due to revenue stamps. A record of destruction should be made for the owner for this purpose. Loose-leaf tobacco cannot be salvaged except for use as fertilizer.

Such personal articles as baby nipples, rubber catheters of small size and various other small articles that in use come in contact with the human body cannot be salvaged and owners should be instructed to destroy them. The investigator should sign a record and give it to dealers showing destruction of such products.

Fresh, smoked, salted or other meat except canned cannot be salvaged for human food. Nor can meat in the process of pickling or curing, if the containers have been submerged in flood water.

Miscellaneous food such as ice cream and fish must be destroyed and has no salvage value, except in quantities which will make the salvageable fat of some value.

The type of containers in which spices are usually shipped permit contamination with flood water. Therefore, all spices must be destroyed.

In most cases, flood waters will destroy bags of salt, sugar, dried milk or powdered eggs by dissolving or damaging them. If, however, the bags are only wet it is possible to salvage the sugar or salt by returning it to the factory for recrystallization.

"Questionable" food items--where authorities are not sure anything is wrong with them--should be tagged with instructions to segregate and hold. It is not the responsibility of the sanitarian or investigator to recondition or segregate the contaminated merchandise from the uncontaminated, but it is his or her responsibility to supervise such activity.

Detention is an early activity that is completed on the preliminary survey of all food establishments. Schedules for supervising segregation and salvage can be made after the preliminary survey.

Food reconditioning is a difficult process which can usually be done best by a commercial salvage firm. Explicit instructions and strict supervision are necessary to ensure good salvage.

Empty fruit jars, cans and bottles may be salvaged by thorough washing and chlorination under supervision. Some types of cans are not easy to clean and the cost of their salvage may not be justified.

Containers with a vacuum lid holding jellies, jams, peanut butter and mayonnaise may be salvaged when present in large quantities. A manufacturing company with the ability to individually open, sterilize the pouring lip, and remove the contents of the jar for resterilization and repacking should do the salvaging.

Canned goods, when flooded, may be salvaged for human consumption. This should be done by removing the labels and thoroughly scrubbing the surfaces. The can is then rinsed and dipped in a chlorine solution. It should be air dried or wiped dry with clean cloths to prevent rusting or leaks. Strict attention must be paid to preserving labels or relabeling.

The only types of cans that can be treated are hermetically sealed metal cans, cans with a key, and those used for cooking oil or syrup with a turnable spout.

Whether stocked in a hardware store or in a restaurant, dishes and

kitchen utensils should be thoroughly washed and disinfected, as should baby bottles and hard rubber equipment.

Barrelled whiskey, beer and vinegar can be salvaged by scrubbing the barrel completely on all surfaces with a cleansing agent and water. Bungs should be carefully examined to see that there is no leakage or possibility of leakage of flood water into the barrel.

When bottled liquors are found in large quantities, some methods of salvaging may be worked out by consultation with the Internal Revenue Office.

In large quantities it may be worthwhile to try to salvage butter, cheese and fats for glycerine and soap-making purposes. The shipment of these goods away from the site of the disaster should only be permitted after inspection, and the goods should either be denatured or shipped under quarantine and seal.

Laboratory assistance in the analyses of foods for chemical or microbiological contamination is provided through the FDA and the USDA. This is especially true of questionable salvage items. The development and release of information to the public on the safety of the food supply, sanitation measures, hazards, and reconditioning methods is also done through the FDA and other federal agencies.

Special investigations into suspected foodborne illnesses following a disaster should be handled using the appropriate forms. If it appears a foodborne illness has occurred, the state epidemiologist should be notified. On confirmed foodborne illnesses, local FDA and USDA workers should be notified of any findings.

Before food establishments are reopened for business, a complete inspection should be made to insure all is in order. No restaurant should be permitted to reopen until the entire establishment has been thoroughly cleaned and disinfected.

Except in an emergency when it is necessary to open earlier, none should be permitted to open until the building has been thoroughly dried out. All electric lights and appliances should be checked by an electrician for short circuits.

All motors for pumps, dough mixers and other mechanical equipment should be examined by a competent person to see that they are clean, dry and free-running before turning on the current. All parts should be cleaned without forcing any dirt into the bearings.

All woodwork in the establishments should be scrubbed with a stiff fiber brush and plenty of water before the establishment is dried out. Plaster may be cleaned with a good wallpaper cleaner as soon as it is bone dry. All wallpaper hanging from walls or ceiling should be removed. All woodwork including floors should be scrubbed.

Linoleum should be removed as silt and other debris will gather underneath.

All furniture and equipment should be taken outdoors and scrubbed to remove mud and dirt. All stoves should be thoroughly cleaned and polished with a good stove polish. All pots and pans should be scrubbed and sanitized.

Disaster work calls for a team approach to the relief effort. The key lies in coordinated activity between local authorities and the FDA, USDA, and other federal and state control agencies. Such work will lead to quicker relief for the unfortunate victims of natural disaster.

Entering Damaged Buildings

- Be sure the building is not about to collapse.
- Turn off gas at meter and allow building to air out for several minutes.
- Do not smoke or use flame until you are certain it is safe.
- Do not turn on lights or appliances until electrician has checked out the electrical system. Wear rubber soled shoes or boots and rubber gloves. Turn off the main switch while standing on a dry board.
- Watch out for holes in the floor or loose boards with exposed nails.
- Watch for loose plaster. As the building dries out, loose plaster will tend to fall. Remove loose plaster before moving about the building.
- Open doors and windows to allow air and heat to dry the building.
- Test plumbing and drains by pouring in a bucket of water. If water does not run out, remove the clean-out plug from the trap and rake it out with a wire.
- Where basement odors persist even with ventilation, sprinkle bleaching powder (chloride of lime) on the floors and walls.
- Mechanical equipment should be checked by a competent technician to be sure they are clean, dry and free running before turning the current on.
- Furniture should be taken outdoors for air drying. If chairs have upholstery material they should be dry and cleaned.

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HUD 148 HM (2)

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News and Events

Rogers Receives DFISA Honor Award

Arthur A. Rogers, president of C. E. Rogers Co., Mora, MN, was selected by Dairy and Food Industries Supply Association as 1981 recipient of the Association's honor plaque, highest award for service to a member.

Rogers' service to DFISA spans both the administrative and technical fields. He began his Association work as chairman of the nominating committee in 1964. He was first elected to the board of directors in 1966 and has been reelected at each term since then. He was first elected by the board as treasurer of the Association in 1969 and has held that post continuously to the present time.

His primary area of contribution has been in the work of the task groups of the 3-A Sanitary Standards program. He has been the chairman of the dry-milk equipment task group since 1966 and co-chairman of the technical committee since 1973. He has devoted his efforts to gaining industry acceptance for the fabrication of stainless steel used in milk-drying systems. The result was the development of the 3-A Accepted Practice for cleanability of drying equipment, the first such application of cleaning criteria for equipment used for nonfluid processing.

Art Rogers, (right) C. E. Rogers Co., and his wife Jane accept the honor plaque for the Dairy and Food Industries Supply Association from James Shanahan, chairman of the DFISA awards committee.

Presentation was made to Rogers, whose company manufactures evaporating and spray-drying machinery for the food industry, by James Shanahan, chairman of the DFISA awards committee at DFISA's 62nd Annual Meeting April 13-15, 1981.

DFISA Directors Elected at SC Meeting

Four new directors and three incumbent directors were elected by the membership of Dairy and Food Industries Supply Association to seats on the DFISA board of directors at the 62nd Annual Meeting at Hilton Head Island, SC, April 13-15, 1981.

New directors are Thomas R. Case, manager, Food Industry Marketing, Reliance Electric Co., Toledo, OH; Robert L. Nissen, vice president, Ladish Co., Tri-Clover Div., Kenosha, WI; Edward Rhawn, president, B-Bar-B Inc., New Albany, IN; and E. Fred Malatesta, president, Wisner Manufacturing Corp., Mountainside, NJ. Case, Nissen and Rhawn will serve as at-large directors and Malatesta will serve as director for the jobber commodity group.

Re-elected as directors were Arthur A. Rogers, president, C. E. Rogers Co., Mora, MN, at-large; Robert C. Anderson Jr., president, Anderson Instrument Co. Inc., Fultonville, NY, general commodities and services director; and Howard Smith, president, Virginia Dare Extract Co. Inc., Brooklyn, NY, ingredients director.

All terms are for three years with the exception of Case, whose term is one year.

Retiring from the board were Donald H. Wedin, vice president sales, Paperboard Packaging, American Can Co., Greenwich, CT; Clyde N. Monda, president, Waukesha Foundry Div., Abex Corp., Waukesha, WI; George L. Remus, president, Cherry-Burrell, a unit of AMCA International Corp., Cedar Rapids, IA; and Hase Smith, chairman of the board, M. G. Newell Co.

DFISA is the national trade association of 525 equipment and supply companies serving the dairy, food, beverage and related processing industries.

Kostroski Joins NIFI Staff as Special Projects Director

Lois Kostroski, former Executive Vice President, Wisconsin Restaurant Association, has joined the staff of the National Institute for the Foodservice Industry as Director of Special Projects.

Kostroski, who was President-Elect of the International Society of Restaurant Association Executives, will assist NIFI in expanding its educational services to the foodservice industry and to state and local restaurant associations.

In her prior position with the WRA, Madison, Wisconsin, which she joined in 1974, Kostroski directed governmental, promotional, educational, membership, local chapter and convention services of the state association.

Earlier, Kostroski served as Promotion Director, WTMJ, Milwaukee television station. She received a bachelor of arts degree in Speech-Radio-TV-Film from the University of Wisconsin-Madison.

She is the author of *A Manual for Writing an Employee Handbook* for the foodservice industry and has taught seminars in several states.

Ray Joins Wyoming Staff

Dr. Bibek Ray, formerly with North Carolina State University and Shaw University at Raleigh, NC, has joined the University of Wyoming, Laramie, as Associate Professor of Food Microbiology in the Food Science Section of Animal Science. At the University of Wyoming he will be involved in developing undergraduate and graduate teaching and research programs in the food microbiology area.

WPI, ADMI Elect Officers

Harold K. Olson, Land O'Lakes, Inc., Eau Claire, WI, was elected President of the Whey Products Institute at the Institute's 10th Anniversary Meeting held in Chicago, IL, on April 22-24, 1981. Olson, who has been a member of the Board of Directors since 1977, served as Vice-President prior to his election as President; he also is a member of the Institute's Executive Committee.

Other WPI officers elected were: H. Jack Pollei, Galloway-West Company, Fond du Lac, WI, Vice-President; and Nico van Zwanenberg, Cuba Cheese, Inc., Cuba, NY, re-elected Secretary-Treasurer.

Truman (Torgy) Torgerson, Land O'Lakes, Inc., Manitowoc, WI was re-elected President of the American Dry Milk Institute at the Institute's 56th Annual Meeting, also held in Chicago April 22-24. Torgerson previously had served as Vice-President of the organization; he is a member of its Executive Committee, and has served on a number of standing committees since being elected to the Board of Directors in 1967.

Other ADMI officers re-elected were: John M. Ringenberg, Mid-America Farms, Springfield, MO, Vice-President; and Al J. Freisem, Michigan Producers Dairy Company, Adrian, MI, Secretary-Treasurer.

Three new members were elected to the Board of Directors of the WPI. They are John M. Dunker, Western Dairy Products, San Francisco, CA; Ron Leaf, First District Association, Litchfield, MN; and Dr. George A. Muck, Dean Foods Company, Rockford, IL.

The Whey Products Institute is celebrating its 10th anniversary as the national trade association of the whey products industry. Since its organization in 1971, WPI has been instrumental in supporting the development and expansion of markets for whey and whey products.

Three new members were also elected to the Board of Directors of the ADMI. They are Jack W. Barnes, Michigan Milk Producers Association, Detroit, MI; Ed R. Egermeier, Sanna, Inc., Madison, WI; and Ralph L. Strock, Holly Milk Cooperative, Baltimore, MD.

The American Dry Milk Institute is the national trade association of the dry milk industry. It was founded in 1925, and currently is headquartered in Chicago. Dr. Warren S. Clark, Jr. is the Executive Director of both Institutes.

Strategies of Product Development ...

. . .that's the theme of the Eastern Food Science and Technology Conference, which will be held October 4-7, at the Host Farms Hotel, Lancaster, PA. Speakers at the Conference will address some realistic everyday problems:

* *How should R&D interface with marketing?. . .*
* *How do you identify market opportunities?. . .*
* *How do you optimize consumer acceptance?. . .*
* *What should a product development checklist contain?. . .*
* *How do you safeguard quality?. . .*
* *How do you deal with labeling constraints?. . .*
* *What new regulatory attitudes can be expected?. . .*

Another highlight of the Conference will be plant tours. Arrangements have been made to tour the facilities of Pepperidge Farm, San Georgio, W&F Candies, and Lancaster Labs.

A poster session, describing some of the food research being conducted at leading colleges and universities, will also be part of the program.

The Conference is sponsored by eight different IFT Sections - Central New York, Maryland, New York, Northeast, Nutmeg (Connecticut), Philadelphia, Pittsburgh, and Washington, D.C.

Further details about the program, as well as registration information, can be obtained by contacting: George M. LoPresti, Registration Chairman, Campbell Institute for Research & Technology, Box 57B, Campbell Place, Camden, NJ 08101.

Industry Services Guide Available

A classified guide to the capabilities and services offered by more than 400 food testing laboratories and consulting organizations is available from the Institute of Food Technologists.

The 1981 IFT "Classified Guide to Food Industry Services" is organized into 16 categories of services, such as chemical components, quality assurance, nutrition and toxicology.

The description of each organization listed includes a discussion of the testing capabilities and consulting services offered by the organization.

The 56-page directory is available from IFT Regional Guide, Lockbox 94332, Chicago, IL 60690 for $10.00 per copy, postpaid.

Poster Contest Winners Announced

"Don't Hesitate, Refrigerate; When in Doubt, Throw it Out," was the message which won first prize in USDA's first annual food safety poster contest for children. The winning entry was submitted by Carl Ugent of Dyer, IN, and won the kindergarten through third grade category. First prize winner for grades four through six was Patricia Powers of Cinnaminson, NJ, whose poster showed children carrying signs with food safety tips.

About 45,000 elementary students submitted entries in the contest, part of USDA's celebration of the 75th anniversary of the passage of the Federal Meat Inspection Act. Students used information from packets distributed by the USDA to create posters illustrating any aspect of food safety.

AIB Offers Pest Control Course

The Sanitation Education Department at the American Institute of Baking, in conjunction with American Fluoride Corporation and Pestcon Systems, Inc., will present the final pest control operator training course during 1981 in Chicago, IL from September 14-16.

Accepted in over 35 states for either full or partial recertification credit, the course will provide up-to-date technical and regulatory changes that affect this highly specialized industry.

Taught by industry experts, participants will hear discussions and presentations on State and Federal FIFRA laws and requirements; label comprehension; restricted use pesticides; fumigation practices and the accepted safety practices of the industry. Also included in the program are presentations on understanding, identifying and controlling common stored product insects; controlling birds and rodents; maintaining perimeter weed control; and how to establish an Integrated Pest Management (IPM) program.

In addition, the course will present a discussion on procedures for establishing an insect fragment analysis program and raw material examination procedures to comply with new regulatory quality assurance procedures.

Each participant will receive 1.6 Continuing Education Units after successful completion of the course. Registration fee is $250.00 per participant.

For additional information write or call Carol Lyon, American Institute of Baking, 1213 Bakers Way, Manhattan, Kansas 66502; (913) 537-4750.

Communication Stressed at Florida Meeting

Professionalism, and the importance of sanitarians demonstrating to consumers or taxpayers they're getting their money's worth, particularly during times of budget cuts, were some of the ideas offered at the opening of the 1981 meeting of the Florida Association of Milk, Food and Environmental Sanitarians, Inc. It was held in Tampa April 21-23.

"For a number of years regulators have been off in a corner, relatively inert, not needing to justify their position, responsibilities and costs so much, but that's not the case now," said Dr. James Oblinger, Dept. of Food Science and Human Nutrition at the University of Florida. He discussed "The Food Connection: Communication." An important aspect of communications Oblinger noted, is external communications - letting those who are affected and served by your work know what your mission is.

It's important, Oblinger explained, to let the public know "who you are, what you are, and how you do your work." Let them know how the profession fits in the overall picture, he said.

"Accountability to the taxpayer is the bottom line," he added.

Oblinger suggested that the path to follow in increasing external communications is to accept that most information comes from the media, then provide the media with factual information. "Become an 'available expert' for the media," he suggested.

Faced with a strong antiregulatory spirit, "we can't keep everybody happy, but we feel we're doing an effective job of protecting the consumer, which is our main concern," said Adam Trujillo, when he spoke on "The Role of the FDA in Food Quality." Trujillo is the District Director of the RDA's Region IV. There is a strong antigovernment sentiment now, he said.

Trujillo, supported Oblinger's suggestion of informing the media and public what the sanitarian does, and how he or she fits into the "big picture."

"Sanitation Considerations in Plant Design," was addressed by several persons including Bruce Murdock, Crepaco; Clark Crane, Publix Dairy Products; and Phil Ryan, Wyandotte. Among aspects of a new plant which must be considered at the design level, they said, are the nature of the materials used, local guidelines and ordinances, the equipment layout, 3A Sanitary Standards, and other aspects.

At the initial planning stage, "get regulatory people involved with you, said Crane. "It saves time and it saves money," he explained. Determine the function of the plant and possible expansion plans. Consider, also, the product being manufactured, he said. But the product you start out with, may not necessarily be what you end up manufacturing," he added.

Among scenes from the Florida Meeting, right, D. A. "Doc" Hatcher, Borden's, Tampa, shows off the winning ticket for an expense-paid trip to the IAMFES meeting in Spokane.

1981 FAMFES officers and board members are, l to r, Tom Hart, Jr., Secretary-Treasurer; Dr. Jim Jezeski, Board member; Cecil Hickox, Past President; William Isbell, President-Elect; Doris Marchetti, President; Norman Rasmussen, Board member; Jim Langley, Board member; and Jim Strange, Board member. Above, the Social Hour before the Awards Banquet was held at the poolside.

Additional program sessions included, "Innovation in a Cultured Dairy Plant," Dave Fry, Life Style Foods; "*Vibrio cholerae* in Florida Waters and Seafood," Dr. Mary Hood, University of West Florida; "Pulp Wash

cont. p. 346

Missourians Discuss Day Care Sanitation

The Missouri Day Care Program was just one of many subjects discussed at the Third Annual Educational Conference of the Missouri Milk, Food & Environmental Health Association. The meeting was held in early April in Columbia. "Rabies Legislation," "Cross Connection in Water Supplies," "Chlorine Production by Electroylsis," and "Milk Ordinance Implementation," were just a few of the many other sessions from which meeting participants could choose.

Nancy Pope, Supervisor, State Day Care, and Jack Wax, Assistant Supervisor, State Day Care, Missouri Division of Family Services, shared with the audience their experiences working with the fast-expanding day care program, and asked the sanitarians in the audience to suggest sanitation items which should be emphasized with daycare center owners and operators.

Pope noted that of the 334,000 Missouri children school age and younger, 70-130,000 are now in daycare centers, and projections are for 2/3 or more of the total number of children that age range to be in daycare centers by the end of the decade.

State budget cuts mean decreased manpower to regulate and inspect the daycare centers even though an ever-increasing number of children are in the centers, she said. A proposed change to work around the budget cuts is to have registration of the centers, or self-inspection, Pope said. But trends toward larger centers do mean there is a greater chance of diseases and public health problems, she said.

Though Pope emphasized a need for flexibility in inspections and interpretations of regulations in order to accomodate a decreased budget one member of the audience commented, "You don't need to be flexible on procedural things that need changing, but which won't cost money, such as proper holding time and temperature for foods." Audience suggestions of priority items which must be emphasized with daycare center owners were outlawing use of home canned food, proper storage of toxic substances, general safety, checking for nitrites in drinking water, checking sewage systems, and ensuring proper exit access in case of a fire.

"Payment for Quality Milk Production," by Don Rollins highlighted the basics and importance of somatic cell counts as the best way for fieldmen to approach farmers on proper milk production.

"Somatic cells are body cells that should be producing milk, but are not," he said. "Once you have a dairyman convinced that somatic cells are a direct result of mastitis, you've made some real progress," Rollins added. One of the procedures that can lead to mastitis

con't. p. 346

Rail Car Sanitation Part of N. Texas Program

"I'm proud of the US food industry. I'm not proud of the condition of the rail cars they travel in, however," said Vern Walters, Industrial Fumigant Company, as he spoke on "The Work of the Carrier Sanitation Committee." Walters spoke at the Spring Conference of the North Texas Association of Milk, Food and Environmental Sanitarians.

Walters noted that while it is illegal to divert a rail car designated for food use to other uses, the fine for such a violation is only $100. For example, cases have been documented of lead oxide in a car being mixed with flour.

"Rail cars were not designed by sanitarians," Walters said. "The engineers who design them should operate and clean them the first month!" he said.

The inspection and evaluation of chain restaurants was the focus of another program session. Dennis Eastin, FDA, noted that the FDA now publishes a list of approved foodservice manager training programs. Chains have responded to increasing public awareness of food safety and potential foodservice hazards by increasing their training programs, but "we need follow-up to insure that what they're trained to do, they do," he noted.

"We're at a point where we need to pull together manager certification programs into something unified," he said. "I don't know if that needs to take the form of the Interstate Milk Shippers Program or what. The FDA Chain Restaurant Evaluation Program was begun in FDA Region 6, in the southeast US, but will be expanded nationwide next year, Eastin said.

Additional program sessions at the one-day meeting included "*Bacillus cereus* in Dehydrated Packaged Foods," by C. W. Noah, FDA; "The Significance of Water Activity in Foods," by Rusty McKee, FDA; "Khapra Beetle in the United States," Donald Woodham, USDA; "Rodent Eradication," by John Cobo, Jr., Bugs Burger Bug Killers; and "The Red Lobster Quality Control Program," by Tim Scott, Red Lobster.

Nutrient Labeling, Food Marketing are OFPA Seminars

"Nutrition/Nutrient Labeling" and "Food Futures---Prices and Prophets," were two seminars which composed the program of the Ontario Food Protection Association's 23rd Annual Meeting, held in Toronto in late March.

Jane Hope, a journalist and consultant from Toronto discussed "Consumer Perceptions" of nutrition and nutrient labeling. Six of North America's leading killer diseases are linked to dietary problems, she said. "Consuming too much fat and sugar, and too few grains and fruits and vegetables are part of the problem of the dietary link to the deadly diseases," Hope said. This is one reason why nutrient labeling can be useful---to help consumers eat wisely. At the same time, she said, "Most people can't handle more than three or four bits of information at a time. Are we simply adding to consumer concern and confusion by offering the information? Some consumers are avoiding rather than seeking the label information. And some consumers just don't much care about nutrition," she added. Statistics show that 75% of consumers use nutritional labeling "seldom to never," Hope said. According to one Pillsbury representative, each change on a product label costs from $500-$15,000 and must be questioned if the information isn't used.

"People who should most use labeling---the elderly, those with little education, and the poor---are least likely to use it," Hope claimed.

Dr. Dewey Patterson, Director of Technical Services for Kellogg Salada Canada Ltd., Rexdale, noted, "If the labeling system is confusing and is not going to be used by the average consumer, then it's not serving its purpose. What ways can labeling be made more visible? More effective?" he asked the audience. "The back panel of the cereal box is one of the most widely read morning chronicles in Canada and North America," he claimed. "It's a good vehicle for such communication," and communication of nutrition issues, in general, he said.

"Food Futures---Prices and Prophets," the afternoon seminar, was approached from several directions.

"Supermarket Trends" was the subject approached by Harold Hayne, Director of Public Relations and Advertising, Zehrs Markets; "Milk Industry Trends," by Michael E. Pearce, Director, Promotion Division, Ontario Milk Marketing Board; "Meat Industry Trends," Lew Bradich, Vice-President, Sales and Marketing, J. M. Schneider, Inc.; and "Bakery Industry Trends," Paul Nelson, Technical Director, Corporate Foods. Groceries, and food marketing, in general in the 80's will be affected by such social trends as smaller families, changing perceptions of satisfying work, and working women and mothers, said Hayne. "The 80's family will be richer, with two children, two wage earners, and more income for discretionary spending," he said. Senior citizens will comprise 20% of the population by 1990, and their needs will need to be considered more in grocery marketing, he said. The effect all this will have on grocery stores is a trend toward "minis and maxis," stores over 30,000 square feet and small convenience stores. Inflation will result in more generic products and box stores, Hayne said.

"The trend to eating in restaurants will reverse itself, as a result of inflation," and the microwave oven, with home ownership at 50% by the mid-80's, will affect the type of products grocery stores will offer. In addition, Hayne said, higher gas costs will result in fewer shopping trips per family, with a result in fewer impulse sales, he said.

"Before the 1990's, wood pulp fibers will be used in food," Hayne said. Plankton and space-grown fruits and vegetables, and decreased consumption of beef and all meats will be aspects of food marketing in the next decade, he projected.

Michael Pearce of the Ontario Milk Marketing Board noted changes which will affect the milk industry in the next few years. "New product innovation, including flavored milk, UHT milk, and other changes, as well as an increasing population will affect milk sales and the sale of dairy products, in general," he said. "The size of the industry will depend on the dairy industry meeting the challenges of the coming years, as well as meeting the competition of other beverage products," he cautioned.

Lew Bradich, addressing meat industry trends, said that in the 80's it will be particularly important for producers to listen to consumers. "The North American diet has changed perceptably," he said, and indicated a particularly strong trend to leaner meats. He cautioned against converting agricultural land to non-agricultural uses. "Crop production is simply not keeping stride with world demand."

Among changes instituted by the Ontario Food Protection Association for the coming year is the hiring of a management agency, Mitchell Management Services, to handle all Association mailings, correspondence, and membership campaigns.

The "Sanitarian of the Year Award" was presented to Vince Lucca of Christie, Brown & Co., Ltd. He received a check for $200.00 along with a plaque.

con't. p. 346

Robert Coe, left, receives a Service Award from Howard Ferreira, Past President, for eleven years' service to the Illinois affiliate as its secretary-treasurer. Several persons pause during the coffee breaks at the Illinois meeting including, top left photo, l to r, Mario Williams, Curtis Candy Div. of Standard Brands; Charles Bagans, McDonald's, and Frazier Thomas, Standard Brands; top right, Kraft representatives l to r, included Joe Byrnes, Dan Stockwell, and Ron Case. Below, members of the audience listen to one of the speakers. (Photos by Robert Crombie).

Energy Recovery Systems Discussed at Illinois

"The recovery of energy from waste products is controversial," noted Harold Wainess, Harold Wainess & Associates, as he spoke on "Energy for the Food Industry," at the Spring Educational Seminar of the Associated Illinois Milk, Food and Environmental Sanitarians. The meeting was held in Elgin in May.

"Waste from the food industry includes polluted water, air, and other products," Wainess noted. "Since the beginning of the century, the paper industry has recycled returns for reuse," he noted.

Consumer interest in recycling was high when the subject was introduced as a common practice a few years ago. That interest has waned, however, he noted. Recycling possibilities include using modern landfills for biological gassification," a system where gas is recovered for reuse in underground pipeline systems. Another system which may be used is a "waterfall combustion system." The garbage goes through separators including magnets, flotation systems, or airstreams. Noncombustibles are separated and sold before combustibles are used for production of steam. The steam can then be used for energy.

"We won't burn garbage and completely eliminate the problem, but if we eliminate even 5% of the problem, that makes a difference," Wainess said.

"There are many ways to turn garbage into fuel or electricity," Wainess said, and lots of different approaches," he said. "The best system varies according to the circumstances."

Among the problems of such systems, however, he said, are that the wall of one plant in Milwaukee was blown out when a gallon of gasoline was allowed through separators and inspection spots. New plants can work around such a problem by having walls which are designed to blow out easily without damage to the rest of the building, Wainess said.

Wainess noted that the Environmental Protection Agency (EPA) has previously helped out a great deal on the cost of some plants, but due to budget cuts, it may not be able to in the future. The largest plant so far is one in Hempstead, NY, which serves a regional area, and the $92 million needed to build it came from regional contributions.

"This is all new technology and lots of people say it won't work," Wainess said. "It'll work. There's enough evidence of that. The group that built the Hempstead plant is so convinced it'll work that they've contracted to build one in Dade Co., FL," he added.

"To a certain extent, OPEC has done us a favor in creating a situation where we conserve, recycle. But an insignificant amount is being recycled now," Wainess said. "It's cheaper to just dump garbage than to recycle it, but with stricter pollution laws and the ever increasing need for energy, it means dumps are gone," Wainess said. Twenty recycling plants are in the US now, and twenty or more additional plants are planned for the next few years, he said.

Dr. J. C. Honer, technical editor for *Dairy Record,*

con't. p. 351

Missouri Meeting, *con't. from p. 343*

problems, Rollins said, is not capitalizing on milk letdown.

"If you don't capitalize on letdown, you'll drain the pipeline, but lots of milk will be wasted," he said. In addition, a few bacteria will be left in the alveoli, along with some milk, "Flush the system properly by using oxytocin in your favor. Approach the cow right," he said. "Some farmers approach the cow as if they're involved in a battle instead of making milk," he said.

"Many coops provide the dairyman with monthly somatic counts." For each 100,000 increase in somatic cell count, there's a 1% decrease in milk production. "The somatic cell count is a direct correlation with the amount of irritation in the 'milk plant'," Rollins said.

Bob Taylor, Director, Health and Safety, Missouri Dept. of Elementary and Secondary Education, spoke on "Changes in Comprehensive School Health Instruction." "What do *you* want the public to know, and more specifically, school-age kids, about public health? About the work you do?" he asked the audience. Three years from now all schools will have to show that they have a comprehensive school health program. A program has been developed and 50 out of 500 schools in the state are now using it, Taylor said. "We have followed a voluntary approach on it so far," he said.

Among audience suggestions for the school health instruction program were teaching temperature control of foods, basic sanitation practices, preventative medicine, litter and debris and the problems they breed. In addition, audience members felt it important to teach the philosophy of public health rather than the technicalities, as well as to encourage stronger cooperation in reporting outbreaks.

"Take the time to talk to children at schools, get a crowd of 300 or so of them and *talk* to them," Taylor summarized.

An "IMS Update" was provided by Jim Kennedy, Executive Secretary, Missouri State Milk Board, while Barry Steevens, Extension Dairy Specialist for the University of Missouri, spoke on "Stray Voltage on the Dairy Farm." "Diseases Important to the Dairy Animal," was discussed by Taylor Wood, DVM, State Veterinarian, Missouri Dept. of Agriculture, while Ted Hooker, Director of Environmental Sanitation and Safety, St. John Regional Medical Center, looked at "Institution Hazard Control". "Frozen Dessert Labeling," was discussed by Larry Claypool, Vice President of Product Development and Marketing, Mid-America Dairymen; "Status of Inhibitor Tests," was addressed by Harold Bengsch, Director Springfield-Greene County Health Department. Additional program sessions included "Special Dairy Cleaning Problems," by Ray Kaltendieck, President, Farm Chemicals; "Hazardous Substances, Household Chemicals," by Gene Agins, Assistant Regional Director, Consumer Product Safety Commission, FDA; "Small Bottling Plant Sanitation," by Gregg Fast, Sanitarian, Regional Office, Missouri Division of Health, and "Sampling of Bulk Food Products," by John Norris, Chief, Food Processing and Drug Control, Missouri Division of Health.

Officers who will serve the Missouri Association for the coming year include John Stark, President; Ron Blumer, First Vice President; Conn Roden, Second Vice President; John Norris, Treasurer; and Erwin Gadd, Secretary.

Ontario Meeting, *con't. from p. 344*

Officers who will provide leadership for the OFPA for the coming year include: Dr. John Sterns, Astro Dairy Products, President; Pat Dodsworth, J. M. Schneider Ltd., Vice-President; Gary Huber, Christie Brown Co., Ltd., Secretary-Treasurer; Ralph Abell, Abell Waco, Ltd., Past President; and Directors: Dr. Ron Usborne, Dept. of Food Science, University of Guelph; Sue Lymburner, Miracle Food Mart; David Collins-Thompson, Dept. of Environmental Biology, University of Guelph; Reinhard Purfurst, Donlands Dairy Co., Ltd.; Dr. Ian Sutherland, Agriculture Canada; and Jackie Crichton, Loeb Food Services.

Florida Meeting, *con't. from p. 342*

Solids---What Are They?" by Dr. Don Petrus, Florida Dept. of Citrus; "Practical Applications of Tamed Iodine (Iodophors) in the Dairy and Food Processing Industry, Lyle Blattert, West Agro-Chemicals; "Insect and Rodent Control," Carl Reynolds, Orlando District, FDA; "Quality Control Within the Seafood Processor," Don Toloday, Singleton Packing Corporation; "Shelf Life Tests for Fluid Milk," Dr. Ken Smith, University of Florida; and Health and Rehabilitative Services; "Heat Resistant Molds and Other Microorganisms of Significance in Fruit Juices and Drinks," Dr. William S. Hatcher, Coca Cola Co., Division of Foods.

Social events at the Florida meeting included a poolside social hour and the Awards Banquet. Officers who will serve the Florida Association for 1981-82 include: President: Doris Marchetti; President-Elect: Bil Isbell; Directors: Jim Jezeski, Jim Langley, Jim Strange, Norman Rasmussen, and Debby Miller.

Food Service Sanitation Notes

Food Service Sanitation Notes *is written by the National Sanitation Foundation. Write to the NSF with your questions on food service sanitation, problems for which you need answers, or issues you feel should be aired. They'll be included in a future issue of* Dairy and Food Sanitation.

Q. In "Food Service Sanitation Notes" contained in the February 1981 issue of "Dairy and Food Sanitation" you indicated that cement asbestos decks are acceptable in pizza ovens but not for direct food contact.
Several years ago, when asbestos was receiving some notoriety, I raised the question of the acceptability of these decks with our offices in Richmond. At that time, I was told that they were acceptable as long as they were in good condition, and that there was no known risk from ingested asbestos. I do realize, of course, that it is not an approved food additive.
Seeing your answer raised a question in my mind as to the reasoning behind it. Was the determination made on the basis of the smoothness and cleanability of the surface, or on the basis of a potential hazard to the customer? In small operations serving frozen pizza, and in some cases submarines, the deck is frequently used as a contact surface. If a hazard does exist, I feel we should take the necessary action to eliminate it.

-W. H. Souder, Jr., R.S.
Assistant Director for Environmental Food Services
City of Virginia Beach, Virginia

A. We checked again with the people in the FDA relative to your questions. In the quantities which are likely to be picked up from an oven deck, there is no evidence that asbestos would create a problem if ingested.
Their response was that even if products such as pizza or sandwiches were placed directly on a relatively smooth asbestos cement deck, there should be no ill effects from the asbestos itself.
As to cleanability, the degree of smoothness for cleaning purposes is relative. For operating temperatures of a cooking or heating oven, there should be no microbiological problems.
NSF has not evaluated such decks nor accepted them for direct food contact. By definition the oven deck is considered in a splash zone.

Q. We seem to be experiencing a number of problems with refrigerated salad bars, cafeteria units, and buffet tables. They just don't keep the products cold!

A. These equipment items are available in several general configurations:
1. Many of the shallow designs have refrigerated plates and are intended only to reduce the melt rate of crushed ice, which in turn keeps the product cold.
2. The deeper units which have a solid retainer for receiving inset pans can do a good job of retaining refrigerated temperatures.

In any event, the product must be pre-chilled prior to placement in a *holding* unit.

ADDRESS any problems or questions you wish clarified or answered to:

Food Service Sanitation Notes
National Sanitation Foundation
3475 Plymouth Road
P.O. Box 1468
Ann Arbor, Michigan, U.S.A. 48106

"Meals on Wheels" Foodborne Outbreak in CA

A foodborne outbreak was associated with a "meals on wheels" program for senior citizens in Victorville, CA earlier this year. Persons who became ill had had dinner delivered to their homes from 11:00 a.m. to 12:30 p.m. on January 13. Thirty-nine of the 41 persons who had received the suspect meals were interviewed, and twenty-three had some or all of the following symptoms: diarrhea, abdominal cramps, nausea, vomiting, fever and headache. The mean incubation period of the illness was 8.7 hours, with a range of 1-16 hours. Two patients were hospitalized and all patients recovered within 6 days with a median illness duration of 12 hours.

Chicken was shown to be the mode of disease transmission, in terms of food-specific attack rates. Food handlers for the catering service reported they thought the chicken might be spoiled when they detected an unpleasant odor during heating. They attempted to recall the catering trucks, but 41 of the meals had been delivered. Further questioning showed the chicken had been cooked six days previously, frozen, thawed on

con't. p. 353

Case Studies in Sanitation

This and future Case Studies in Sanitation *are written by Frank Raffaele, Vice President of Regulatory Compliance, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.*

Case #19 - Last Chance

1980 became an important year for the owners of the XYZ Bakery. The small to medium size bakery, which had experienced its ups and downs since the mid 1970's, had finally appeared to turn the corner in late 1979 and 1980. While the country had sunk into a recession, the bakery sales had gone up with added markets and a much stronger projected future. Overall, things looked good. 1980 was expected to be a good year, until that black day in June, 1980.

On Monday morning, June 9, James Cook, FDA inspector, introduced himself to the plant manager of the XYZ Bakery. After introductions and presentation of credentials along with the form #482, Cook began his inspection. The form #483 filed at the conclusion of the inspection was extensive. A few examples of the items listed are included below.

1. One live insect found on the floor near the first support post near the southwest corner in the finished product storage area.
2. Three dead insects observed on the floor near the center of the southeast corner in the finished product storage area.
3. One dead insect in the northeast corner of the raw materials storage area.
4. Three dead insects were observed on the concrete partition (bulkhead) near the third support post, between the raw materials storage area and the packaged product storage area in the basement.
5. One dead insect observed on the seam of a bag of sesame seeds (18/50 pound bags on pallet) located near concrete partition in the raw materials storage area.
6. Six dead insects observed on the floor in a five foot by eighteen inch area behind the walk-in refrigerator (retarder) in the northeast corner of the basement.
7. Two dead insects observed on two separate electrical junction boxes in the back of the basement retard box.
8. One dead insect found near the floor west of the elevator in the northeast corner of the basement.
9. One dead insect and a suspect insect egg casing observed in the bulk flour tailings of the sifter.
10. Approximately twenty-five dead insects observed in the bottom of the elevator pit.
11. Four dead insects observed on the top of the basement retard box.
12. At least twenty dead insects observed in encrusted grease on the outside bottom of a trough which was on the trough lift to a mixer.
13. One live insect observed in a barrel of sifted flour which was located in the bread room in the southwest corner near the bun line.
14. One live insect observed on the base of the dust arrester in the bun line.
15. Three dead insects observed on the north side of the conveyor under the oil collector on the bun line.
16. One live insect observed on the south hoist of the oil collector bun collector.
17. Ten dead insects observed on the support stand of the Model K dough divider on the bun line.
18. Forty dead insects observed adhering to grease on the outside surface of the mixer trough hoist.
19. One dead insect in webbing observed on the center floor of the oven side of the proof box.
20. Approximately one and a half bushels of old, hard, some moldy, stale product which was dropped from the bread conveyor belt on packaging materials in the southeast corner of the basement.
21. Sewage pipes and drain pipes leaking in the basement area (near the tray washer).
22. Door located in the repair shop which exists to the outside of the rear of the building in the basement had a hole approximately two inches in diameter which could be a possible vermin entry point.
23. Mold on the northwest corner approximately ten feet up to the ceiling in the processing area from the bun line.
24. Plastic buckets observed in the pastry area were not correctly identified as to the contents. Contact surfaces were encrusted with dried residuals from previous use. These dried residuals were of a different product than currently was being stored in these buckets. (I.E.-raspberry residuals in a bucket containing apple filling).
25. Cloth bag on sugar hopper in the pastry area encrusted with hard residual materials.
26. Grease from a Pan-O-Mat conveyor chain was observed dripping onto the product line.

con't. p. 349

Case Studies in Sanitation, *con't. from p. 348*

27. An open seam in the proof room, which spans the ceiling from east to west, had chipped paint and rust. Condensate was observed dripping from this seam onto an uncovered product which was in storage in the room.
28. Inadequate and improper hair restraints were being worn by long-haired employees.
29. One cloth breather sock was pulled loose from its security ring and leaking flour along the top of the bulk storage silo.
30. Product contact surfaces at the top of the bulk flour bin were covered with clumps of flour. Rusting was also noted in this area.

In addition thirty-one samples were collected and reported on a form #484 with twenty-five of the thirty-one samples found positive for insects, reported on form #1551 (Report of Samples Analysis).

Two weeks after the inspection, on the day of the receipt of the form #1551, the FDA District Office notified the firm that it had requested an injunction to be filed against the bakery and its owners. Immediately the owners and their lawyer requested an appointment with the FDA District Office.

Among improvements needed were:

1. Develop a complete master sanitation schedule listing all equipment and areas of the plant that must be cleaned. Manpower and budgets must be established to insure that all equipment and cleaning schedules are met.
2. A pest control program including fogging, space spraying, crack and crevice pesticide application and spot fumigation should be established by a licensed pest control operator.
3. A maintenance for sanitation program should be developed to maintain the physical structure and equipment in a sanitary condition and eliminate sources of foreign matter, contamination of ingredients, processed food and finished products.
4. All employees should be required to conform to Good Manufacturing Practices and supervisors should be properly instructed in how employees can prevent product adulteration.
5. Management must participate in weekly self-inspections to point out and correct sanitation discrepancies.

It was understood from the very beginning, the sanitation program would be expensive and that it must be supported and improved in the future. It was also a program that would likely absorb the long awaited profits of the owners. On that day the consultant and contractors were contacted and purchases made. The race was on and the money spent. It was explained to the bakery employees the problems which lay ahead and the decision which had been made by the owners to stay in business. Everyone there at the meeting was committed to the goals that had been established. It seems with both the management and employee commitments that a good chance of reaching these goals was possible, particularly through what appeared to be a team approach which might have been the most valuable result of the FDA decision.

Whether or not the bakery will be able to deal with the problems ahead, it appeared a positive commitment to sanitation and product safety was made. The result of bad publicity and the consequent loss of sales as the result of the FDA's action, again placed the bakery in the red. Again the bakery must go back, as it was their last chance.

Pork Microwave Cooking Technique Described

Consumers and food processors should microwave pork to a temperature of 170 degrees Fahrenheit (77 degrees Celsius) throughout to destroy any microorganisms that might be present, a USDA official says.

"Preliminary unpublished studies indicate that under certain circumstances trichinae and food poisoning bacteria may not be destroyed by microwave cooking," said Donald L. Houston, administrator of USDA's Food Safety and Quality Service. The studies showed that live trichinae could be present in some cases in fresh pork cuts which were cooked in several ways, he said.

"USDA is repeating the studies to verify the results," Houston said.

Cooking instructions in some cookbooks may not guarantee sufficiently high temperatures to kill all microorganisms, Houston said.

USDA has notified the microwave oven industry of potential problems if cooking instructions do not ensure that the pork product reaches 170 degrees F. uniformly.

However, Houston said, there have been no reported cases of any illness resulting from pork cooked in a microwave. "We are taking these precautions to alert the public to potential hazards," he said. "Consumers who

con't. p. 351

Calendar

Aug. 16-20---HOSPITAL, INSTITUTION & EDUCATIONAL FOOD SERVICE SOCIETY (HIEFSS), 21st ANNUAL MEETING. Hyatt Regency Houston Hotel, Houston, TX. Contact: Carolyn Isch, HIEFSS, 4410 West Roosevelt Road, Hillside, IL 60162, 312-449-2770.

Aug. 17-21---FOOD PROCESSORS ADVANCED MICROBIOLOGY SHORT COURSE. University of California, Davis. Contact: John C. Bruhn, Food Technologist, or Shirley Rexroat, Program Assistant, Dept. of Food Science & Technology, University of California, Davis, CA 95616, 916-752-2192.

Aug. 17-21---21st ANNUAL MEETING, HOSPITAL, INSTITUTION & EDUCATIONAL FOOD SERVICE SOCIETY. Houston, TX. Contact: HIEFSS, 4410 West Roosevelt Road, Hillside, IL 60162.

Aug. 30-Sept. 4---WORLD ASSOCIATION OF VETERINARY FOOD HYGIENISTS. Eighth Symposium. Theme: "Animal Health, Food Safety and the Consumer." Dublin, Ireland. Contact: The Secretariat, 8th WAVFH Symposium, 44 Northumberland Road, Ballsbridge, Dublin 4, Republic of Ireland.

Sept. 14-16---PESTICIDE RECERTIFICATION. Chicago, IL. Course sponsored by American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

Sept. 14-16---AMERICAN CULTURED DAIRY PRODUCTS INSTITUTE, Annual Meeting and Conference. Sheraton Royal Hotel, Kansas City, MO. For information: Dr. C. Bronson Lane, P.O. Box 7813, Orlando, FL 32854.

Sept. 14-18 --- MICROANALYTICAL SANITATION SERIES I (Basic Quantitative). Melbourne, FL. Course sponsored by American Association of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121.

Sept. 15-17---FEMS SYMPOSIUM, "Significance of Indicator Organisms." Netherlands Congress Centre, Churchillplein 10, The Hague, 070-512851. For information: H. J. Beckers, Rijksinstituut voor de Volsgezondheid, Postbus 1,3720BA Bilthoven, The Netherlands.

Sept. 15-17---INTRODUCTION TO FOOD LAW AND REGULATIONS, Chicago, IL. Course sponsored by American Association of Cereal Chemists, 3340 Pilot Knob Road, St. Paul, MN 55121.

Sept. 15-17---"SIGNIFICANCE OF INDICATOR ORGANISMS," Symposium sponsored by Food Microbiology Section, Netherlands Society for Microbiology. The Hague, Netherlands. Contact: H. J. Beckers, Meeting Secretary, Rijksinstituut voor de Volksgenzondheid, Postbus 1, 3720 BA Bilthoven, The Netherlands.

Sept. 16-18---NEW YORK STATE ASOCIATION OF MILK AND FOOD SANITARIANS, Annual Meeting. Hotel Syracuse, Syracuse, NY. Contact: Dave Bandler, 11 Stocking Hall, Ithaca, NY 14853, 607-256-3027.

Sept. 17-18---MINNESOTA SANITARIANS ASSOCIATION, Inc., Annual Educational Conference. Earle C. Brown Continuing Education Center, St. Paul Campus, University of Minnesota. Banquet, Sept. 10, Olympia Brewing Co.'s "Rathskellar in the Sky." Contact: Roy Ginn, Dairy Quality Control Institute, Inc., 2353 N. Rice St., St. Paul, MN 55113, 1-612-484-7269.

Sept. 21-25---CONFERENCE OF THE CANADIAN INSTITUTE OF PUBLIC HEALTH INSPECTORS, Ontario Branch. For information: L. A. Lychowyd, Canadian Institute of Public Health Inspectors, Ontario Branch, Inc.

Sept. 22-24---RESEARCH CONFERENCE, FOOD PROTEINS. Sponsored by Faculty of Dairy Science, University College, Cork, Ireland. Contact: Seamus Condon, Dean, Dairy Science Faculty, University College, Cork, Ireland.

Sept. 23-24---WISCONSIN ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, Annual Meeting. Wisconsin Dells, WI.

Oct. 1-2---WISCONSIN LABORATORY ASSOCIATION, Annual Meeting. Holiday Inn, Eau Claire, WI 54701. For information: Dr. P. C. Vasavada, Chairman, Program Committee, Wisconsin Laboratory Association, P.O. Box 2433, Appleton, WI 54913.

Oct. 1-2---WISCONSIN LABORATORY ASSOCIATION, 1981 Educational Conference. Holiday Inn, Eau Claire, WI.

Oct. 4-7---EASTERN FOOD SCIENCE AND TECHNOLOGY CONFERENCE. Conference theme: "The Strategies of Product Development." Host Farms Motel, Lancaster, PA. Conference sponsored by the following regional sections of IFT: Central New York, Maryland, New York, Northeast, Nutmeg, Philadelphia, Pittsburgh, Washington, DC. Contact: Toni Ruth Manning, Conference Chairman, McCormick & Company, 11350 McCormick Road, Hunt Valley, MD 21031, 301-667-7243 for more information.

Oct. 4-9---65th Annual Session, INTERNATIONAL DAIRY FEDERATION, Torremolinos, Spain. For information and registration: Harold Wainess, Secretary, United States of America National Committee of the International Dairy Federation (USNAC), 464 Central Ave., Northfield, IL 60093.

Oct. 7-8---NEBRASKA DAIRY INDUSTRIES ASSOCIATION, 27th Annual Convention Regency West Motel, I-680 and Pacific Street, Omaha, NE. Contact: T. A. Evans, Executive Secretary, 116 Filley Hall, East Campus, University of Nebraska-Lincoln, Lincoln, NE 68583.

Oct. 7-9---KANSAS ASSOCIATION OF SANITARIANS, Annual Meeting. Thunderbird Motel, Concordia, KS. Contact: John Mitchell, 2715 Ousdahl Rd., Lawrence, KS 66044.

Oct. 13-14---CALIFORNIA ASSOCIATION OF DAIRY AND MILK SANITARIANS, Annual Meeting. Holiday Inn, Ontario, CA. Contact: Jack Pollock, 402 Johnson St., Manhattan Beach, CA 90266, 213-374-4752.

Oct. 14-15---NEBRASKA DAIRY INDUSTRIES ASSOCIATION, Annual Convention. Omaha, NE. For information: T. A. Evans, 116 Filley Hall, East Campus, University of Nebraska-Lincoln, Lincoln, NE 68583.

Oct. 19-21---CANADIAN SANITATION SEMINAR. Course sponsored by American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502.

Oct. 21---IOWA ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, Fall Meeting. Holiday Inn, Cedar Rapids, IA. Contact: Hale Hansen, 4010 University Avenue, Des Moines, IA 50311, 515-281-4937.

Illinois Program, *con't. from p. 345*

discussed "Raw Milk Psychrotrophs---The Importance of Their Control." "The basic problem is not the psychrotrophs in the raw product, but the enzymes produced by the bacteria that cause problems with production of finished products - cheese, cottage cheese, and butter, he said.

As with all industries in the current economy, economics and profitability are more important now in the dairy industry than they have been in recent years, Honer said.

"The energy and profitability picture are changing the industry pretty drastically," he said. "We've changed the flora, the background of the raw milk over the years," he said. "Now we have milk with more age on it, such as five days as opposed to two or less," he said.

"Plants closer to the farm won't be a solution to the problem," he said. "And it is not entirely realistic to expect to control psychrotrophic problems on the farm or in bulk tanks," he added.

He cited a study conducted at Cornell University which showed that milk heated on the farm stopped psychrotroph growth right away, adding six or seven days to the shelf-life. The study showed that the product was better than a twelve-hour product that had not been heated.

"The Cornell work is significant, but it is not realistic for each farmer to spend $15,000 for equipment to reduce the psychrotrophic count," he added.

One proposal of the Interstate Milk Shippers Conference, Honer said, is to add lactic acid bacteria to the raw milk, one effect of which is an increased yield of mozzarella cheese. "The time has come for regulatory people to realize the industry is moving very rapidly. There are changes in raw milk that we must give credence to, that we must look seriously at," he explained. "The time is coming when as soon as milk is produced on the farm, select organisms will be added immediately to the bulk tank to solve some of the current problems," he said.

Additional program sessions at the one-day meeting included "The Evolution of Standards," by Robert Coe, Illinois Dept. of Public Health; "What Should be the Test of Antibiotics and Inhibitors in Milk?" by Berry E. Gay, Jr., Illinois Dept. of Public Health; "Regulations---An Industry Overview," by Barry R. Marlin, Director of Quality Assurance for Standard Brands, Inc; and "New Developments for the Dairyman," by Maurice Rich, Babson Bros.

Trichinosis, *con't. from p. 349*

follow prudent cooking procedures face no health hazard."

Trichinosis is a minor problem today, Houston said, with only about 100 to 120 clinical cases reported each year. In addition, there is a very low incidence of trichinosis in animals--only .125 percent of the some 80 million hogs slaughtered each year are infected, he said.

Consumers and the food service industry can avoid any problems if they make sure that every part of pork roast or chop reaches at least 170 degrees F., Houston said.

He advised those who prepare pork in microwave ovens--at home or in food institutions--to first check the manufacturer's directions for appropriate cooking times. Also, he said, microwave cooks should:

- Rotate dishes during cooking.
- Let the pork sit for several minutes after cooking, as recommended by manufacturers, to assure more uniform temperature distribution. Cooks can increase the effectiveness of this "equalization" or "dwell" time by wrapping the pork in aluminum foil after cooking.
- After the pork sits, check various places with a meat thermometer. If any part of the pork chop or roast has not reached at least 170 degrees F., cook the meat more thoroughly.

The potential problem is unique to microwave cooking, Houston said, because of the uneven heat radiation that can result if extra care isn't taken.

Microwave ovens cook by exciting the water molecules in the food. The variations in the distribution of water in the pork, the uneven energy distribution in microwave ovens and the potential energy blockage by bone may result in uneven cooking. If the entire piece of meat doesn't reach a temperature of at least 170 degrees F., trichinae may not be killed, Houston said.

Codex Seminar Scheduled

A national seminar on participation by the United States in the Codex Alimentarius Commission will be held Sept. 15-16 at USDA headquarters in Washington, D.C.

The Codex commission works to develop international food standards that will promote world-wide food safety and international trade in food products, according to Eddie F. Kimbrell, associate deputy administrator of USDA's Agricultural Marketing Service.

According to Kimbrell, the purpose of the meeting is to assess the past and future role of the U.S. in the commission.

Brucellosis Infection Rate is Down

The brucellosis infection rate for the market cattle testing (MCI) program has declined from 0.72% to 0.47% since 1975. Even though the total number of cattle tested in the MCI program has declined, it has been more effective because of the increase in testing at livestock markets. For the first time, in 1980 more than half of the MCI samples were from livestock markets.

An increased number of cattle were tested on farms and with this increased testing, the number of infected herds declined by more than 800 since 1979 and by more than 3000 since 1975. However, an increase has been shown in the number of infected herds in previously brucellosis-free states. This illustrates the problem that the disease is in some cases spreading back into states where owners are rebuilding herds. The number of infected herds found in three states with intensified programs---Georgia, Tennessee, and Alabama---has been reduced from 2,236 in 1975 to 1,253 in 1980. Reactor rates for these three states in the market cattle testing program were less than half what they were before the intensified program began. In two other states---Arkansas and Kentucky---exceptional progress has been made in surveillance, including the detection of infected herds.

Five states---Texas, Florida, Mississippi, Arkansas and Louisiana---accounted for nearly two-thirds of the infected herds last year. Five other states---Oklahoma, Tennessee, Kentucky, Alabama and Missouri---accounted for another one-fourth of the infected herds; thus, ten states were responsible for 90% of the brucellosis-infected herds. With more than 900 infected herds, Florida has the highest brucellosis infection rate in the nation, more than double the rate of Louisiana, which has the second highest rate. An accelerated surveillance program with a budget of $18.8 million in federal and state funds for the first year began in Florida, in October, 1980. Calf vaccinations in the United States increased in 1980, up to 5.9 million, a 15% increase over 1979. Two major advantages of the reduced recommended dosage are: 1) there will be a substantial reduction in the number of vaccinated animals with persistent titers that confuse test results when the animals are older and, 2) use of this vaccine will permit the vaccination of calves up to 12 months, which is expected to increase vaccination in beef herds, especially in the high incidence states. The reduced dosage is based on results of research done at the National Animal Disease Center in Ames, IA, which indicated satisfactory immunity in calves vaccinated at between 4 and 12 months of age with a dose of about 1/50 of the previously recommended vaccine dose.

Excerpted from CDC's Veterinary Public Health Notes, *Feb. 1981.*

USDA Acts on Violations of Garbage Handling

USDA officials have moved to withdraw approval for handling and disposing of foreign-origin garbage from Marriott Corporation's World Way West catering facility at Los Angeles International Airport, Los Angeles, CA.

USDA's Animal and Plant Health Inspection Service deputy administrator Harvey L. Ford said he notified the corporation of his agency's intent to withdraw approval because Marriott has been in repeated violation of federal regulations requiring biologically safe disposal of food and food wastes from international flights.

"We are very concerned about food-borne foreign plant and animal insects and diseases," Ford said.

"Destructive agricultural diseases and pests might easily get into this country through food service wastes on these flights, even though the food is quite safe for human consumption," Ford said. "Effective disposal requirements are our principal means of protection."

Ford said the USDA rules require wastes of foreign origin to be sterile and disposed in a landfill or incinerated.

"In March and May of 1980, Marriott employees committed apparent violations of our regulations, which involved putting foreign-origin garbage directly in trash compactors destined for a landfill, without necessary sterilization procedures," Ford said. "Another violation in December of 1980 involved improper disposal of airline meals."

"Without the required treatment, agricultural pests and disease organisms could remain alive in the garbage and subsequently might be spread by birds, dogs or wildlife that scavenge landfills and other disposal sites."

After the first two violations, Marriott officials acknowledged that further violations could result in USDA withdrawing approval for the company to service incoming foreign flights.

"It's difficult to get an urban population to understand the threat foreign agricultural pests and diseases pose," Ford said. "For example, the Dominican Republic has systematically destroyed and is replacing that nation's entire swine population because African

con't. p. 353

PCB - Related Fire in New York Office Building

A fire which occurred in the basement utility room of a state office building in Binghamton, NY resulted in the spill of 180 gallons of fluid from a transformer containing PCB's.

The 5:30 a.m. fire was an intensely hot, local electrical fire in the switch gear adjacent to a transformer which contained 1,060 gallons of askarel, a type of transformer fluid. The fire caused the transformer bushings to crack, resulting in the spill of fluid. An estimated 90 gallons of askarel was pyrolyzed and spread throughout the 18-story building as a fine, oily soot.

The askarel contained 65% polychlorinated biphenyl (PCB), (Aroclor 1254)® and 35% chlorinated benzenes (mainly trichlorobenzene and tetrachlorobenzene) with trace additives. Several days after the fire, concentrations of the Aroclor 1254® in the air in the building averaged 1.5 $\mu g/M^3$. Dry swabs of horizontal surfaces in open office areas averaged 162 $\mu g/M^3$ Aroclor 1254®; similar surfaces within cabinets and desks averaged 74 $\mu g/M^3$.

Composite soot samples were analyzed for potential pyrolysis products of PCB's and polychlorinated benzenes. Tetrachlorodibenzo-p-dioxin (TCDD), tetrachlorodibenzofuran (TCDF) and polychlorinated dibenzofurans (PCDF) were found, along with chlorinated biphenylenes.

The most likely path for the soot to have reached all the floors of the building was through two vertical shafts that extended the entire height of the building and were open at the bottom of the utility room where the transformer and switch gear were located.

Building cleanup began soon after the fire, but was stopped when high TCDD and TCDF concentrations were found. Cleanup plans now await further assays of soot to determine how uniform the PCDF contamination is throughout the building, and to what extent the chemicals may be biologically active when bound to the soot. No health effects attributable to the soot chemicals have been documented in cleanup and maintenance workers associated with the building. MMWR editors note that PCB's manufactured in this country contain up to 2 ppm PCDF as contaminants, and heat can increase concentrations of PCDF. The high concentration of PCDF in the soot found in the building is presumed to be due to the pyrolysis of PCB's. TCDD, however, is not known to be a contaminant of PCB's, and is probably a pyrolysis product of the chlorinated benzenes.

Explosions have occurred in factories which manufacture triclorophenol and similar compounds, and the fires have resulted in spread of TCDD, but no comparable situation has been known to occur in an office building. The National Institute for Occupational Safety and Health is conducting a national survey of the presence and location of transformers in office buildings and is working with Broome County and New York State Health officials in follow-up studies of workers involved in cleanup of the Binghamton building.

Health effects on humans which are associated with chemical compounds such as TCDD and TCDF, as well as PCB, have thus far been observed in situations of high-dose occupational exposure. Effects observed include chloracne, liver function abnormalities, elevations in serum lipid levels, and neurologic changes. TCDD has been shown to be oncogenic in rodents, and no health effects have yet been clearly demonstrated in human populations in lower-dose levels. Potential human health risks in connection with the Binghamton fire will be closely studied.

Excerpted from MMWR, *Vol. 30, No. 16, May 1, 1981.*

Meals on Wheels, *con't. from p. 347*

January 11, held refrigerated and reheated on a steam table January 13. The manner in which the chicken had been prepared and the timing of the onset of symptoms led investigators to suspect a *Clostridium perfringens*-associated outbreak. Lab tests of the chicken confirmed that it contained *C. perfringens. MMWR* editors noted that between 1975 and 1979, 57 outbreaks involving 3323 cases of foodborne illness associated with *C. perfringens* were reported to CDC, making *C. perfringens* the third most common bacterial pathogen, after *Salmonella* and *Staphylococcus,* implicated in cases of foodborne disease. The most common vehicles in *C. perfringens* associated outbreaks were beef and beef products, with turkey the next most common.

Excerpted from Morbidity and Mortality Weekly Reports, *Vol. 30, No. 14, April 17, 1981.*

USDA Withdraws Approval, *con't. from p. 352*

swine fever, one of the world's most devastating swine diseases, was introduced from some outside source."

Improper disposal of food wastes from ships or planes caused the recent spread of African swine fever to western hemisphere nations--Brazil, Cuba, Dominican Republic and Haiti, Ford said.

"In addition to African swine fever, we are constantly concerned about many other pests and diseases that can easily be carried in food, foreign souvenirs, cargoes and other materials," Ford said.

USDA officials administer agricultural import regulations to prevent the entry of products containing such pests or diseases. USDA inspectors are stationed at about 80 ports of entry.

CDC Reports Botulism Statistics for 79-80

The Center for Disease Control received reports of 127 cases of botulism in the 2-year period 1979-1980. Six persons died from their illness. For analysis, cases were classified in one of the following ways: foodborne botulism, 26 cases; wound botulism, 5 cases; infant botulism, 90 cases; and botulism of undetermined classification, 6 cases.

Foodborne botulism: Seven outbreaks (8 cases) of foodborne botulism were reported in 1979 and 14 outbreaks (18 cases) in 1980. Ten states reported outbreaks. Thirteen outbreaks involved *Clostridium botulinum* type A; 4 outbreaks, type B; and 4 outbreaks, type E. All type A outbreaks occurred west of the Mississippi, and all type B outbreaks, east of the Mississippi; the type E outbreaks were reported from Alaska. The median age of patients was 56 years (range 5-80 years). All foods involved in outbreaks were canned or processed at home. Home-canned asparagus and home-canned beets were each implicated in 3 outbreaks. Home-canned peppers were responsible for 2 outbreaks. Three deaths, all in 1980, were reported in association with foodborne botulism outbreaks.

Wound botulism: Three cases of wound botulism were reported in 1979, and 2 cases in 1980. Two of the cases occurred in California, 2 in Washington, and 1 in Texas. All involved type A *C. botulinum*, although type B organisms were also cultured from the wound of 1 California patient. All patients were male; their median age was 29 years (range 6-41 years).

Infant botulism: Twenty-four cases of infant botulism were reported in 1979, and 66 cases in 1980. Of the 18 states reporting cases, California reported the most cases with 39, followed by Pennsylvania with 13. Five states-Idaho, Kansas, Kentucky, North Carolina, and Ohio-reported cases for the first time in 1979-1980. Forty-three cases involved type A *C. botulinum*; 45 cases, type B; and 1 case, type F. In 1 case the strain isolated produced toxin neutralized by a combination of type B and F antitoxins. Patients ranged in age from 1 to 38 weeks. Cases occurred most frequently in infants 8-11 weeks old (24 cases); however, 8 patients were 24 weeks of age or older, the oldest being 38 weeks. One death was reported.

Undetermined classification: The category "undetermined classification" includes cases in individuals over 1 year of age who did not have a wound and for which no vehicle could be identified. Five outbreaks (5 cases) were placed in this category in 1979, and 1 outbreak (1 case) in 1980. Four outbreaks involved type A *C. botulinum*, and 2, type B. The median age of patients was 37 years (range 15-71 years). Two deaths were reported in association with these outbreaks.

MMWR editors note that fewer cases of foodborne botulism occurred in 1979-1980 than in 1977-1978, when several large common-source outbreaks resulted in a record number of cases. In contrast, the 5 cases of wound botulism reported in 1979-1980 were the first reported since 1976; before 1979, a total of 188 cases had been reported in the United States since the syndrome was first recognized in 1943.

Ninety-eight cases of infant botulism were reported to CDC in the period 1975-1978. With the additional 90 cases in 1979-1980, a total of 188 cases of infant botulism have now been reported. The 66 cases in 1980 represent the largest number of cases reported in a single year. The 38-week-old patient in 1980 is the oldest patient yet reported.

Excerpted from MMWR Vol. 30, No. 10, March 20, 1981.

Errata

Microbiological Tests for the Evaluation of Dairy Products---Today and Tomorrow

Charles H. White

p. 238-244, June 1981 *Dairy and Food Sanitation*

A statement was included in the article, "The manufacturers of the Bactometer have gone out of business, but the principle involved in the instrument's operation should be noted."

We are assured by Mark Kozek, Sales Specialist for Bactomatic, Inc., PO Box 3103, Princeton, NJ 08540, manufacturers and marketers for the Bactometer® Microbial Monitoring System that "while it is true that an earlier version of Bactomatic no longer exists, we have been in business for approximately the last eighteen months and have all intentions to remain in business and grow for a long time to come."

Dairy and Food Sanitation regrets the error.

IFT: Consumers Seek Simple Answer in Open-Dating

Consumers are looking for a simple solution to a complex problem when they clamor for open dating on food packages, according to the Institute of Food Technologists (IFT). According to a recently released Scientific Status Summary, "Actual shelf life of a food varies with the age and type of ingredients used, the process, the package, and the environmental conditions during distribution and storage. Consumer food storage and handling habits also have a bearing on shelf life, as does the consumer's taste preferences, and his or her own judgement as to how fresh is "fresh." "

Many surveys have shown that consumers want open dating on food packages. Many food packages already do show the date they were processed, in code, to help supermarket personnel rotate the stock efficiently and to identify defective merchandise in the event of a product recall. Consumers, however, have been urging that these codes be expressed in plain English, so that they can be used by the customer to determine a product's freshness -- which they judge by the length of time a food package has spent on the way from the processor to the retail shelf.

Setting such dates in real life situations isn't as simple as it might sound, according to the IFT Expert Panel on Food Safety and Nutrition, which produced the Summary. Foods vary in their perishability, and with the conditions to which they are exposed during the long trek from the farm to the market. The food processor has control over those conditions only up to the time the packages are shipped from his plant or warehouse. After that, the responsibility shifts to the wholesaler, retailer and finally to the individual who takes the food home to the pantry shelf.

con't. p. 356

Raw Milk Outbreaks Occur in OR, CA

Raw milk has recently been associated with cases of campylobacteriosis in Oregon and salmonellosis in California.

Oregon: From Dec. 22, 1980-Feb. 20, 1981, 5 counties in Oregon reported a total of 91 stool isolates of *Campylobacter fetus* subsp. *jejuni* from persons with diarrhea. Of these 57% gave a history of having consumed raw milk before onset of illness. In the households of these 52 index patients, 76 other household members also drank raw milk; 33% of these persons developed diarrhea. Of 19 members of these households who did not drink raw milk, none had diarrhea.

To test the hypothesis that raw milk was the vehicle of transmission, 2 case-control studies were performed. In the first study, 70 control households in 1 county were selected randomly from a local telephone book. Of these households, 81% were contacted and interviewed. One of these households gave a history of consuming a specific brand of raw milk in the previous 2 months compared to 11 of 15 case households. In the control household in which this same brand of raw milk was consumed the 3 members who drank it became ill but the 3 who did not remained well. No significant association was found between developing *Campylobacter* diarrhea and exposure to sick pets, live poultry, livestock, raw eggs, raw meat, untreated surface water, other individuals with diarrheal illness outside the household, or history of foreign travel in the previous 2 months. In the second case-control study, age-matched controls were selected for 28 cases. In 15 matched pairs, the patient drank the same brand of raw milk as was implicated in the other study, and the control drank no raw milk. In no instance did a patient not drink the implicated brand of raw milk and a control drink it.

California: On January 23, 1981, the California State Department of Food and Agriculture (DFA) requested that the State Department of Health Services (DHS) order the removal from sale of some certified, raw, whole milk from a single California dairy after the DFA Laboratory recovered *Salmonella saint-paul* from bottled milk coded Jan. 25 C. Independently, the San Diego County Health Department Laboratory recovered the same serotype from an opened milk container of the same code brought in by an ill consumer. That laboratory had also recovered *S. saint-paul* from a 4½-month-old infant who became ill within 2 weeks of starting on this dairy's certified raw milk; the infant had been breast-fed for the previous 4 months. On February 13, the DFA requested that the DHS order the removal from the market of milk coded Feb 17A, 18A, and 19A after both the DFA Laboratory and the Los Angeles County Milk Commission Laboratory-which regulates the dairy-recovered *Salmonella* organisms from milk coded 17A.

The FDA cultured the implicated dairy's raw milk,

con't. p. 356

Package Open-dating, *con't. from p. 355*

According to the IFT Expert Panel, the temperature, humidity and mechanical abuse encountered during this transport and storage will affect the actual length of time the product remains "fresh" and nutritious, yet the urging for a single date continues.

A number of states already require dating information, depending on whether the food is "perishable," "semi-perishable," or "shelf-stable," the IFT said. These categories are based on the rate at which a given food deteriorates and the conditions that affect that deterioration. Milk, eggs and fish, for example, are classified as "perishable," according to the Summary, and most states limit the length of time they may remain on shelves or in coolers. Requirements vary from state to state, however, and the actual temperature in a given cooler or the length of time the food is left *outside* the cooler will determine whether the product actually retains its high quality for the stated number of hours or days.

Similar considerations also apply to semi-perishable foods such as cheeses, cured meats, some pickled foods and snack foods. Even shelf-stable foods such as canned goods, dried foods, and breakfast cereals can lose their seemingly imperishable quality if exposed to high temperatures and humidity, especially if their protective packaging is damaged. Printed dates become meaningless under such conditions, even though the "abuse" may not be apparent to the consumer at the time the food is prepared for use.

According to the IFT Expert Panel, three different types of dating systems have been proposed. These include a "pack date," which simply tells when a food was packed and leaves it up to the consumer to decide how long after that date the food is still of high quality. This is the coded date most often used for stock rotation at present.

Many states now require a "sell by" date, on certain foods, also called the "pull" date, according to the food technologists. After this date, the store manager must remove the package from his regular retail shelves, and either dispose of it (possibly to charitable organizations) or sell it at a reduced price in a segregated part of the store.

"Use-by" dates are also suggested, but these carry the idea that the product is guaranteed to be of high quality until that date *regardless* of any storage abuse which it may undergo, or that it suddenly becomes unpalatable or even dangerous after that date. This could lead to waste if the food is thrown out on that assumption, the IFT said.

A modification of this system, called "Best if used by" or "Best if used within XX days of date stamped on the package," implies that the food is still safe and usable, if possibly of somewhat lower quality, after that time.

For any of these dates to be meaningful, everyone in the food distribution chain, including the consumer, must be aware of his or her role in preserving freshness and quality, the Summary said. "Like so many other aspects of food and nutrition, safety and high quality is an obligation to be shared among producers, processors, distributors and consumer. Use of open dating will not alter that shared obligation."

Raw Milk, *con't. from p. 355*

obtained from retail shelves in Nevada, and found *Salmonella* Group B organisms in milk coded Feb 18A.

This dairy's raw milk, which is certified by the American Association of Medical Milk Commissions, has been implicated in outbreaks of *S. dublin* in 1958, 1964, and 1971-1975. It has also been implicated in sporadic cases of campylobacteriosis. Of the 12 different serotypes of *Salmonella* that have been isolated from the dairy's milk (*S. agona, S. cerro, S. dublin, S. infantis, S. kentucky, S. lille, S. meleagridis, S. montevideo, S. newington, S. saint-paul, S. typhimurium, S. worthington*) only *S. dublin* has been epidemiologically linked to human disease.

MMWR editors note that an analysis of *S. dublin* cases in the United States in 1979 and 1980 from 17 states (excluding California and Oregon) showed that 11 of 32 patients gave a history of raw milk ingestion. Milk from many different dairies was involved. Unlike tuberculosis and brucellosis, which can be eliminated from dairy herds by adequate precautions, *Salmonella* infections of milking herds continue to occur. Since up to 10% of healthy cattle may carry *S. dublin*, *Salmonella* contamination of unpasteurized milk can be a persistent problem, even in dairies that follow the procedures recommended by the American Association of Medical Milk Commissions, a private organization.

The association of *Campylobacter* infections with the use of unpasteurized milk has been documented in the United States and England. In each outbreak that was investigated, milk was either improperly pasteurized or used in an unpasteurized form. Although up to 60% of healthy cattle excrete *Campylobacter* in their feces, these organisms are eliminated from milk by pasteurization.

Present technology cannot produce raw milk, including that listed as certified, that can be assured to be free of pathogens; only with pasteurization is there this assurance. The U. S. Animal Health Association, the National Association of State Public Health Veterinarians, the Conference of State and Territorial Epidemiologists, the American Academy of Pediatrics, and the House of Delegates of the American Veterinary Medical Association have adopted policy statements that milk for human consumption should be pasteurized.

Excerpted from MMWR, Vol. 30, No. 8, March 6, 1981.

Dairy Herds Could Be Degraded on Somatic Cells

Many dairy herds are in danger of being degraded because of high somatic cell counts, says Myers Owens, South Dakota State University dairy scientist.

A Grade A permit is suspended when three of the last five samples have a somatic cell count exceeding 1.5 million per milliliter.

Several cheese plants are in the process of implementing this same program for their producers and more will be adopting it all the time as federal standards become more strict, says Owens.

Most of the dairymen involved do not recognize the seriousness of the mastitis problem nor the high somatic cell counts until the warning letter arrives, according to Owens. This is true despite the fact that cell counts had consistently been greater than 1 million for a considerable period of time.

Thus the problem just didn't happen; their luck that kept the cell counts just below the regulatory level finally ran out. The time to be concerned about retaining a permit is when the first sample approaches the regulatory level, not the third sample.

If any of your dairy patrons have a cell count greater than 1.5 million, Owens suggests that the following steps be immediately taken:

☐ Use a strip cup on each cow at each milking and withhold visibly abnormal milk. Counts will generally be below the regulatory level if visibly abnormal milk is withheld from the bulk tank.

☐ Use the DHI somatic cell count or conduct the CMT on all milking cows. Depending on the severity of the count and the herd situation, it may be necessary to withhold milk from high cell count cows.

☐ Analyze the high cell count cows. Serious consideration should be given to culling cows previously considered borderline in terms of milk production that are running high counts. In addition, cows in late lactation and low production that have high cell counts should be dried off and dry treated.

☐ Consult with a veterinarian regarding a treatment program. It may be necessary to treat some high cell count cows during lactation. The number of quarters infected on each cow and the type of bacteria should be considered. Antibiotic therapy during lactation is effective against Streptococci; whereas, Staphylococci are extremely difficult to treat and eliminate, says Owens. It should be noted that even if treatment is successful, the cell count may not return to a normal level for a few weeks to several months depending on the extent of the tissue damage.

Those steps will lower the bulk tank cell count. However, unless management weaknesses are corrected, this reduction will only be temporary. Further, dairymen with counts in excess of 500,000 could realize a substantial economic benefit by an improved mastitis control program.

Owens suggests that dairymen:

☐ Inspect and restore milking equipment to proper operating condition.

☐ Reevaluate and correct milking procedures, including sanitation. Dipping teats immediately after milking on a routine basis with a product proven to be effective is a very successful measure.

☐ Reevaluate other management practices such as source of herd replacements, condition of cow lots and freestalls, etc.

☐ Reevaluate mastitis detection and treatment programs. In most herds it is desirable to treat every quarter of every cow at drying off with a product that is labeled specifically for dry cow treatment.

Owens says that you should encourage dairymen to ask for help before they have lost their market, not after.

Reprinted from Professional Fieldman, *published by Klenzade Products.*

Position Available

The position of IAMFES Associate Executive Secretary/Editor will be available December 1, 1981. The position includes responsibility as Editor of *Dairy and Food Sanitation,* and Associate Managing Editor of the *Journal of Food Protection,* as well as some management responsibilities with the Association. Candidates should have a degree and experience in journalism and management or marketing. The application deadline is October 1. Send resume to IAMFES, PO Box 701, Ames, IA 50010.

JFP Abstracts

Abstracts of papers in the August Journal of Food Protection

Vacuum-Packed Cooked Potatoes: Toxin Production by *Clostridium botulinum* and Shelf Life, S. Notermans, J. Dufrenne and M. J. H. Keijbets, Laboratory for Zoonoses and Food Microbiology, National Institute of Public Health P.O. Box 1, 3720 BA Bilthoven, The Netherlands and Institute for Storage and Processing of Agricultural Produce (IBVL), P.O. Box 18, 6700 AA Wageningen, The Netherlands

J. Food Prot. 44:572-575

The potential risk of toxin production by *Clostridium botulinum* in vacuum-packed and subsequently cooked potatoes (95 C for 40 min) was determined. Spores of both proteolytic and non-proteolytic *C. botulinum* survived the cooking process. Vacuum-packed cooked potatoes seemed to be an ideal substrate for *C. botulinum* to produce toxin. At storage temperatures of 10, 15 and 20 C, toxin production occurred before the product was spoiled. Only if stored at temperatures below 4 C can the product be guaranteed to have no potential public health risk.

Contents of Nitrates and Nitrites in some Greek and Imported Cheeses, G. K. Zerfiridis and K. S. Manolkidis, Department of Dairy Technology, Faculty of Agriculture and Forestry, University of Thessaloniki, Thessaloniki, Greece

J. Food Prot. 44:576-579

Fifty-four samples of various types of Greek cheese and 69 samples of imported cheese were analyzed for nitrates and nitrites. Domestic Gruyére from cow's milk and processed cheese contained 1-10 and 35-104 mg of NO_3^- per kg, respectively. All other domestic cheeses were either free of or contained nitrates less than 1 mg/kg. Imported cheese contained nitrates as follows: Edam 1-11, Gouda 1-24, Teleme 13-81, Goudasana 27, processed cheese 0-8, cheese spread 19-30, bacon cheese 24-508 and others <4 mg/kg. All types of domestic and imported cheese were either negative for nitrites or contained <1 mg/kg.

A New Shelf-Life Failure Model, G. J. Newell, Hawkesbury Agricultural College, Richmond, N.S.W. 2753, Australia

J. Food Prot. 44:580

A new statistical model for shelf-life failure is proposed. This model is based on consideration of the basic physical characteristics of the shelf-life failure process rather than ad hoc reasons such as goodness-of-fit tests.

Identity of Microorganisms from 'Khundi' - A Smoked Meat, S. I. Faparusi, Biochemistry Department, University of Ibadan, Ibadan, Nigeria

J. Food Prot. 44:581-582

Microorganisms from 45 pieces of 'khundi' - a dried and smoked meat produced from beef and mutton - were cultured on various media. Twelve species of bacteria, ten yeasts and sixteen molds were isolated during a period of 20 months. The microorganisms were compared with those obtained from two raw ingredients, that is, fresh beef and mutton. There were similarities between the raw and dried meats. Some of the microorganisms are known to produce toxins which might be the cause of frequent illnesses often reported after the consumption of 'khundi' meat.

Use of Baird-Parker's Medium to Enumerate *Staphylococcus aureus* in Meats, M. E. Stiles and L. -K. Ng, Faculty of Home Economics and Department of Microbiology, The University of Alberta, Edmonton, Alberta, Canada T6G 2M8

J. Food Prot. 44:583-587

The *Staphylococcus aureus* count was determined, using Baird-Parker (BP) medium and coagulase reaction, on 100 samples of ground beef, 23 frozen pork sausage samples and 140 retail meat cuts (beef and pork). *S. aureus* counts on ground beef ranged from < 100 to 4,500 per g, and 16% had counts of 1,000 per g or greater. Frozen pork sausage samples had similar *S. aureus* counts to ground beef. Retail meat cuts generally had counts less than 100 per cm^2. Typical *S. aureus* colonies in this study on BP medium were dark grey to grey-black, and not shiny black as generally described. Type II colonies (without egg yolk clearing) did not contribute markedly to the total *S. aureus* count and egg yolk clearing type I colony count is suggested for routine estimation of the *S. aureus* count. The *S. aureus* isolates in this study generally had 3+ coagulase reactions. The coagulase-positive isolates were generally phosphatase-positive (96.8%), Voges-Proskauer test-positive (97.4%), DNase-positive (98.7%) and used glucose and mannitol oxidatively and fermentatively (93.5%). Most non-*S. aureus* colonies were "other" staphylococci or micrococci. These isolates had variable phosphatase, Voges-Proskauer and DNase reactions, generally with at least one of these three tests negative.

Fermentation of Lactose in Direct-Acid-Set Cottage Cheese Whey, B. J. DeMott, F. A. Draughon and P. J. Herald, Department of Food Technology and Science, The University of Tennessee, Knoxville, Tennessee 37901

J. Food Prot. 44:588-590

Kluyveromyces fragilis was more suitable than *Candida pseudotropicalis* or *Kluyveromyces lactis* for production of ethanol from whey. Direct-acid-set cottage cheese whey and the supernatant fluid resulting from heat treatment of the whey at 95 C for 20 min showed similar rates of fermentation when inoculated with *K. fragilis*. Inoculation rates of 10, 12 and 14 ml of active *K. fragilis* culture per 100 ml of media were not significantly different in rate of ethanol production. Samples incubated with *K. fragilis* at 35, 37, 40 and 42 C showed more rapid reduction in specific gravity than samples incubated at room temperature or 30 C. Lactose conversion in whey was 83% complete and in whey supernatant fluid, 77%.

Detoxification of Corn, Ajoy G. Chakrabarti, Department of Natural Sciences, South Carolina State College, Orangeburg, South Carolina 29117

J. Food Prot. 44:591-592

Corn samples contaminated with aflatoxins were ground by a Wiley Mill, using a 40-mesh sieve to make meal. The toxin level was reduced to less than 20 ppb, as detected by minicolumn tests. Detoxification was done by the separate treatments of 3% hydrogen peroxide, 75% methanol, 5% dimethylamine hydrochloride or 3% perchloric acid. Loss in fresh weight by these treatments was 28, 14, 7 and 7%, respectively. Loss in proteins and lipids due to the detoxification processes did not exceed 0.5 and 0.6%, respectively, when compared with the fresh weight of corn.

Depletion of Sodium Nitrite by Lactic Acid Bacteria Isolated from Vacuum-Packed Bologna, D. L. Collins-Thompson and G. Rodriguez Lopez, Department of Environmental Biology, University of Guelph, Guelph, Ontario N1G 2W1, Canada

J. Food Prot. 44:593-595

Different strains of lactic acid bacteria isolated from bologna were inoculated into APT broth and vacuum-packed bologna sterilized by gamma radiation. Broth cultures of *Leuconostoc mesenteroides* reduced nitrite levels at 5 and 15 C at a greater rate than *Lactobacillus plantarum* and *Lactobacillus viridescens*. *Brochothrix thermosphacta* and *Lactobacillus brevis* reduced nitrite at rates similar to the uninoculated broth. Similar nitrite reduction rates were noted with the same organisms in the inoculated packs of bologna at 5 C. Residual nitrite losses in the bologna by action of the lactic acid bacteria was estimated to be 30%.

Growth and Survival of *Campylobacter fetus* subsp. *jejuni* as a Function of Temperature and pH, M. P. Doyle and D. J. Roman, The Food Research Institute, University of Wisconsin-Madison, 1925 Willow Drive, Madison, Wisconsin 53706

J. Food Prot. 44:596-601

The objective of this study was to determine what effect temperature and pH have on the ability of *Campylobacter fetus* subsp. *jejuni* to grow and survive. None of three strains of *C. fetus* subsp. *jejuni* could grow at 30 C and below or at 47 C and above. The optimum temperature for growth was in the range of 42 to 45 C. Only one of three strains, FRI-CF8, could grow at pH 4.9 and none could grow at pH 4.7. The optimum pH for growth was in the range of 6.5 to 7.5; however, all strains grew well at pH 5.5 to 8.0. Rate of cell death at pH 3.0 to 4.5 was temperature-dependent. At comparable pH, cells of *C. fetus* subsp. *jejuni* died most rapidly at 42 C, less rapidly at 25 C and at the slowest rate at 4 C. For example, at pH 4.5, a 3 $\log_{10}$ decrease of cells occurred within 8 h when incubated at 42 C but took 4 days when incubated at 4 C. At 25 C and pH 4.5, cells were inactivated at an intermediate rate. Rates of thermal inactivation of five strains of *C. fetus* subsp. *jejuni* were determined at 48, 50, 53, and 55 C in a skim milk heating menstruum. At 48 C, D-values ranged from 7.2 to 12.8 min while at 55 C they ranged from 0.74 to 1.00 min. The times and temperatures used to pasteurize milk should be sufficient to free milk of even unusually large numbers of viable cells of *C. fetus* subsp. *jejuni*.

Attachment of Bacteria to Meat Surfaces: A Review, Ruth Firstenberg-Eden, Food Microbiology Group, Food Sciences Laboratory, U.S. Army Natick Research and Development Laboratories, Natick, Massachusetts 01760

J. Food Prot. 44:602-607

The mechanism of attachment of bacteria to meat surfaces involves two consecutive stages. During the primary stage, bacterial attachment is probably due to physical forces, and the number of bacteria becoming attached is proportional to the number in the water film over the surface. The second stage is initially characterized by an increased strength of attachment due to polysaccharide formation, which is a time-dependent process. The dependence of attachment on various factors such as bacterial strain, type of meat surface, temperature, culturing method, etc. is discussed. Some potential consequences of attachment on slaughter hygiene, kitchen hygiene and methodology are described.

Antimicrobial Activity of Halogens, Theron E. Odlaug, Travenol Laboratories, Inc., Morton Grove, Illinois 60053

J. Food Prot. 44:608-613

The bactericidal and sporicidal effects of halogens are reviewed. Chlorine and iodine are the halogens most widely used for inactivating microorganisms. Compounds containing chlorine and iodine are, in general, equally effective in destroying vegetative cells, but chlorine compounds are more effective in inactivating spores. These relationships are illustrated graphically from the data available in the literature.

Antimicrobial Activity of Sorbate, J. N. Sofos and F. F. Busta, Department of Food Science and Nutrition, University of Minnesota, St. Paul, Minnesota 55108
J. Food Prot. 44:614-622

During the last 30 years sorbate has been tested and used widely in the preservation of various food products throughout the world. Currently it has received increased attention as a potential replacer of nitrite for botulism control in processed meat products. Previous reports, however, had suggested sorbate as a selective agent for clostridia in laboratory media. Recent developments as well as the need for safe, practical and effective food preservatives in current and future food processing have generated intense interest in preservatives such as sorbate. This paper reviews the significant developments relating to use of sorbate as a food preservative - its antimicrobial effects, applications, advantages and limitations. A summary of the current status as well as unanswered questions relevant to the mechanism(s) through which the compound exerts its antimicrobial activity also is presented.

Antimicrobial Activity of Non-Halogenated Phenolic Compounds, P. M. Davidson and A. L. Branden, Department of Food Technology and Science, University of Tennessee, P.O. Box 1071, Knoxville, Tennessee 37901 and Department of Food Science and Technology, Washington State University, Pullman, Washington 99164
J. Food Prot. 44:623-632

Phenol and its non-halogenated derivatives have been used for over 100 years as antiseptics to control growth of microorganisms. Their importance in controlling microbial growth in foods, however, has been recognized only recently. Phenolic compounds important in foods may be classed conveniently into three categories. First, there are those compounds currently approved for use in foods. This group includes methyl, propyl, and heptyl esters of p-hydroxybenzoic acid. Naturally occurring phenolic derivatives comprise the second category. Simple alkyl, hydroxy- and methoxy-phenol derivatives to complex polyphenols are included in this diverse group. The third type is food additives which are antimicrobials but are currently approved for other uses. The phenolic antioxidants are the only compounds in this category which have been tested thoroughly for their antimicrobial effectiveness. Each of these classes of phenolic compounds has widely varying inhibitory powers against certain bacteria, fungi and viruses. Their mode of action has been studied but has not been elucidated fully. A review of research on the spectrum of antimicrobial activity of these compounds as well as their proposed mechanism is presented.

Food-Grade Chemicals for Use in Designing Food Preservative Systems, Jon J. Kabara, Department of Biomechanics, Michigan State University, East Lansing, Michigan 48824
J. Food Prot. 44:633-647

Now that energy has become a world problem, cheap, effective chemical preservation is critical. This discussion forwards a new concept in food preservation. The concept is based on a 'systems' approach, using three common foodstuffs: monolaurin, food-grade phenolics and chelator, three multifunctional food materials, whose history as potential preservatives is reviewed. Although monolaurin (Lauricidin) is a Generally Recognized As Safe chemical, its use as part of a 'preservative system' is new. Comparisons of its germicidal activity by investigators have shown it to be more effective than proprionates, benzoates and even sorbic acid. The common antioxidants, tert-butylhydroxytoluene (BHT) or tert-butylhydroxyanisole (BHA) have been shown since 1967 to affect a number of different microorganisms, including viruses. The chelator ethylenediamineacetate (EDTA) has weak biocidal activity on its own but can potentiate the effect of the first two biocidal agents, particularly against gram-negative bacteria. The three common food chemicals therefore become part of a 'preservative system'. The amount and ratio of one to the other is determined by the specific need for microbiological protection.

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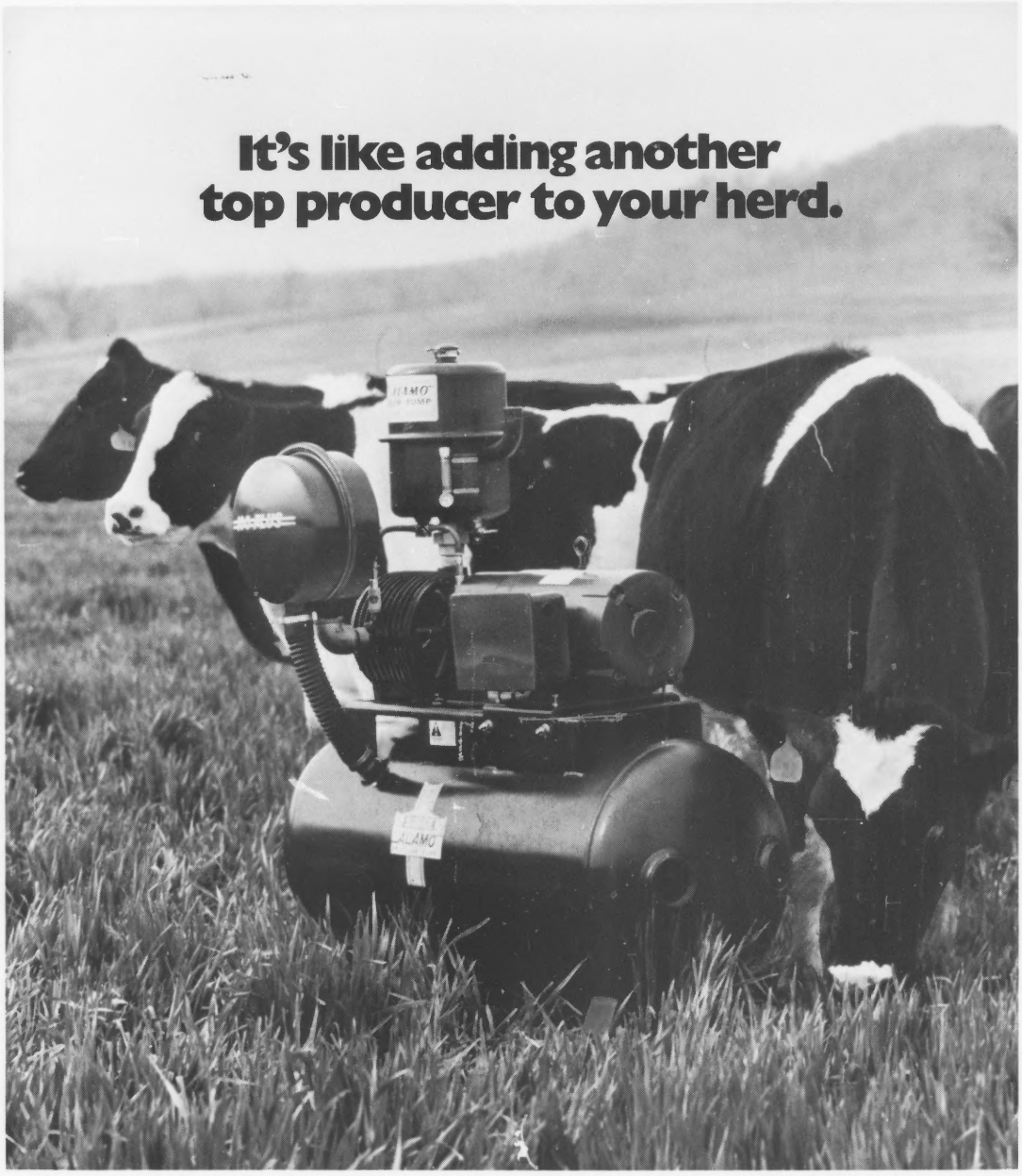

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