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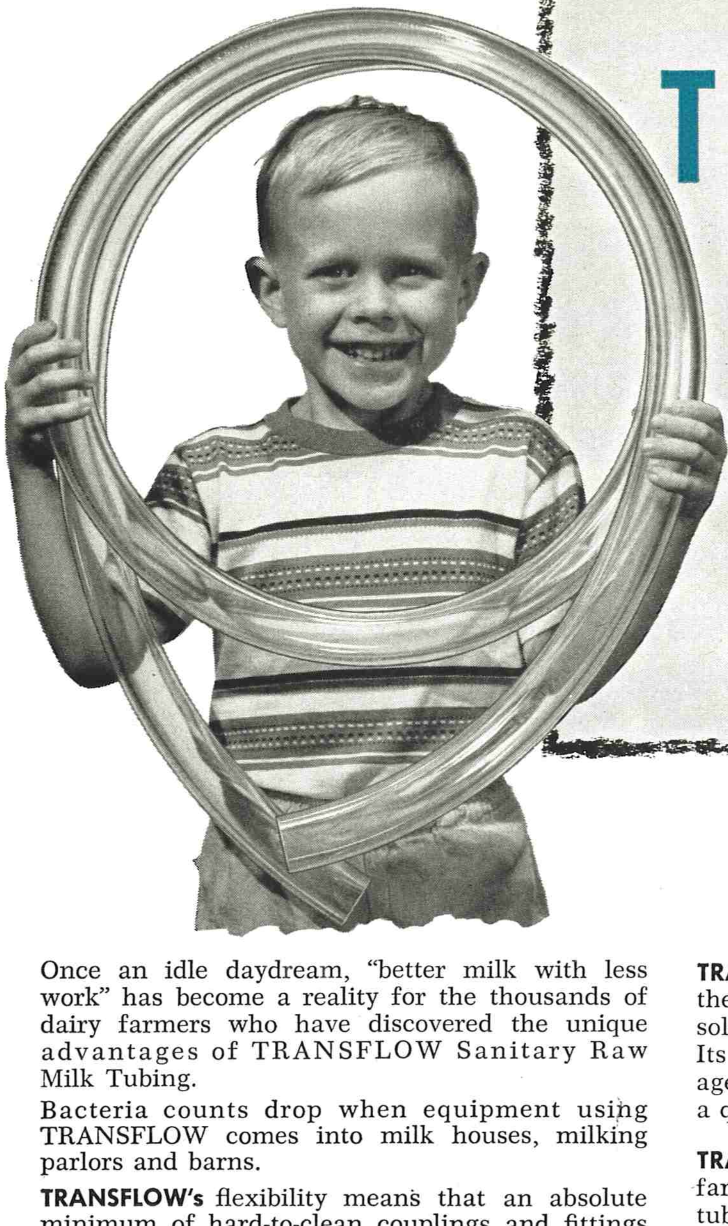

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EDITORIAL

Specialization or Generalization in Sanitation

The American Public Health Association's current definition of a Sanitarian is worth noting as we think about the sanitarian's activities. *A Public Health Sanitarian is a person whose education and experience in the biological and sanitary sciences qualify him to engage in the promotion or protection of the public health. He applies technical knowledge to solve problems of a sanitary nature and develops methods and carries out procedures for the control of those factors of man's environment which affect his health, safety and well being.*

Thus, it is recognized by the leaders in the field that sanitarians, public and private, are functioning not only in the traditional sanitary programs of food and milk but in controlling other factors in the environment which affect man's well being. Within recent years, as we are well aware, there has been a shift from the communicable to the chronic diseases. Likewise, there has been a change in the nature and extent of disease and injury arising from the environment . . . the air we breathe, the water we drink, and the food we eat. In the past, our environment was implicated largely in communicable disease control. Now, it has become strongly implicated in the potentials of chronic disease. Therefore, it seems more appropriate, if not entirely accurate, to consider the activities of the sanitarian in an *Environmental Health Program* rather than a *Sanitation Program*. The impact of scientific, technological and social development has created new problems, as well as intensified or magnified the traditional ones with which the sanitarian must cope. If each new problem area were to develop a group of specialists who were unable to deal with any other environmental health problem, it would dilute our versatility, and versatility has long been our strongest asset. Even though there are large sums of money being spent on certain problems of environmental contamination, such as air and stream pollution, we must not yield entirely to these or other pressures and encourage specialization without taking a good look at what effect it will have upon our status in the community and in coping with local problems.

In urging caution, it is not implied that there are no definite areas in which specialists are not only indicated, but are essential. Communities have their own special or distinct problems. One may have an air pollution problem, another a water pollution problem and the third may be suffering from hazards created by industrial concentration. There is no doubt but what there is a need for specialization in communities where problems of this type or similar ones are so outstanding as to over-shadow other environmental situations. However, in these communities the general sanitarian can be far more effective in evaluating the problems of environmental contamination because he has the over all knowledge and viewpoint of conditions as they exist. His viewpoint is broader than that of the specialist.

In order to overcome the hazards which threaten the economy, as well as the health of the community, sanitarians must avail themselves of skills and talents of other leaders such as planners, economists, lawyers, physicians, politicians and engineers. Specialists with a compentency in only one or two areas of the total problem, it appears, would be at a disadvantage in motivating such a heterogeneous group to action.

The term *specialization* does not have the same meaning to all of us. For example, some consider a sanitarian responsible for a food control program as a specialist in food sanitation. Yet when we analyze activities in this area it is obvious that there must be a compentency in food additives and preservatives, a knowledge of sanitary aspects of production and distribution as well as sanitary aspects of preparation and serving of food to the consumer. In addition to competency in these areas the *specialists* in food sanitation must possess sufficient knowledge of water supplies, sewage disposal facilities and processing equipment to recognize deviations and bring about corrections.

Now the question arises, *How far do we go in limiting our activities to the category of the specialist?* Shall we have "specialists" in food additives and preservatives, others in processing equipment and still others in each area affecting distribution of food? Only a little thought is needed to see that we must be realistic in our thinking with regard to specialization. Sanitarians with their broad educational background in the basic sciences can and must be versatile enough to function in very broad areas with a mimimum of assistance from the experts. We may plead guilty to the charge that we tend to do our thinking on the basis of past experiences. But past experience in the solution of local environmental problems is of inestimable value. This then is why we urge that sanitarians tread with caution before endeavoring specialization as a sort of public health cure-all.

Traditionally, the techniques of epidemiology have been effective tools in the hands of the professional sanitarian in the control of communicable diseases. They still appear to be just as effective in controlling the chronic diseases. Despite pressures exerted by the introduction of new terms and new processes the sanitarian who is effective in the use of such basic tools will not be hampered by a restricted viewpoint but will see the wide variety of implications and piecing these together will move toward an effective solution.

D. C. CLEVELAND
Oklahoma City-County Board of Health
Oklahoma City, Oklahoma

Opinions expressed in this editorial are those of the writer and do not necessarily represent the views of this Association.

PUBLIC HEALTH PROGRAMS – ARE THEY REALLY NECESSARY

C. L. Bradley

City of Fargo Health Department
Fargo, North Dakota

The need for adequate public health services by a community is a basic one. Such programs as home and school nursing, water and sewer facilities, milk and food sanitation, vector control and refuse disposal have markedly contributed toward disease prevention. The sanitarian must not forget to emphasize that there is a valid economic justification for complete public health services. This fact is often overlooked. The public health worker has a very real job of selling to do in order to bring about general acceptance of the philosophy that "sanitation is a way of life."

The struggle for the survival of the human population cannot be separated from the struggle of all other organisms. Disease may be said to occur, in most instances, because the individual or group moves into an unfavorable relationship with their environment or with other individuals. Human beings and groups struggle not only with other organisms, but also against the physical and social environment in which they live *(3)*.

The Health Department attempts to control man's environment through the operation of public health programs based upon proven principles of preventive medicine.

Disease Factors

The fact that certain foods sometimes cause illness or death upon ingestion was recognized early in man's history; however, the reasons why this happened were not thoroughly understood until about 75 year ago when the germ theory was demonstrated and accepted as a fact *(3)*.

The primary causes of food contamination are by *(a)* infection of food by organisms such as bacteria; *(b)* autolysis or spontaneous disintegration of food by enzyme action; and *(c)* adulteration of food by unsalubrious materials. Microbial contamination of food is equally analogous to the bacterial contamination of water. All facts available certainly indicate that every step in the handling of food or drink may be a contributing factor to its contamination. It is, therefore, up to the sanitarian of the public health team to visualize every point in its processing including a check of the personnel, equipment and techniques in order to achieve satisfactory control *(3)*.

There is a very close relationship between communicable and noncommunicable diseases *(3)*. This should not be overlooked; this connection could prove to be an important factor in determining the effectiveness of the control technique.

For example, malnutrition may let certain pathogens invade the body and, consequently, produce certain communicable diseases through secondary infection by pathogens. Hookworm is considerably more widespread among undernourished persons than among those who have adequate diets. This is true, even though both groups may be equally exposed to infection. Silicosis predisposes for tuberculosis and bad housing results in exposure, and reduces body defenses to the extent that pathogens may invade the body and cause communicable disease. Infectious hepatitis may injure the liver and produce cirrhosis of the liver.

Some diseases may be indirectly connected to insanitary or unhealthy environmental conditions, and these may give rise to other noncommunicable and communicable diseases. Such diseases as rheumatic fever and diptheria are examples. Rheumatic fever may bring about rheumatic heart disease, and diphtheria may weaken the heart muscles and hence cause heart disease after the diphtheria organisms have disappeared. These examples seem to further emphasize the need for good public health practices because both communicable and noncommunicable diseases may be brought about by exposing the individual to unfavorable physical or social environments.

Economic Factors

A study of all of the facts indicates that public health activities may be justified on an economic basis, and it seems that this particular approach has not been emphasized to the citizen as often as it should be. If it can be shown that adequate public health programs can actually save money for the community, wide acceptance of our goals and proposals would seem to be assured.

It must be admitted that the costs of all government services have arisen along with other costs in our economy. We cannot deny that, proportionately speaking, the expenditure for public health services represents an area of considerable expansion in recent years. An important factor bringing about this expansion in health services is that the need for adequate health services has finally been demonstrated to a greater number of communities than in the past. Health Department services have been, in many cases, less than adequate and there is still, understandably, considerable opposition to the expansion in public health services in many communities and areas. This inadequacy is true because the apparent high costs of public health programs are invariably associated with the adequacy of them *(4)*.

The implication should not be drawn that an expensive program is necessarily the best one, however, it is true that adequate public health is rarely obtained on a minimum budget. Many health department operations are actually useless, and in some instances dangerous to the welfare of the community they attempt to serve when they are operated as minimum services.

During any discussion of this economic factor it should be made clear that healthy living obtained through the efforts of public health teams is admittedly expensive. Most intelligent people can appreciate the fact that a considerable amount of human suffering has been alleviated by public health programs. Many have, however, come to feel that the public health department represents an added, and perhaps unnecessary, expense to the taxpayer.

An increase in the money judiciously spent on public health services, including both the medical and sanitation programs, actually can bring about a decrease in the net bill for personal and community health and welfare.

Most people will grant that even though the construction and costs of water purification, sewage collection and disposal systems are undeniably high, in their absence a similar or very likely greater cost would have to be borne by the individual and the community. These costs would be expressed through increased medical expenses and lost earning power.

In 1935 lobar pneumonia caused the death of 2,039 males in New York City, 809 of them between the ages of 20 and 50. Since the deaths occurred among working males, it has been estimated that these deaths represented an economic loss of 20 million dollars. This fact was noted and used when it was found necessary to request $50,000 to provide adequate pneumonia control work. It has been estimated that the expenditure of this sum would save 5 million dollars. It was pointed out by some authorities that when 2 million dollars of State and Federal funds were used in 1937 to prevent and control syphilis, this was a paltry sum when compared to the 10 million dollars spent on the syphilitic insane annually *(4)*.

In 1930 the Commissioner of Health of Detroit, Michigan, requested $200,000 a year for each of 5 years for early tuberculosis finding and hospitalization. He was able to demonstrate that the total extra appropriation of one million dollars for this purpose would repay itself several times over by the end of that period. At that time only 15% of the new cases of tuberculosis were found while still in the minimal stage, 30% were moderately advanced, and 55% were far advanced. By 1943, as a result of the accelerated program for case finding and hospitalization, the figures for minimal and far advanced cases were literally reversed so that 55% of the newly diagnosed cases were in the minimal state and 17% had progressed to the far advanced stage. When it is considered that the average hospital stay for minimal cases in Detroit was 9 months in contrast to 2 years or more for far advanced cases, the enormous savings to the taxpayers in terms of hospital costs alone is most evident. It was calculated that the initial investment of $200,000 in preventive medical procedures saved about $1,400,000 per year *(4)*.

Large savings from milk and food sanitation programs also may be realized when one considers hospital costs and labor lost from milk, food, water and vector borne diseases.

Rats are notoriously destructive because of their knawing habits and it is an accepted fact that some of our worst fires have been attributed to rodents such as rats and mice. Rats cost the United States 500 million dollars each year. A rat destroys $200 worth of food annually. These facts indicate that costs other than those from wages lost and hospitalization may be realized by a municipality *(3)*.

The refuse collection and disposal systems of the municipality or district may also be important factors, both as an indicator of the sanitary status of the area and as a valuable reclamation tool and eventual source of income. An efficient, properly operated garbage and trash collection and disposal system will not only reduce the insect and rodent population of a community but if the Sanitary Landfill procedure is used, it can effectively and efficiently reclaim much otherwise worthless land for future use *(1)*.

Insect control programs also should be considered as being potentially capable of paying financial dividends to a community or health district. Flies and mosquitoes are vectors of diseases such as typhoid fever, dysentery, malaria and encephalitis. Certain areas of the United States have long had a history of malaria and encephalitis endemicity *(6)*. Adequate mosquito control should not fail to consider the public health aspect of the work along with the nuisance phase where the local conditions indicate such action is needed.

A local health unit may easily determine for itself just how expensive communicable diseases are to a community. Statistical information may be obtained from the local and State Health Departments, the State Employment Bureau, local hospitalization insurance companies and similar sources. These data should clearly indicate how substantial savings could be realized by a municipality, district, or locality by well planned, effective public health services.

In Fargo, North Dakota, data obtained from such sources as these just mentioned, indicated that approximately $61,000 was lost in wages and through hospitalization expenses during the first 9 months of 1960 *(2, 5)*.

Public Health Personnel

A brief word regarding the size of the staff needed to carry out a minimum effective public health program might not be amiss at this point. The recommendations suggested by some public health authorities state that a ratio of 1 per 50,000 population be used for medical personnel; 1 per 15,000 for sanitary personnel; 1 per 5,000 for nursing staff (1 per 2,500 population of bedside nursing is included); and 1 per 15,000 for office personel *(4)*. On this basis a considerable number of districts and units in the nation are understaffed. It is readily granted that local conditions should determine the required number of staff members; however, as a general rule, units with less than minimum staff requirements would be more likely to carry out a substandard public health program.

Conclusions

1. Disease occurs, primarily, because the individual or group is related unfavorably to the physical or social environment.
2. The Health Department's health and sanitation programs are needed to control the environment.
3. Public health activities may be further justified on both an altruistic and economic basis.
4. The effectiveness of any given public health program may be related in direct proportion to the adequacy of its budget.
5. The increase in public health budgets is due to a rise in cost of all government operations, and the realization in many areas that long overdue changes in staffing and programing are due.

The public health profession must attempt to prove to the taxpayer that the health and sanitation programs are actually worth the rather large sums that are currently being requested. This can be done by *(a)* stressing the relationship of communicable and noncommunicable diseases to man and his environment; and *(b)* by indicating the actual monetary savings that may be effected by public health activities.

References

1. Bradley, C. L. The Sanitary Landfill in North Dakota. The Sanitarian, **22** (No. 2):80-82.1959.

2. Fargo Health Department, Fargo, N. Dakota. Dept. files and records.

3. Freedman, Ben. *Sanitarian's Handbook: Theory and Administrative Practices.* Peerless Publishing Company, New Orleans. 1957.

4. Hanlon, John J. *Principles of Public Health Administration.* The C. V. Mosby Company, St. Louis. 1960.

5. North Dakota State Health Department, Communicable Disease Bulletin. 1960.

6. Post, Richard L. and Kramer, Marvin C. "Skeeter" Troubles: Camp Followers of a Water Program. Bi-monthly Bulletin, North Dakota Agricultural Experiment Station, **14** (No. 3):101-104.1952.

NOCARDIA AND ACTINOMYCES AS CAUSATIVE AGENTS OF BOVINE MASTITIS: A REVIEW[1]

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(Received for publication February 12, 1962)

Mastitis still prevails as a major herd health problem— thus supplying concrete evidence that the era of antibiotics and vaccinations has not yielded the "cure-all" results which had been hoped for when such treatments were put into general use several years ago. In fact, there is increasing suspicion that instead of alleviating the mastitis problem, antibiotic practices have created a somewhat more difficult situation by causing a change in the predominant types of organisms responsible for udder infections. For example, some years back, mastitis was generally attributed to *Streptococcus agalactiae*. Now, due to antibiotic therapy, staphylococci and other organisms such as *Nocardia* and *Actinomyces* have reportedly assumed a greater role. This review is presented for the purpose of indicating the significance of the latter two organisms as causative agents of bovine mastitis.

Trends in Organisms Causing Mastitis

Drury and Murray *(5)* in 1959, found that the organisms involved in mastitis in a Michigan area included 58.8% streptococci, 39.4% staphylococci, and 1.8% other organisms. In this same area in 1939, about 98% of the mastitis causative organisms were streptococci. Niksch, *et al. (12)* reported on 3137 milk samples from 582 herds in different areas of the United States in which mastitis had not responded satisfactorily to antibiotic treatment. They found the following organisms to be involved: staphylococci, 50.9%; streptococci, 25.9%; *Escherichia coli;* 5.9%; *Corynebacterium*, 5.6%; *Pseudomonas aeruginosa*, 1.9%; *Klebsiella*, 1.2%; and other possible pathogens, 3.5%. Since 1957, Pier and associates *(13, 14, 15)* have reported several instances in which *Nocardia asteroides* was involved in outbreaks of mastitis in California and Hawaii.

Recently, in Ohio, *Nocardia alba* and *Nocardia flavescens* were identified as being the cause for a case of serious udder infections in one herd *(17)*.

Characteristics of *Nocardia* and *Actinomyces*

The *Nocardia* are obligately aerobic microorganisms of the family *Actinomycetaceae*, and the *Actinomyces* are anaerobic or microaerophilic members of the same family. Both are commonly referred to as actinomycetes, and are considered to be a group of microorganisms which are intermediate between true fungi and true bacteria because they possess some characteristics of both groups. *Nocardia* are free living in nature, whereas the *Actinomyces* are strict parasites of man and animals. Several species of *Nocardia* may enter directly into wounds to cause localized infections, and *Nocardia asteroides* may be inhaled to cause a primary pulmonary disease in man which can eventually move to any area of the body, particularly to the subcutaneous tissue and the central nervous system. There are only three recognized species of the genus *Actinomyces*, but all three are pathogenic to man and animals *(2, 6)*.

Significance of *Nocardia* and *Actinomyces* in Mastitis

The increasing incidence of fungus infections of both man and animals has been emphasized by the American Veterinary Medicine Association *(1)*. *Actinomyces* was cited as an example of an organism which has appeared more often as a secondary invader after bacterial infections have been reduced with antibiotics. This trend appears to be similar to the reported incidences of *Nocardia* and *Actinomyces* in mastitis. A chronological summary of some of the reported incidences of these organisms in mastitis is presented in Table 1.

The data reveal that reported incidences of nocardial and actinomycotic infections in dairy herds occurred only in isolated cases until Pier and associates *(13)* diagnosed the disease in 16 of 29 cows of a single dairy herd in the Southern California area in 1957. Since that time the disease has been diagnosed in 9 additional dairy herds by these workers: six herds in California and three in Hawaii *(14, 15)*. Losses due to *Nocardia asteroides* mastitis totaled 300 cows out of a 700 cow herd and 180 cows out of a 500 cow herd in Hawaii. In one California herd, 56 cows out of 157 were lost. The disease was diagnosed as severe in these cases. In other herds where the disease was detected, the infection was less severe and resulted in a considerable lower incidence of loss. Experimental reproduction of the disease in test animals was accomplished with the isolated *Nocardia asteroides*.

[1]Article No. 1-62, Department of Dairy Technology, The Ohio State University. Prepared as a portion of a project supported by a grant from the National Institutes of Health (U. S. Public Health Service).

TABLE 1. REPORTED INCIDENCES OF *Nocardia* AND/OR *Actinomyces* IN UDDER INFECTIONS

Research worker(s)	Year reported	Organism isolated	Type of animal	No. of animals infected	No. of herds	% of animals infected
Evans *(7)*	1918	*Nocardia asteroides*	cows	18	1	
Smith *(18)*	1934	actinomycotic species	cows	2	1	
Gray *(8)*	1935	*Actinomyces farcinica*	cow	1	1	
Hardenbrook *(9)*	1946	*Actinomyces species*	cows	Frequently isolated from udders		
Munch-Petersen *(11)*	1954	*Nocardia asteroides*	cow	1	1	
Pier, *et al. (13)*	1957	*Nocardia* species	cows	16	1	58
Jungerman *(10)*	1958	*Nocardia asteroides*	cows	several	1	
Defaala & Gharib *(3)*	1958	*Nocardia asteroides*	goat	1		
Pier, *et al. (14)*	1958	*Nocardia asteroides*	cows	28	1	18
Ditchfield, *et al (4)*	1959	*Nocardia braziliensis*	cows	1	1	
Pier, *et al. (15)*	1961	*Nocardia asteroides*	cows	560	6	36
Pounden & Martin *(17)*	1961	*Nocardia alba* & *Nocardia flavescens*	cows	3	1	

HABITAT OF *Nocardia*

Pier, *et al. (16)* have reported studies designed to determine the sources of nocardial infection in dairy herds. From the premises where the cattle contracted the disease, *Nocardia asteroides* was isolated from the soil, infusion cannulas, medicine vials, and from partially used drug infusion mixtures. When the organism was experimentally added to drug infusion mixtures it remained viable for 7 weeks, and a clinical response typical of the naturally occurring infection could be observed following infusion of these experimentally contaminated mixtures into the mammary gland of a non-lactating cow. The infection rate could be alleviated by the institution of proper aseptic techniques and the substitution of disposable single-dose applicators for multiple-dose drug mixtures.

HEAT RESISTANCE

Several investigators have reported thermal death studies with the isolated organisms *(7, 11, 14)*. Evans *(7)* found the *Nocardia* organism isolated from infected udders to be killed by a temperature of 56°C for 30 minutes after it had remained in whole milk for 8 days. The 8-day culture was assumed to contain organisms as resistant to heat as would occur in milk at the time of pasteurization; consequently, it was concluded that normal pasteurization treatment was sufficient to kill the organism. Munch-Petersen *(11)* reported that the thermal death point of *Actinomyces (Nocardia) asteroides* grown at 37°C for 7 days in skimmilk was 10 minutes at 70°C. Pier and associates *(14)* determined that *Nocardia asteroides* isolated from mastitis cases survived exposure to 64°C for 30 minutes. Smith *(18)* did not report specific thermal death studies, but stated that the milk from cows suffering from mastitis caused by the actinomycotic species of organisms might present public health problems to consumers.

RESISTANCE TO ANTIBIOTICS AND GERMICIDES

Defaala and Gharib *(3)* observed the apparent ineffectiveness of antibiotics against *Norcardia asteroides.* Penicillin was infused into the infected udder of a goat for 6 days without effect, and, later, a mixture of penicillin and terramycin was included with no observed improvement. Bacteriological tests showed the organism involved to be resistant to penicillin, terramycin and streptomycin. Jungerman *(10)* found that when cows infected with *Nocardia asteroides* were treated with antibiotics the inflammatory process apparently became more severe. Ditchfield, *et al. (4)* reported a case of chronic mastitis due to *Nocardia braziliensis* which did not respond satisfactorily to any commercial mastitis preparation.

According to Pier, *et al. (14)*, none of the more commonly used antibiotics were effective against *Nocardia asteroides.* These included penicillin, streptomycin, chloramphenicol, polymixin, neomycin, and three tetracycline derivatives. However, the antibiotics novobiocin (albamycin) and nitrofurazone (furacin) were effective against the organism, and erythromycin exhibited limited effectiveness. A mixture of novobiocin (500mg) combined with 25 to 40 cc of nitrofurazone solution (0.2%) was used successfully in treating infected udders. Common dairy disinfectants which were practically ineffective against the organism were iosan and nolvasan. However, satisfactory bacterial destruction was obtained with chlorine, 100 ppm and exposure time of 5 minutes, and Roccal, 100 ppm for 10 minutes or 200 ppm for 5 minutes.

For control measures, Pier, et al. *(16)* recommended that *(a)* strict aseptic procedures be maintained in intra-mammary infusion therapy, *(b) disposable* single-dose applicators be used when infusing antibiotics into the infected udders of several cows, *(c)* disinfectant solutions be used on the teat ends at the completion of milking, and *(d)* complete segregation of diseased cows be accomplished in all infected herds.

SURVEY FINDINGS

A questionnaire survey was made in an attempt to obtain information on the national situation in respect to *Nocardia* and *Actinomyces* as causes for mastitis. Questionnaires were sent to public health and mastitis-testing laboratories in the 50 states, Puerto Rico, the Virgin Islands, and to the U. S. Public Health Service Laboratory in Cincinnati.

Fifty-three questionnaires were distributed, and 45 responses were received. Of this number, 28 (62%) of the agencies reported that these organisms had never been found in milk or in mastitis cases, six (13%) reported that no check for these organisms was being made, and 11 (25%) reported the presence of *Nocardia* or *Actinomyces* either in raw milk or in mastitis infections. Most of the positive results were from raw milk sent to the laboratories for mastitis diagnosis. Five (45%) of the positive replies indicated that these organisms were found occasionally (in 10 to 12 samples per year) in whole raw milk, raw cream and raw skimmilk received at dairy plants. No incidences were reported in which the organisms were found in pasteurized products.

Five states reported that either *Nocardia* or *Actinomyces* had been involved in mastitis outbreaks. The number of outbreaks which occurred in a given state ranged from one to 15, and the number of animals involved from 20 to 300. The number of cows in certain individual outbreaks was high: in three of the outbreaks reported, the percentage of cases from herds totaling 1000, 400, and 180 cows was 30%, 45%, and 8%, respectively. One laboratory supervisor reported that actinomycotic mastitis had been encountered sporadically in his state for at least 20 years.

SUMMARY

The reported incidence of *Nocardia* and *Actinomyces* in mastitis infections is not alarming when considered in relation to the many other organisms which have been implicated. However, literature indicates that these organisms may be becoming more significant as mastitis causative agents, and that their high virulence causes greater loss of animals than occurs from infection with other organisms usually associated with the disease.

Some health agencies reported having found *Nocardia* or *Actinomyces* in raw milk products or as causes for mastitis; however, many have not been attempting to relate these organisms to mastitis infections. Perhaps more attention generally should be given to these organisms in determining the cause for mastitis infections and to the possible control steps to be taken. Because of their characteristics, these organisms do not lend themselves to simple control measures. Consequently, this necessitates more alertness on the part of the producer to herd health symptoms, prompt diagnosis, and immediate and perhaps drastic remedial measures.

REFERENCES

1. Anonymous. A new interest in animal mycoses. J. Am. Vet. Med. Assoc. **126**:320.1955.

2. Breed, R. S., Murray, E. G. D. and Hitchens, A. P. *Bergey's Manual of Determinative Bacteriology.* Sixth Edition, pp. 892-896. Williams and Wilkins Co. Baltimore. 1948.

3. Defaala, E. N. and Gharib, H. M. Study of mastitis in a goat caused by *Nocardia asteroides.* Brit. Vet. J. **114**:143. 1958.

4. Ditchfield, J. Butas, C. A., and Julian, R. J. Mastitis due to *Nocardia braziliensis.* Canad. J. of Comp. Med and Vet. Sci. **23**:93.1959.

5. Drury, A. R. and Murray, D. L. A 1960 survey of mastitis in the Lansing milk shed. Quarterly Bull. Mich. Agric. Exp. Sta. **43**:502.1961.

6. Dubos, R. J. *Bacterial and Mycotic Infections of Man.* 3rd edition, p. 584. J. B. Lippincott Co. Philadelphia. 1958.

7. Evans, A. C. A *Streptothrix* (*Nocardia*) infection of cows' udders. J. Infect. Dis. **23**:373.1918.

8. Gray, J. D. A. An aerobic acid-fast *Actinomyces in* cow's milk due to an udder infection. J. Dairy Res. **6**:49.1935.

9. Hardenbrook, H. Studies in Cowpox. III. A note on the fungal flora of bovine teat and udder lesions. Cornell Vet. **36**:251.1946.

10. Jungerman, P. Fungus mastitis - A case report. Vet. Med. **53**:53.1958.

11. Munch-Petersen, E. *Actinomyces* (*Nocardia*) Sp. from a bovine udder infection. Australian Vet. J. **30**:297.1954.

12. Niksch, G., Newberne, J. W. and Mayer, K. Bacteriological survey of milk samples from 582 problem mastitis herds. Allied Vet. **31**:167.1960.

13. Pier, A. C., Gray D. M., and Fossatti, M. J. *Nocardia* infection of the bovine mammary gland - A preliminary report. J. Am. Vet. Med. Assoc. **131**:327.1957.

14. Pier, A. C. Gray, D. M., and Fossatti, M. J. *Nocardia asteroides* - A newly recognized pathogen of the mastitis complex. Am. J. Vet. Res. **19**:319.1958.

15. Pier, A. C., Mejia, M. J., and Willers, E. H. *Nocardia asteroides* as a mammary pathogen of cattle. I. The disease in cattle and the comparative virulence of 5 isolates. Am. J. Vet. Res. **22**:502.1961.

16. Pier, A. C., Willers, E. H. and Mejia, M. J. *Nocardia asteroides* as a mammary pathogen of cattle. II. The sources of nocardial infection and experimental reproduction of the disease. Am. J. Vet. Res. **22**:698.1961.

17. Pounden, W. D., and Martin, J. H. Unpublished data. The Ohio State University. 1961.

18. Smith, H. Two cases of actinomycotic mastitis. J. Am. Vet. Med. Assoc. **84**:635.1934.

CONTROL OF MILK FILLING OPERATIONS[1]

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Work was undertaken to determine the applicability of statistical techniques for the evaluation and control of milk filling operations. It was shown that the components of the variation followed a so-called normal distribution. Thus, well developed statistical techniques can be applied. The use of gross weight appeared to be a logical control measure. The extent of deviation was found to be a characteristic of the individual filling operation. The machine filling larger containers showed a greater variation but not in proportion to the quantity filled. These statistical techniques were found applicable for the evaluation, adjustment, and routine control of filling operations for milk. Furthermore, these findings can be used as a helpful guide in establishing tolerances to be used for regulatory purposes.

Modern filling operations are designed for high speed production. At the present filling rate a considerable quantity of milk is involved, and with each new model of machine there is generally an increase in the filling rate. Adequate control measures for filling accuracy are therefore needed. The public should be protected against shortages in the individual cartons. Yet, the control system should not seriously penalize the producing plant.

There is a lack of well defined, adequate standards for regulating filling operations. Legal standards are in terms of volume while routine control is in terms of weight. Often the control standards, including tolerances, etc., are different for various regulatory groups because of a lack of understanding of the variation that is normal and to a certain degree inevitable.

The necessity for a plant to overfill is taken for granted. The amount of overfill is in a great degree determined by the extent of variation. A plant may experience considerable loss in complying with the variety of standards. For example, one of our most efficient plants of a national organization estimates its daily loss from the above lack of well defined uniform standards in excess of $100 per day.

Only a limited amount of work has been published pertaining to the evaluation of filling operations. Farmer *(3)* reviewed the commercial application of some statistical quality control measures as adapted to the receiving of materials and supplies and also to the packaging process in an ice cream operation. Some further work pertaining to the application of statistical quality control techniques was carried out by Smallwood and Roberts *(5)*. Tarver and Schenck *(6)* explored the use of extreme value control charts in the operation of canning machinery. Jensen *(4)* of the Bureau of Standards published a Handbook on the checking of prepackaged commodities. It dealt primarily with the personal behaviorial aspects and management of the official checking program. The paucity of published work especially on milk filling operations plus the value of product involved points to the need for additional work along these lines.

Methods

In determining the quantity of milk in a package the weight was used. Approximately 200 containers were taken for each sample from a continuous uninterrupted operation. For the early evaluations the weight was determined to the nearest 0.1 g. After the initial pattern of distribution was found the weights were recorded to the nearest gram. In those trials where the net weight was to be determined the milk was emptied and the residue was rinsed from the package by using distilled water. The cartons were air dried and weighed individually to allow the calculation of the net weight of milk by the difference. Weight was chosen as the unit of measure for the contents since weighing constituted the only practical system of non-destructive checking for routine control purposes.

Experimental

The filling operations evaluated consisted of the University dairy plant and five rather large commercial plants. The commercial plants were chosen to represent the three large manufacturers of common oommercial filler machines. Half-pint, quart, and half-gallon operations were evaluated.

To determine the nature and extent of variation that could be expected with a common packaging machine for paper bottles, a group of half-pint units was obtained from the University dairy plant. The gross weight of each package, and the weight of the rinsed and dried carton was determined. The net weight of milk was determined by the difference. The nature of the distribution of these weights can be seen in the accompanying Figures. The mean

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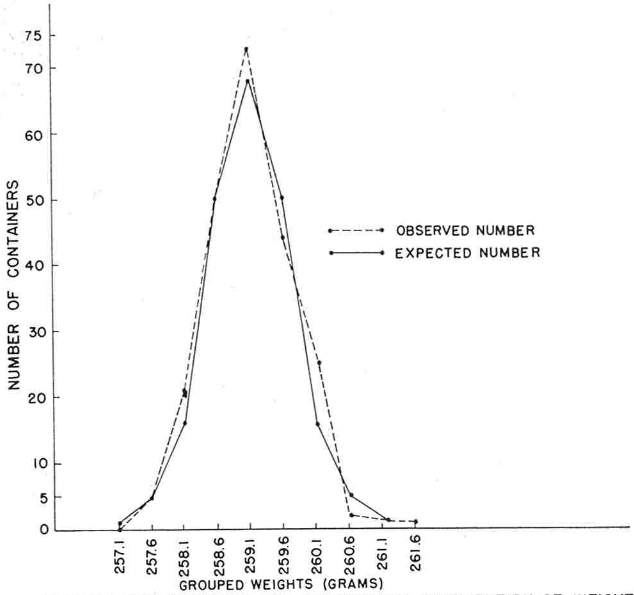

FIGURE I. THE OBSERVED AND THEORETICAL DISTRIBUTION OF WEIGHTS OF FILLED HALF-PINT CONTAINERS OF MILK

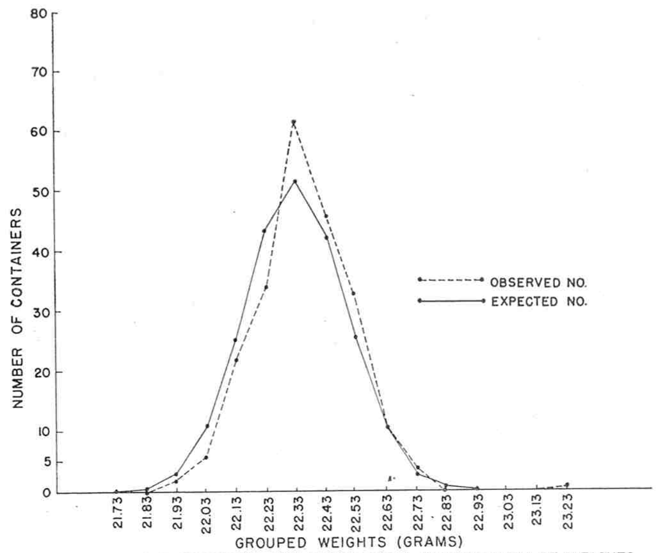

FIGURE 2. THE OBSERVED AND THEORETICAL DISTRIBUTION OF WEIGHTS OF EMPTY HALF-PINT CONTAINERS FROM WHICH MILK WAS REMOVED

was taken as the midpoint, and the interval of grouping was chosen for convenience of plotting. Figure 1 shows the grouped distribution of gross weights. The variance of these weights was determined by the following formula:

$$S^2 = \frac{\Sigma X^2 - \frac{(\Sigma X)^2}{N}}{N - 1}$$

From the mean and variance a normal theoretical curve was established. This curve is shown as the expected distribution in Figure 1. The similarity of plot of the observed distribution and the calculated curve showed the filling operation had a variation that exemplified a normal distribution. A good fit was indicated by the Chi-square test.

A similar approach was taken for the two major components of the gross weight, e.g., the container, which included fiberboard, glue, wax, and wire clip, and the net weight of milk. The distribution of the weights of the containers is shown in Figure 2. The expected curve based on the calculated variance for the containers is also shown. Here too the appearance and the Chi-square test indicated a normal distribution. The distribution of the net weights of milk is shown in Figure 3 along with the theoretical curve calculated from the variance. As would be expected, the appearance and the Chi-square test indicated a normal curve.

It is apparent from the presentation of the above work, which was corroborated by further experiments, that the deviation of the gross weights and components are normal. Thus, one is permitted the use of the well developed mathematical operations of a normal distribution. For example, Anderson and Bancroft *(1)* pointed out that the component deviations of an overall system can be expressed as follows:

$$S_x^2 = S_1^2 + S_2^2 + S_3^2 + \ldots + S_i^2$$

The total variance is equal to the sum of the variance of the mutually independent components. Since the variance of the net weight is large as compared to the variance of the carton (in this instance 0.4314 compared to 0.0277), the gross weight appears to be a logical means of routine control.

A careful look at Figure 3 gives an example of the applicability of this technique to the evaluation of an operation. The mean net weight of milk was 236.8 g and none of the packages contained the ex-

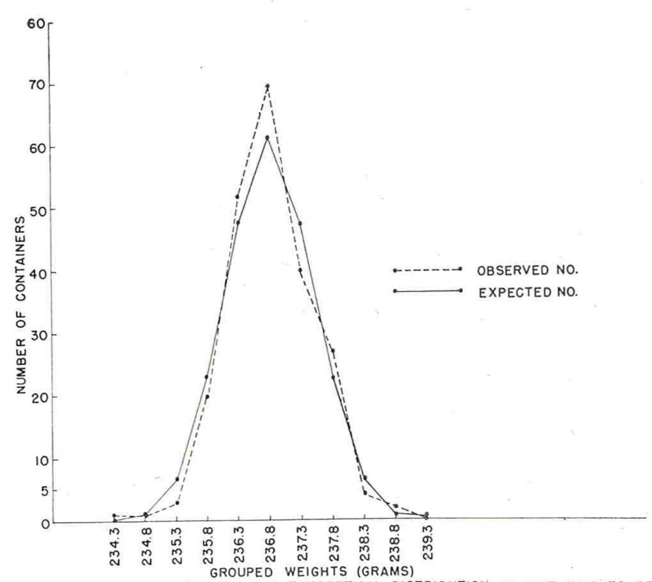

FIGURE 3. THE OBSERVED AND THEORETICAL DISTRIBUTION OF NET WEIGHTS OF HALF-PINT CONTAINERS OF MILK

TABLE 1. CHARACTERISTICS OF OPERATIONS FILLING HALF-PINT PACKAGES

Operation	Mean gross weight (grams)	Standard deviation
1	259	0.6
1a	278	0.9
2	261	2.1

pected 244.15 g (based on 946.33 cc per quart and a density of 1.032 g per cc). It was obvious that there was a continuous shortage and action should be taken to obtain adjustment of the filling operation.

The above operation was evaluated approximately a year later when the operating personnel were different. No advance warning was given. In addition, an outside commercial operation was evaluated. The mean gross weights of two evaluations of the University operation filling half-pints and the similar commercial operation are given in Table 1 as operation 1, 1a, and 2, respectively. There was a mean difference of approximately 18.4 g of milk in each half-pint the consumer received from operations 1 and 1a. This quantity is of obvious importance and indicates a lack of adequate control.

The one quart filling operation of the University was evaluated, but with the use of a different approach to establish the net weight of milk. A series of 202 packages was completed except that no milk was put into them. The mean weight of the packages was 46.5 g and the standard deviation was 0.5. A series of 220 filled packages was taken to determine the gross weight. The mean gross weight was found to be 1,028 g and the standard deviation was 3.4 g. The mean net weight was calculated to be 981 g. Similar results were obtained with other

TABLE 2. CHARACTERISTICS OF OPERATIONS FILLING QUART PACKAGES

Operation	Mean gross weight (grams)	Standard deviation
1	1,019	7.7
2	1,019	6.0
3[a]	1,019	5.8
4	1,021	5.0
5	1,028	3.4
6[b]	1,018	3.6

[a]Over a one year period and 314 packages.

[b]The components of the two individual filling mechanisms showed a standard deviation of 0.8 and 0.9.

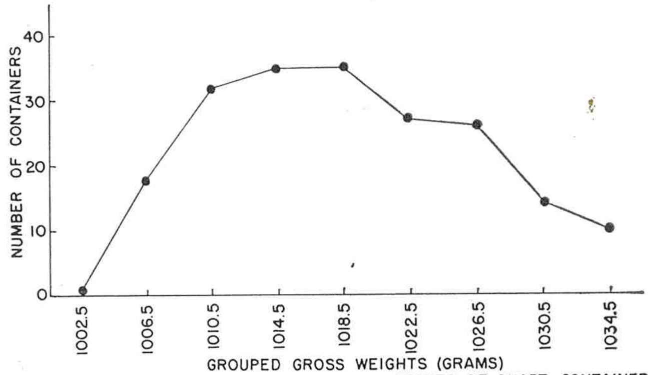

FIGURE 4. THE DISTRIBUTION OF GROSS WEIGHTS OF QUART CONTAINERS OF MILK FROM A COMMON FILLING OPERATION.

packaging operations. The results indicated this to be a satisfactory method of evaluating an operation. It was also apparent that the gross weight was an adequate criterion for the expression of the characteristics of the filling operation, since the distribution was normal and the standard deviation of the gross weight was seven times that of the package.

A number of other quart filling operations were evaluated. An example of the distribution of an operation with a standard deviation of 7.7 g - an extremely wide variation - is given in Figure 4. Some other operations showed considerably less variation. A comparison of six operations is given in Table 2. Operation number 1 showed more than twice the variation of operation number 5, and 1.5 times the variation of number 4. Thus, it follows that considerably more milk would have to be included in the average package of operation number 1 in order to meet a prescribed standard. It is also evident that each operation should have its own control standards.

Operation number 6 had an unusual characteristic that was not apparent from the compilation of data, but became apparent on plotting the data. This is shown in Figure 5. The two humps show that there are independent variables within this operation. This might be expected since it is a dual operation. It is also worthy of note that the standard deviation as represented by the two individual humps was 0.8 and 0.9 g.

The above work was extended to the evaluation of half-gallon fillers to determine the similarity and extent of variation as compared to the quart machine. An example of the distribution is given in Figure 6, which is based on weights in ounces and shows the unit of weight is relative and can be converted. Comparative data in grams from four operations are given in Table 3. These figures indicate the extent of variation that may be expected. The variation is in the general range of the one-quart machines. It is far from being doubled as might be expected from the quantity of milk involved. It is apparent that

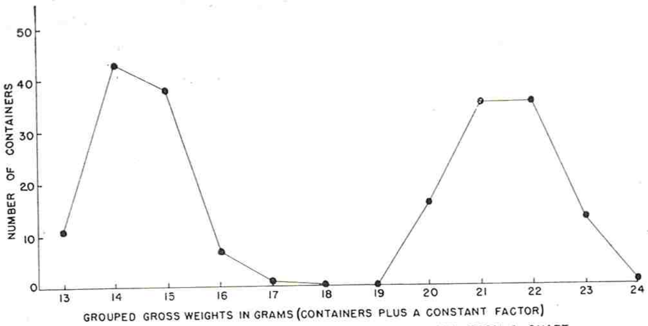

FIGURE 5. THE DISTRIBUTION OF GROSS WEIGHTS OF PACKAGES FROM A QUART MACHINE WITH TWO INDIVIDUAL FILLING MECHANISMS

TABLE 3. CHARACTERISTICS OF OPERATIONS FILLING HALF-GALLON PACKAGES

Operation	Mean gross weight (grams)	Standard deviation
1	2,027	7.6
2[a]	2,025	7.0
3	2,041	2.8
4	2,041	4.7

[a]Over a one year period and 288 packages.

each filling operation and size of container must be considered separately, because the extent of deviation is a characteristic of the individual filling operation.

Some observations were made to determine the applicability of these techniques to other operations in the dairy plant. Figure 7 serves as an example and shows results on paper cartons of cottage cheese, which is known to be an extremely difficult product to control. The data are presented as the grouped distribution around the mean gross weight of 378.85 g with a group interval of 10 g. The plot on these data shows that the technique is applicable though a close examination of the data shows that the variation is much greater than is found in milk filling operations previously given.

To compare the continuous run samples with routine random samples, two operations were evaluated by taking throughout a year the weights of periodic individual samples of approximately two per day of production. The data from the continuous runs were compared to data obtained by compiling the weights of the periodic single individual cartons for routine control purposes. The same general degree of variations was obtained.

The above results are based on the individual weights of a large number of packages. For routine control work sample size must be selected in harmony with the degree of accuracy desired. In order to exemplify the type of variation and the approach to selecting a sample size, Figure 8 was constructed using a theoretical mean of 975 g and a standard deviation of 5. This figure shows that 95.5 per cent of the individual weights would be between 965 and 985 g. If multiple units are taken the deviation becomes less. The relation is $s_{\bar{x}} = s/\sqrt{N}$, where $s_{\bar{x}}$ is the standard deviation of the mean weight of a sample of N units and s is the standard deviation of the individual units in the entire operation. It is apparent that the mean weight of a 4 unit sample would fall between 970 and 980 g with a 95.5% frequency, and a 10 unit sample would have a mean

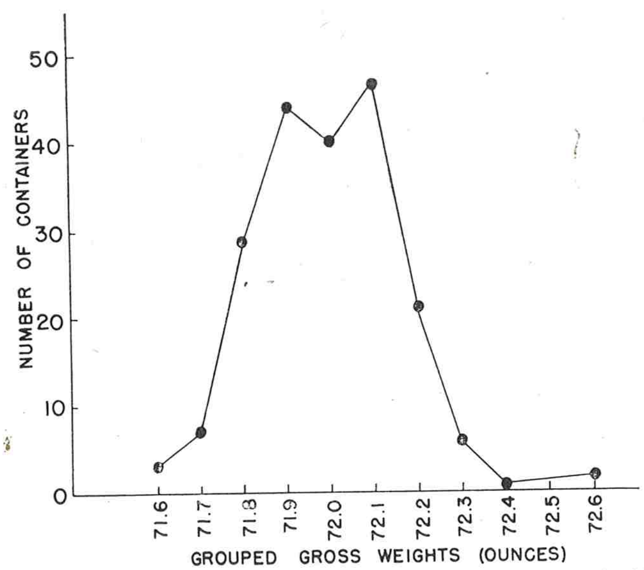

FIGURE 6. THE DISTRIBUTION OF GROSS WEIGHTS OF HALF-GALLON CONTAINERS OF MILK.

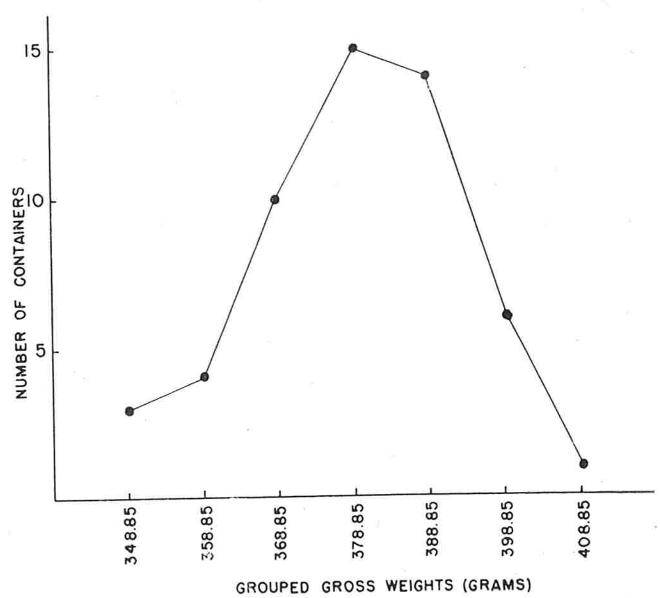

FIGURE 7. THE DISTRIBUTION OF GROSS WEIGHTS OF PACKAGES OF COTTAGE CHEESE.

weight between 971.84 and 978.16 g with the same frequency. Similar calculations show a 25 unit sample would have a mean weight between 974.0 and 976.0 g with this frequency. From these figures it is apparent that the routine control might be based on a fairly small sample depending on the accuracy demanded and the frequency of sampling, or control might be based on a number of individual periodic samples. For the basic adjustment of machines, however, a sample of 25 or more should be used.

The considerable variation involved in a milk filling operation makes it necessary to take logical precautions in controlling unfair practices against the consuming public and to prevent serious economic loss to the producing plants. It is apparent that the examination of a single package may tell if the individual consumer is receiving the quantity stipulated on the package. On the other hand, the examination of an individual package may tell little about the next package from that machine or the general characteristic of the filling operation. For example, a single package from the operation of machine 1 shown in Table 2 might vary from 1003.6 to 1034.4 and be within a perfectly normal operation. One would expect to get a package weighing between these limits 95.5% of the time, or beyond these limits 4.5% of the time.

All of the above results show the necessity of overfilling to maintain a reasonable assurance that individual packages will not be underfilled. The extent of overfill is directly related to the characteristic of the filling operation. This is expressed by the standard deviation, and a large standard deviation is depicted by a wide distribution on a graph. The wide distribution and overfill are the source of loss to the dairy plant. For example, even if the average net weight is correct, to have no more than 5% of the packages underfilled, it is necessary to put 1.6 times the standard deviation as an average overfill; and to have no more than 1% of the packages underfilled, it is necessary to put 2.3 times the standard deviation as an overfill. Control standards as well as the selection of machinery and conditions of operations should be based on this sort of finding.

While working with this type problem it is constantly apparent there is one major handicap in the control of packaging of milk products. Milk is labeled by volume. As the law now stands the official method of control is by volume. Most routine control work, both in the plant and regulatory bodies, is done by weight. For routine control purposes it is highly desirable to have a non-destructive type of control and weight is the only logical means available. More efficient plant control means more reliable regulatory control. It is therefore suggested

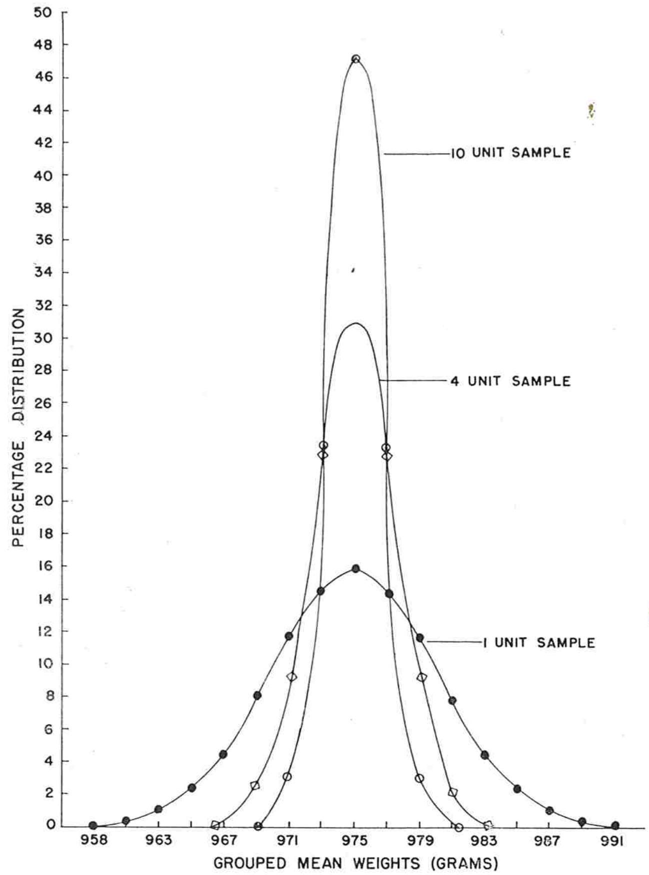

FIG. 8 THE THEORETICAL DISTRIBUTION AROUND A MEAN FOR VARIOUS SIZE SAMPLE

that a new approach be taken to labeling. One logical way would be to label the containers as average net weight with the wording approximately one pint, quart, or half gallon as appropriate. The deviation allowed would be based on normal operating conditions. It would be a more logical method of assuring the consumer the quantity stipulated on the container, a more practical method for routine control, and a more satisfactory method for the producing plant.

REFERENCES

1. Anderson, R. L. and Bancroft, T. A. *Statistical Theory in Research.* McGraw-Hill Book Company, Inc., New York. 1952.

2. Duncan, A. J. *Quality Control and Industrial Statistics.* Richard D. Irwin, Inc., Homewood, Illinois. 1952.

3. Farmer, E. C. Statistical Quality Control in Ice Cream Manufacturing. Forty-sixth Ann. Production and Control Council. Intern. Assoc. Ice Cream Mfgrs. **2**:101-116.1950.

4. Jensen, M. W. *Checking Prepackaged Commodities.* National Bureau of Standards Handbook No. 67.1959.

5. Smallwood, R. T. and Roberts, W. M. Application of Statistical Quality Control Techniques to Pint and Half-gallon Ice Cream Packaging Operations. J. Dairy Sci. **43**: 1682-1692.1960.

6. Tarver, Mae-Goodwin and Schenck, Anna. Use of Extreme Value Control Charts in the Packaging Industry. J. Food Technol. **13**:262-265.1959.

REMOVAL OF STRONTIUM 90 FROM MILK

Editorial note: This is summary of remarks by Dr. Sam R. Hoover, Assistant to the Administrator, Agricultural Research Service, U. S. Department of Agriculture, at a Radiological Health Press Seminar, Department of Health, Education, and Welfare, Washington, D. C., December 18, 1961.

The photographs which accompany this report were obtained through the courtesy of the Agricultural Marketing Service and Office of Information, U. S. Department of Agriculture, Washington, D. C.

This is a report on a research program initiated almost two years ago by three separate agencies of the U. S. Government to develop a standby process for the removal of radioactive contamination from milk.

Such process would become exceedingly important in the event of a nuclear attack, an accident in an atomic energy installation resulting in the release of large amounts of radioactive fallout, *or a vastly increased contamination of the atmosphere through an atomic testing program of far greater magnitude than any country has undertaken to date.*

Milk Is Safe

The safety of our milk supply was not in jeopardy when this research program was initiated: it is not in jeopardy today. Then a ban on nuclear bomb testing was being observed throughout the world, and the levels of atmospheric contamination from previous tests were receding. Now, nuclear testing has been resumed. But as you have learned from previous briefings in this series, *levels are still well below the point of any serious concern and are expected to remain so for the foreseeable future.*

Still, from a long-range viewpoint, it appeared then—and it does today—that we should be in a position to safeguard our supply of such a vital food as milk in the event of an emergency. Our primary concern is over strontium 90, the long-lived (28-year half life) component of radioactive fallout which is presenting the greatest hazard. When we started this work, there were indications that a process for removing strontium 90 from milk could be developed, but no private company could have been expected to underwrite the necessary research. Three governmental agencies were vitally concerned: the Atomic Energy Commission, which has manifold duties in nuclear research and in the uses of nuclear energy; the Public Health Service of the Department of Health, Education, and Welfare, which conducts a comprehensive monitoring program and keeps close count of food contamination with radioactivity as part of its responsibility of protecting the Nation's health; and the U. S. Department of Agriculture, which has responsibility for research in the production, handling, processing, and marketing of milk.

Research Began 2 Years Ago

Early in 1960 these three agencies entered into a cooperative agreement to underwrite jointly the cost of a program to develop a feasible process for removing strontium 90 from milk. The program was set up in the Agricultural Research Service's Eastern Utilization Research and Development Division in Beltsville, Maryland.

Today a pilot plant is in experimental operation at Beltsville. Milk obtained from cows fed radioactive strontium is being run through the equipment at the rate of 100 gallons per hour. Tests for the milk's radioactivity before and after passing through the equipment show that as much as 98 percent of the contamination is removed by the process. *No significant effect on the milk's chemical composition, physical stability, or flavor has been noted as a result of this treatment.*

Removal Process Is Simple

The process itself is quite simple. It is based on the well-known principle of ion exchange. The milk, slightly acidified, is filtered down through a bed of resinous material charged with a concentration of metallic salts similar to that found in milk. The metallic ions in the milk reach equilibrium with the ions on the resin, and the minute amounts of strontium ions in the milk change places with calcium ions on the resin. The milk, minus its radioactivity, is then restored to its original acidity and pasteurized and homogenized as usual. Periodically, the resin columns must be washed and regenerated with fresh salt solutions. The technical details of the process are covered in another statement, which is available at this briefing.

We are dealing here with minute quantities of radioactive materials. Strontium 90 gets into milk through plants eaten by the cow. Some of the radioactive material is transferred from the soil to the plant root by a process similar in principle to the ion-exchange principle we are using to remove it from milk. But most plant contamination from fallout is absorbed through the leaves. Ruminants take into their system only about 5 percent of the strontium 90 they ingest when feeding on these plants. And cows secrete in their milk only one-fifth of the strontium 90 they take into their systems each day.

Then why, if such infinitesimal quantities of radioactive contamination ingested by the cow actually show up in milk, are we so concerned about this commodity? We are concerned about it because milk is such a basic food, and because strontium is quite closely related, chemically, to calcium. Hence it replaces calcium in the bones and in the teeth. *With a standby process for removing strontium 90 from milk we can have reasonable assurance of the continued safety of this food, which is so vital especially to our children's health.*

Before this project was initiated, work had been done in other laboratories which gave us reason to believe that an ion-exchange process could be developed for removing strontium 90 from milk. In our work we have taken advantage of earlier research sponsored by the Atomic Energy Commission at the University of Tennessee, of studies undertaken by Dr. B. B. Migicovsky of the Canada Department of Agriculture, and of unpublished work done at the British Atomic Energy Research Establishment, Harwell, and at our own AEC's Health and Safety Laboratory. Our research has also been supplemented by studies at the Taft Engineering Center of the U. S. Public Health Service in Cincinnati, Ohio.

PROCESS IS READY FOR EMERGENCY ADOPTION

We now feel that the process is at such a stage of development that it could be adopted in case of an emergency. Research is continuing at our Beltsville laboratory to improve the effectiveness of the treatment and to decrease its cost. Now that we have one process developed to the pilot-range stage, we are ready to consider not only modifications to it, but other approaches that may offer further advantages.

REMOVING RADIOSTRONTIUM FROM MILK

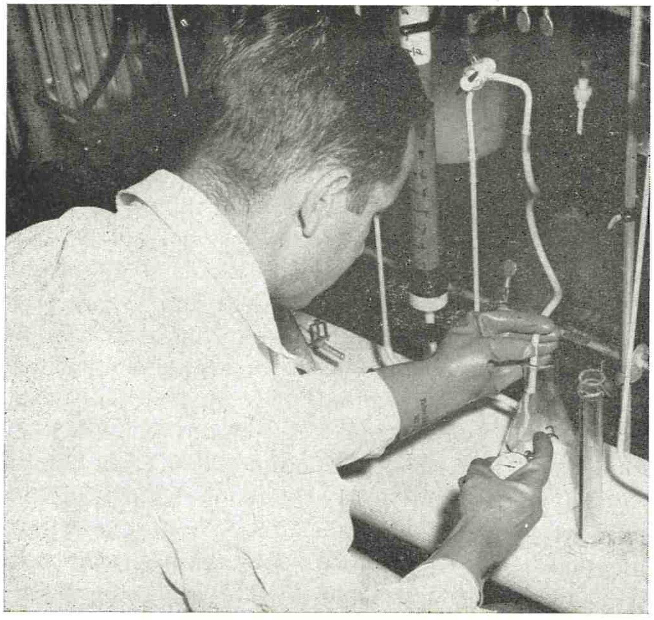

Figure 1. Scintists have succeeded in removing up to 98 percent of radiostrontium from milk by applying known ion-exchange principles, using modern, complex synthetic resins. Here USDA food technologist, David Easterly times the rate of flow through a laboratory-size column containing ion-exchange resin.

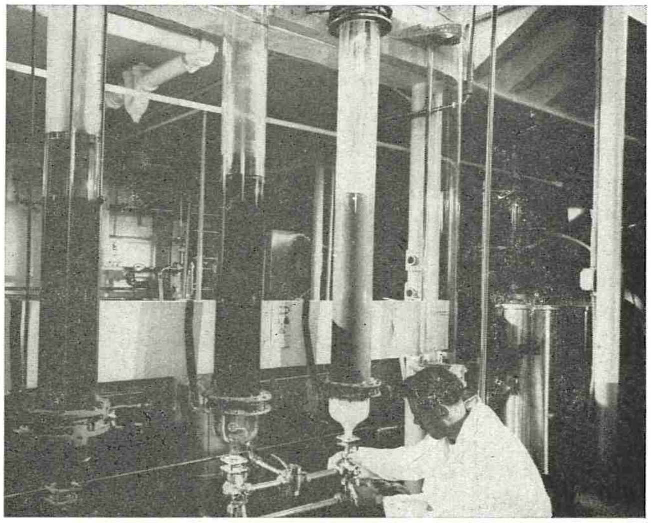

Figure 2. Here, the same process, advanced from laboratory to pilot-plant scale, is operated by dairy technologist William Mattingly. Milk is pumped from the tank at the right through one of the large columns packed with an ion-exchange resin. When the column becomes saturated with radiostrontium, it is washed and recharged for another run. Meanwhile, milk is being processed through another one of the columns. This pilot plant processes 100 gallons of milk an hour.

Figure 3. Scinetists found that for efficient radiostrontium removal, they had to increase the acidity of the milk. Here USDA dairy technologist, Homer E. Walter adds dilute citric acid to the milk preparatory to passing it through the "fixed-bed" ion-exchange resin column. By thus lowering the milk's pH from its normal 6.6 to 5.4, the percentage of radiostrontium removed by the process is raised from 60 to 98.

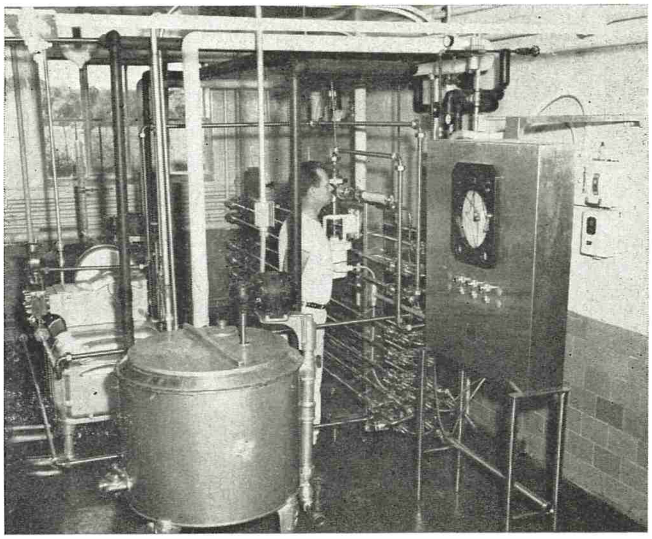

Figure 6.The milk is then homogenized and pasteurized using equipment similar to that in any small dairy. Here dairy technologist, Arthur M. Sadler is pasteurizing the decontaminated milk.

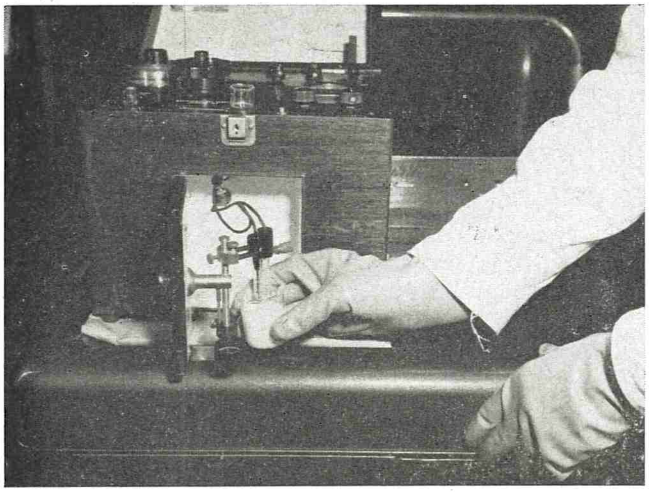

Figure 4. Milk samples are then given an acidity reading to make sure that the desired level of pH 5.4 has been achieved before putting the milk through the resin column.

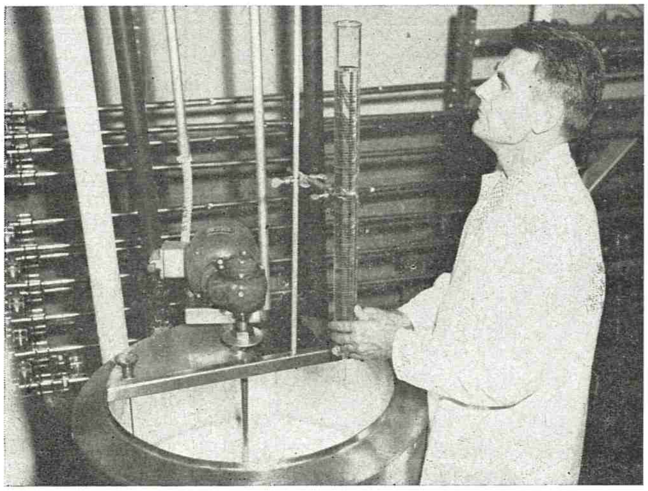

Figure 5. After passing through the ion-exchange resin, the decontaminated milk is neutralized. Here Dr. L. F. Edmondson, who heads the strontium-removal program, is adding a measured amount of dilute potassium hydroxide to restore the milk to pH 6.6.

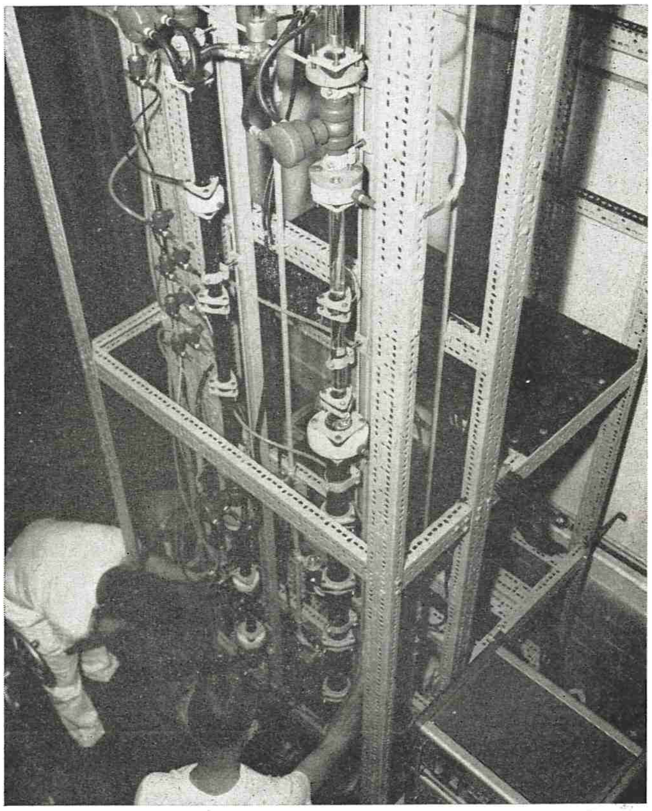

Figure 7. "Moving-Bed" Resin Contractor. Although proved effective by both laboratory and pilot-plant experiments, the "fixed-bed" method is not the only, or even necessarily the best, way of removing radiostrontium from milk by ion-exchange. Among other approaches under investigations is the "moving-bed" method, whereby the resin is pumped through the continuous column in one direction and brought into contact with the milk being pumped in the opposite direction. This has the advantage of constantly presenting fresh resin to the milk. The continuous contactor shown here, which operates in this way, is now under investigation as part of the radiostrontium-removal program. Electronically controlled and completely automatic, this machine removes the isotope from the milk and cleans and regenerates the resin all in one continuous process.

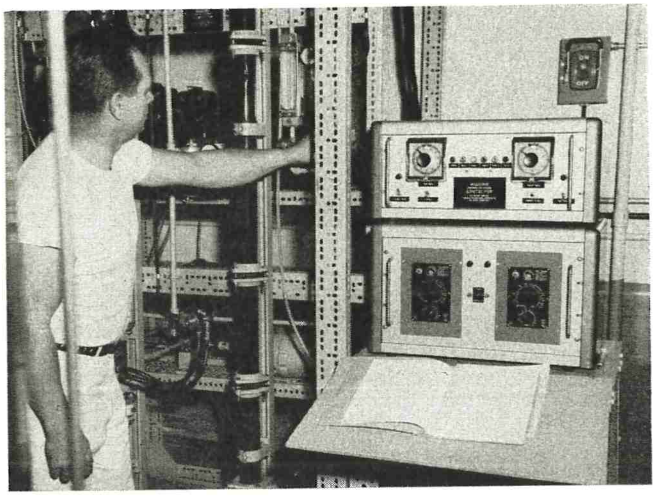

Figure 8. This electronic instrument panel, operated by Arthur M. Sadler, acts as the brain of the contactor, controlling its operations.

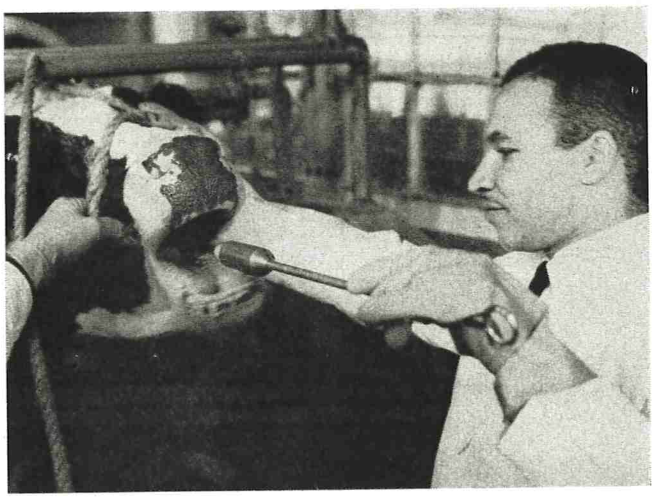

Figure 9. Milk from cows injected with radiostrontium is used for this experimental work. Also, "pure" milk samples, to which the isotope is added directly are used. Here Public Health Service officer Jesse Harris injects capsule of radiostrontium into cow's throat.

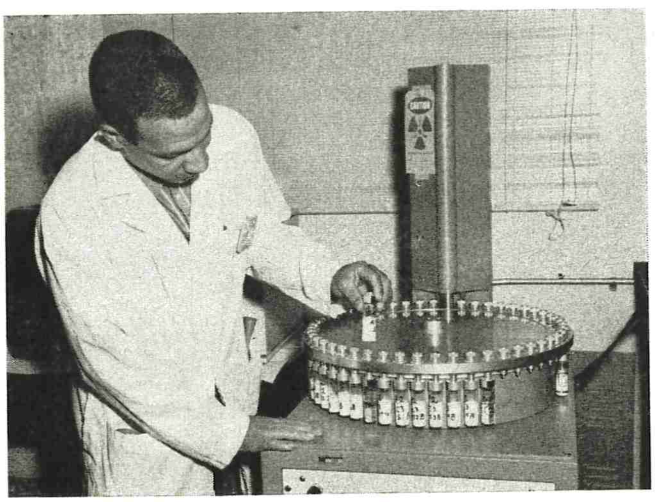

Figure. 10. Radiostrontium contamination is determined through gamma-ray emission before and after milk samples are processed. Jesse Harris loads the single-channel automatic scintillation counter which counts and automatically records data on 50 samples at a time.

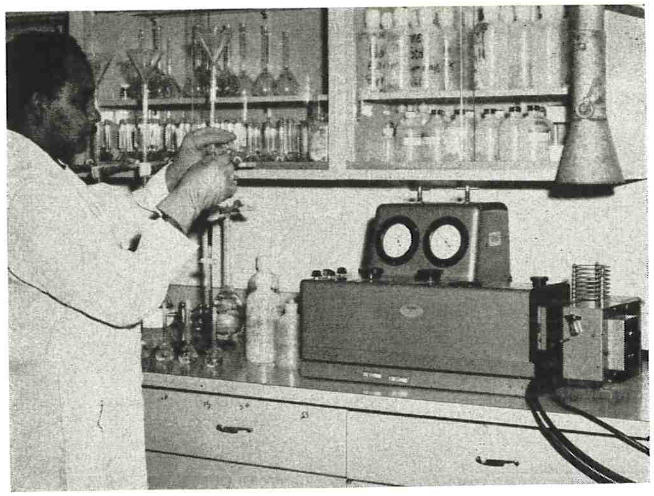

Figure 11. ARS chemist Fred W. Douglas, Jr., determines the calcium, potassium, sodium, and magnesium content in experimental milk samples. The resin mnust be treated with proportionate amounts of these minerals.

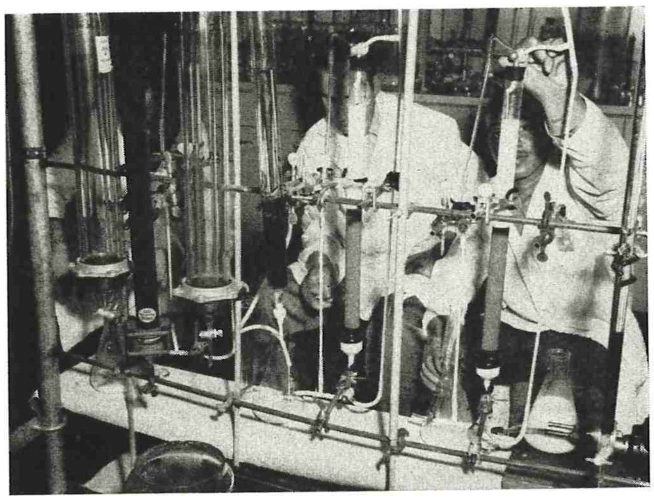

Figure 12. Tests runs on how well the resin is functioning are made in the laboratory. Adjustments in charging may be made based on these runs. David Easterly times the passage of milk through the resin as Jesse Harris directs the milk flow into cylinder.

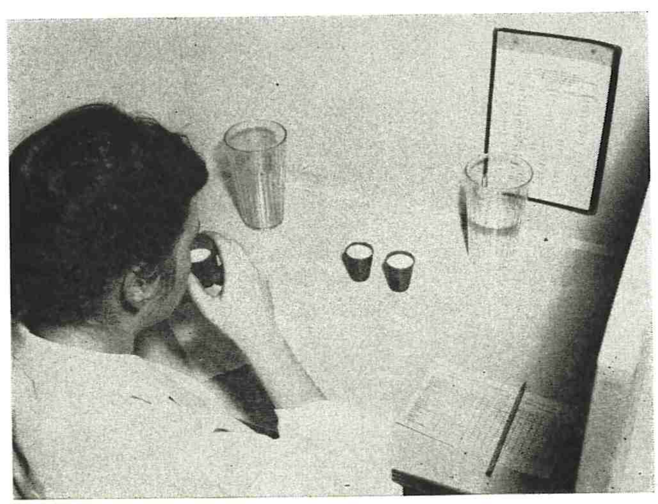

Figure 13. Normal milk put through all steps that would be required to remove radiostrontium is sampled by trained tasters to make sure that the process induces no objectionable flavor changes. Criticisms by by the tasters guide researchers perfcting the processing operation.

COMPARISON OF THE AGE OF UNDATED AND DATED MILK ON HAND FOR SALE IN FOOD STORES IN NEW YORK CITY

A. C. Dahlberg

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Three years ago a study was made of the influence of dating retail milk containers on certain practices in food stores located in New York City *(1)*. It was found that the date on retail containers had several undesirable features in the merchandising of milk and that this requirement in the Sanitary Code was not necessary to assure the sale of milk within reasonable time limits. A number of companies sold milk marked by code to food stores with no time limit for sale in markets near New York City. This coded milk moved out of the food stores as fast as the dated milk in the metropolitan city and there were none of the problems of additional cost and loss inherent in the dated milk.

In the light of these results and the apparent need for some basis of determining the time from pasteurization to sale, "It was recommended that code marking of milk containers and a time limit from pasteurization to sale be established in the Sanitary Code to replace the present dating requirement." This change in the Sanitary Code was not made by the New York City Department of Health but in 1960 the New York State Legislature passed a law prohibiting any board of health or similar regulatory agency from requiring the dating of retail milk containers.[1]

Effective in May 1960 the milk dealers of New York City discontinued the use of dated milk containers but coding was not put into practice. It appears that the milk dealers were certain that the milk in food stores would be entirely satisfactory without date or code providing careful instructions were given to its wholesale route men about proper handling of milk in food stores.

The author proposed that a study should be made of the age of milk in undated containers in food stores in New York City to determine the current situation. The project was outlined at a private conference and three selected milk dealers agreed to code mark milk containers for two weeks. The plan was to ascertain the age of the milk offered for sale in the food stores the second week of coding. The experiment was held confidential so that only management in the companies was informed of the test to assure no checking on the rotation of milk in the sales refrigerators by means of the code.

All details were arranged to make this study comparable with the previous study of April and May 1957. The test was conducted in May 1961. An independent research organization[2] was hired to collect the data. Forms for recording data were drawn up and their suitability was determined by some advance test trials. Interviewers visited each food store to obtain answers to specific questions from the manager of the store or of the dairy section, and an actual count was made of the number of containers in the sales case with a notation of the code markings. Obviously, no count was made of milk containers with no code mark from other milk plants. The containers will be referred to as "undated" to mean neither dated nor coded even though they were coded because there was no chance to gain any merchandising effects from the temporary code marking.

Results

Data were secured from 154 food stores (Table 1), which were classed in four groups or types, as in the previous study. These stores had 21,936 undated milk containers (temporarily coded) in the sales refrigerators, or an average of 142 containers per store. This number compares with 187 food stores and 56,342 containers in the previous study of dated milk.

The number of containers of milk on hand in the food stores the night before the day of the interview was now 27 per store, which was 10 more

Table 1. Type of Food Stores in the Study

Number of stores	154
Type of stores	
Supermarket, chain company	64
Supermarket, independently owned	29
Food stores open Sunday	25
Food stores closed Sunday	36
Number of undated milk containers[1]	
Total daily	21,936
Average per store	142

[1]This milk was temporarily coded and other milk in the refrigerators of food stores was not counted.

[1]This Law was repealed in March 1962.

[2]The author is indebted to the Dairy Products Improvement Institute, 302 East State Street, Ithaca, N. Y., for obtaining the data through the services of interviewers in the employ of an independent research organization, Andrews Research, Inc., 246 East 46th Street, New York 17, N. Y.

than the number found in the study of dated milk (Table 2). The number of food stores that closed yesterday's business with no milk on hand decreased from 34% to 9%. Apparently, there is still some carry-over from the practices developed through the years of dating retail containers because in 1957 food stores handling coded milk outside New York City closed the day with 49 containers per store on hand and only 3% closed with no milk on hand the day prior to the survey.

The age of the 1-qt. undated containers in the food stores' sales refrigerators was very satisfactory as 98.8% of all milk was today's or yesterday's milk (Table 3). Only 2 containers of milk, 0.01%, were 3-day milk, the longest period that any milk remained in the food stores. These results were very comparable to those obtained for dated milk. The data are less satisfactory for 2-qt. containers. One of the 154 stores failed to properly handle its 2-qt. containers as it had for sale 15 containers of 4-day milk and 5 containers of 6-day milk.

TABLE 2. INVENTORY OF UNDATED AND DATED MILK IN FOOD STORES

	Undated	Regularly Dated[1]
Number of stores	154	187
Containers of milk on hand when business ended yesterday		
Total	4,096	3,152
Average per store	27	17
Number of stores found with no milk at close of yesterday's business		
Total	14	63
Per cent of stores	9	34

[1]Influence of Dating Milk Containers on Retailing Milk in New York City Food Stores. A. C. Dahlberg, Cornell Research Bulletin 927, March, 1958.

TABLE 3. AGE OF UNDATED MILK IN 1-QT AND 2-QT CONTAINERS ON HAND FOR SALE IN FOOD STORES IN NEW YORK CITY AS SHOWN BY TEMPORARY CODE ON CONTAINER AT TIME WHEN COUNT WAS MADE

	Number of containers - May 1961[1]			
Category of milk	1-qt.	Per cent	2-qt.	Per cent
Total milk on hand for sale	18,068	100.00	3,074	100.00
Today's milk	16,234	89.85	2,619	85.20
Yesterday's milk	1,622	8.98	357	11.61
2-day milk	210	1.16	78	2.54
3-day milk	2	.01	0	0
4-day milk	0	0	15[2]	.49
5-day milk	0	0	0	0
6-day milk	0	0	5[2]	.16

[1]Counts were made about one year after the end of the dating of milk and the containers were coded for too brief a period to affect sales practices.

[2]These containers were all found in one food store.

TABLE 4. COMPARISON OF AGE OF UNDATED AND DATED MILK ON HAND FOR SALE IN FOOD STORES IN NEW YORK CITY AS SHOWN BY TEMPORARY CODE ON CONTAINER OR BY DATE ON CONTAINER AT TIME COUNT WAS MADE

	May 1961, undated milk in 1-qt. and 2-qt. containers[1]		April-May 1957, dated milk in 1-qt. containers[2]	
Category of milk	No. of containers	Per cent	No. of containers	Per cent
Total on hand for sale	21,142	100.00	38,237	100.00
Tomorrow's milk, predated	0	00	1,701	4.45
Today's milk	18,853	89.17	35,062	91.69
Yesterday's milk	1,979	9.36	1,365	3.57
2-day milk	288	1.36	107	.28
3-day milk	2	.01	2	.01
4-day milk	15[3]	.08	0	0
5-day milk	0	0	0	0
6-day milk	5[3]	.02	0	0

[1]Summary of data obtained in present study as given in Table 3.

[2]Influence of Dating Milk Containers on Retailing Milk in New York City Food Stores, A. C. Dahlberg, Cornell Research Bulletin 927, March 1958. Since 21 per cent of the dated milk was predated by one day it is obvious that some of this milk was one day older than shown in this table.

[3]These 2-qt. containers were all found in one food store.

DISCUSSION

Two principal points are at issue from the data in this study and in the former one on dating retail milk containers in New York City. The first involves the comparative time intervals from pasteurization of milk to its being offered for sale in the sales refrigerators of food stores in undated and in dated containers.

The combined figures for 1-qt. and 2-qt. containers for undated milk and the previous data on dated milk in New York City clearly demonstrate that undated and dated milk take the same approximate time from pasteurization to sale in food stores (Table 4). It is reasonably accurate to state that 90% of the milk in the sales refrigerator is today's milk, 9% is yesterday's milk, and 1% is 2-day old milk. Only .01% of the milk offered for sale in 1-qt. containers was 3-day milk or one container in each 10,000. This shows very comparable data for undated and dated containers.

The second point involves the significance of the 2-qt. containers found in one food store out of 154 which were over three days old. In the former study a total of 196 stores were involved in the over-all study of dated milk and none of them had milk dated over three days old; however, one extra day must be added to the age of some of this milk as 21% of all milk was legally pasteurized and packaged one day early so there probably was some 4-day dated milk offered for sale. There were 38 stores in the previous study that sold coded milk and the period from pasteurization to sale in food stores was the same as for dated milk. In the present study there were 154 food stores selling undated milk and one store had milk that exceeded the previous time limits. Even though this one store in 154, as compared with no store in 234 in the previous study, may be statistically insignificant, the fact remains that five containers of milk were in the sales refrigerator that should not have been there, which is one container in each 4,000 offered for sale.

A regulation requiring the dating of containers may not control this age problem for Kirchoff *(2)* reported in 1952 that inspectors in Jefferson County, Alabama, picked up 2,445 over-age containers of dated milk in food stores of which 30.5% ranged in age from five to eight days.

The essence of these findings is that nearly all milk was offered for sale within the limit of "3½ days after the day of pasteurization," previously recommended by the author *(1)* as sound commercial and public health practice. Equally important, however, is that there was a small amount of undated milk found in food stores of sufficient age to have a possible effect on quality. Quality used in this respect refers to off-flavors, due to bacterial growth or spontaneous chemical reactions which are objectionable to consumers. It affects consumer acceptance of milk and goodwill toward the milk industry, as well as competition among milk companies. There is no easy way by which the Board of Health and the milk dealer, or anyone else could determine that an isolated food store was not properly moving milk from the dealer to the consumer except by coding. The age of this milk was actually determined by coding milk containers in New York City without introducing any of the problems and needless costs due to dating, and without any aroused feelings in public relations as the code was not known to consumers. Unfortunately, the milk dealers of New York City have not adopted coding on their own initiative. This study showing that one food store in 154 studied did have milk of sufficient age to raise the possibility of justified consumer complaints about milk flavor may prompt voluntary adoption of coding. Emphasis is given by this study to the soundness of the recommendations of 1958, namely, that code marking of milk containers and a time limit for sale of 3½ days after the day of pasteurization should be a requirement in the Sanitary Code unless these practices are adopted by the milk industry.

SUMMARY

Since undated milk has been sold in food stores in New York City there has been an increase in the number of containers held overnight in the sales refrigerators of food stores and a decrease in the percentage of stores that had no milk for sale at the end of the day.

Undated milk in 154 food stores surveyed had the same period of time from pasteurization to sale to consumers as previously found for dated milk, except in one food store. The milk in this one food store which was older than necessary under good milk distribution practices and which may cause consumer complaint due to developed off-flavor represented one container in each 4,000 sold. For the purpose of providing a method of detecting these isolated instances of not maintaining an entirely satisfactory rate of movement of milk to consumers at all times, it is recommended again that retail undated milk containers should be marked by codes known to those responsible for proper handling of the milk but not known to the public.

REFERENCES

1. Dahlberg, A. C. Influence of Dating Milk Containers on Retailing Milk in New York City Food Stores. Cornell University Agricultural Experiment Station Bul. 927. March, 1958.

2. Kirchoff, George F. Dating - An Essential and Necessary Public Health Control Measure. The Milk Dealer. March, 1952.

NEWS AND EVENTS

IMPROVED METHOD ELIMINATES BACTERIOPHAGE FROM CHEESE STARTER CULTURES

Normal growth of bacterial starter cultures used in making cheese can now be more certain, as a result of an improvement U. S. Department of Agriculture scientists have made in their original method of controlling bacteriophage.

Bacteriophage, or simply phage, is a virus that destroys bacteria, or at least limits their vigorous, abundant growth. Contamination of starter cultures with phage prevents them from developing the acidity required to make cheese. Some time ago, R. E. Hargrove, an Agricultural Research Service scientist, discovered that the milk used for starter cultures could be made resistant to the growth of phage by adding phosphate and heating to bind the calcium. A specific procedure for treating the milk was worked out by Hargrove at the Dairy Products Laboratory of the Eastern Utilization Research and Development Division, in Washington, D. C.

The original procedure used orthophosphate salts, consisting of potassium phosphate and sodium phosphate. These were added to the starter milk at a 2-percent level. Subsequently, a few types of phage were found that were resistant to this treatment. Experiments were then made, using 2 percent phosphate in which a small fraction of the orthophosphate was replaced with pyrophosphate. These tests showed that no available phage was able to grow in milk containing 1.7 percent orthophosphate and 0.3 percent pyrophosphate, and that the treatment had no deleterious effect on starter activity.

To test the modified procedures, the earlier experiments of making cheese with starters intentionally contaminated with phage were repeated. Included in the experiments were those phage types resistant to the original treatment. None of the phages were able to proliferate in the starters when the milk had been heated in the presence of the combination of orthophosphate and pyrophosphate. In all cases, good-quality cheese was made from the starters in spite of their original contamination with phage.

Stock solutions of orthophosphate are available commercially. Cheese-makers desiring the additional protection provided by the combined orthophosphate-pyrophosphate treatment can prepare their own solutions in accordance with specific directions that can be obtained from the Dairy Products Laboratory, Eastern Utilization Research and Development Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C.

PUBLIC ATTITUDE CALM ON FOOD RADIOACTIVITY

Recently the Milk Industry Foundation sponsored a survey, conducted by a private polling organization, in which 480 people were interviewed as to their attitudes on fallout. The results are interesting.

Not one of the persons interviewed mentioned fallout in connection with food or dairy products until the interviewer introduced the subject. Less than 10% of those questioned indicated that they were using less dairy products than they were using five years ago and, of these, the majority cited as the reason the fact that their children were grown and the family was smaller.

The question was asked whether the interviewee would use more or less dairy products during the Spring and Summer months. About 25% would use more; about 70% would not change their consumption; and only about 5% would use less. Of those who expect to use less during the Spring and Summer, virtually all of them said it would be because they prefer other drinks during the Summer. No one mentioned testing, fallout, or radiation.

Those interviewed were also asked this question: "If atom bomb tests are resumed, do you think this might affect the choice of foods you serve your family?" Of those who said "Yes", 18 said they would use less dairy products; 40 said they would be guided by advice from scientists, newspapers and Government.

The survey also revealed that there is *almost a total lack of knowledge concerning the protective feature of milk in relation to strontium-90.*

OFFICIAL STATEMENTS WARN AGAINST OMITTING MILK

In this connection, two statements from unimpeachable scientific and Government authorities are vitally important and deserve wide dissemination. Dr. Donald R. Chadwick, who is Chief of the Division of Radiological Health at the U. S. Public Health Service issued a statement for the press as follows:

"The Public Health Service views with concern the actions of well meaning but unqualified individuals or groups who are urging curtailment of milk consumption. This is because any disruption of dietary patterns, particularly in children and infants, may have serious health effects. Therefore, decisions of this kind should be made only by qualified physicians and health authorities. Even they must carefully weigh the possible adverse consequences of a reduction in milk consumption against the reduction in the risk associated with the small amounts of radioactivity present in milk now and anticipated in the months ahead. Additionally, it is important to remember that efforts to reduce strontium-90 intake by diet alterations unless very carefully conceived might have precisely the opposite effect."

"Federal, State and local health authorities are maintaining constant watch over the levels of fall-out in air, water, milk and other foods. If levels should reach and be sustained at a point where protective action by governmental agencies, industry or the medical profession is needed, appropriate action will be taken, and the public will be kept fully informed".

Dr. Byron Shaw, Administrator of the Agricultural Research Service at the U. S. Department of Agriculture testified before the House Agriculture Appropriations Subcommittee in this manner:

"I would like to state for the record that there is no current danger with regard to strontium-90 from using the milk that is on the market. If we should stop drinking milk, we would lose the nutritional benefits that are coming from milk, and we might, by substituting other foods for milk, get into more strontium problems that we do in using milk. What I am saying is that the strontium-to-calcium ratio is higher in a number of other foods than in milk, so that no one has anything to gain by discontinuing the amount of milk that they are drinking — babies or adults."

WOMEN FOR PEACE URGING BOYCOTT

The Women's Strike for Peace is still sounding the alarm and urging boycott of milk for one week following each U. S. atmospheric test. In the Washington, D. C. area, however, dairies have reported *very few cancellations of home deliveries as a result of this boycott.* One dairy here reports that two of its 25,000 customers have requested termination of deliveries. Two other smaller distributors report only one cancellation between them.

[1]Reprinted from *Dairy News Letter*, Vol. **7**:18; May 1, 1962.

FOOD LABELING UNDER SCRUTINY

A Bureau of Standards official has put on the record before the Senate Judiciary Antitrust and Monopoly Subcommittee several corrective labeling measures that he believes state, county and city weights and measures officials would like to see brought about. William S. Bussey, Assistant to the Director for Weights and Measures Administration listed the following: (1) Plain, conspicuous, and readable quantity statements on the principal panel of all packages; (2) The quantity statement and all other required information in letters and figures meeting or exceeding reasonable minimum size standards that are compatible with available label area and with the largest printing used elsewhere on the label; (3) Adequate color contrast; (4) An end to deceptive, misleading, and slack-filled packages; (5) Effective(efficient, and prompt control of false and deceptive advertising relating to quantity; (6) Uniformity among the Federal and state laws and regulations pertaining to packaging and labeling; (7) Effective coordination of the activities of Federal agencies engaged in the administration of laws and regulations pertaining to packages; (8) Effective co-operation and liason between Federal and state agencies in this general area; and (9) A clarification of the relations between Federal and state packaging and other weights and measures laws.

Also testifying before the Senate Subcommittee was the Chairman of the Federal Trade Commission, Paul Rand Dixon. Mr. Dixon said that additional legislation could serve a useful function by spelling out responsibility for enforcement and by detailing abuses to be outlawed. He said that FTC could invoke its powerful but seldom used authority to help a campaign against deceptive labeling and packaging of foods. Mr. Dixon also asked for a law authorizing FTC to draw up packaging standards, to clarify manufacturers' responsibility for fair packaging and complete accurate labeling.

REPORT OF THE 3-A SANITARY STANDARDS SYMBOL ADMINISTRATIVE COUNCIL — 1961

Only two new authorizations have been issued by the 3-A Symbol Council since its report was presented at the last Annual Meeting, in Chicago, October 28, 1960. One holder of an authorization has temporarily discontinued operation. This brings the number of authorizations in effect to 122.

The finances of the Council are not cause for concern. Operating funds are ample, and the reserve, set aside for legal contingencies, is growing. An audit of the Secretary-Treasurer's records covering the approximately five years ending December 31, 1960, has recently been completed. As of that date, the Council has experienced no loss of tangible assets.

In addition to the two authorizations newly issued, eight applications for the amendment of authorizations or renewals in effect have been acted upon. In all cases arrangements of some nature have been made for an inspection of a prototype of the equipment to be covered, or of a specimen of the new model. If portable, it has been brought to Chicago for examination by the Secretary; if not readily portable, a member of the Committee on Sanitary Procedure has generally volunteered to include the factory in a scheduled field trip, or has made a special trip for the inspection, and has filed a report. In several instances minor, or even major, modifications of design or construction have been requested, and have been made (sometimes over an interval of several months), before an amended authorization was issued.

Virtually all of the charges of misuse of the 3-A symbol brought to the attention of the Council during the intervening nine-and-a-half months have originated with the equipment fabricating industry, not regulatory sanitarians. Some of these charges have proven to have been based upon erroneous information. A few have been warranted, and corrections have promptly been effected.

It is becoming increasingly evident that the dairy equipment fabricating industry is convinced of the value of the 3-A Symbol Council program. Modifications in design are submitted to the Council for approval, and amendment of the authorization, before new models are advertised and marketed. It does not yet appear logical, however, to presume that the effectiveness of the Council program is so complete that sanitarians should not themselves give new equipment inspection, even though it bears the 3-A Symbol, before it is installed. The probability is rather high that somewhere, sometime, a defect in construction, which discredits the appearance of the 3-A Symbol, would be discovered by a rigid inspection. It is that type of discredit which the 3-A Symbol Council hopes to minimize, by standing ready to take prompt action upon all reports received.

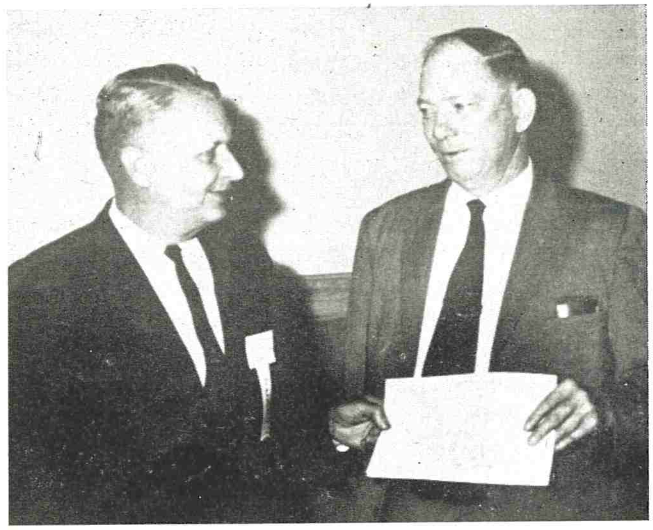
FRANKLIN OF ALABAMA HONORED

U. D. Franklin, employed since 1923 as a sanitarian for the Alabama State Health Department and in point of service one of the oldest rating officers certified by the Public Health Service, recently was presented with a PHS Milk Sanitation Rating Officer Certificate by Dr. Hugh B. Cottrell, Regional PHS Health Director.

Mr. Franklin was named the winner of the first "Outstanding Sanitarian Award" of the Alabama Association of Sanitarians in 1960. He participated with the Public Health Service in the development of the first national Recommended Milk Ordinance and Code as one of his first assignments with the State. The code, published in 1924 as a model milk sanitation standard, is now the basis of milk sanitation laws and regulations in 37 States and more than 1900 communities.

In making the presentation, Dr. Cottrell said: "In completing 39 years of service in Alabama, Mr. Franklin's teachings, beliefs and accomplishments have been made known, accepted and followed throughout the State. His services, consultations and advice have been most helpful not only within the dairy industry and the Alabama Health Department, but the United States Public Health Services as well."

International congratulates Mr. Franklin for his many years of outstanding work. He holds another distinction too. He has been a member of IAMFS since 1923.



U. D. Franklin (right) Alabama State Health Department sanitarian, receives Milk Sanitarian Rating Officer certificate from Dr. Hugh B. Cottrell, Regional Public Health Service Health Director. Presentation was made March 2, 1962 at Montgomery, Alabama at a general session of the Alabama Public Health Association.

PAPERS PRESENTED AT AFFILIATE ASSOCIATION MEETINGS

Editorial Note: The following is a listing of subjects presented at recent meetings of Affiliate Associations. Copies of papers presented may be available through the Secretary of the respective Affiliate Association.

DAIRY AND FOOD INDUSTRY CONFERENCE DEPARTMENT OF ANIMAL INDUSTRIES, UNIVERSITY OF CONNECTICUT

In Cooperation With

The Connecticut Association of Dairy and Food Sanitarians, Inc.

Storrs, Connecticut

May 16, 1962

(*Secretary*: Richard M. Parry, Tunnel Road, R. R. 1, Vernon, Conn.)

What's Ahead in the Food Industy? - Charles Carroll, Vice Pres., Stop and Shop, Inc., Boston, Mass.

Modern Concepts of Efficient Quality Control - The Food Industry - Ramsay Brown, Nancy Lynn Bakeries, Grand Union Co., Bridgeport; *The Dairy Industry* - D. J. Hankinson, Head, Dept. of Dairy and Animal Science, University of Massachusetts, Amherst, Mass.

Modern Concepts of Dairy Plant Management - Hugh L. Moore, Dept. of Agricultural Economics, Purdue University, Lafayette, Ind.

Answers for the Salesman Concerning Fats - R. G. Jensen, Dept. of Animal Industries, University of Connecticut.

Panel - How We Are Meeting the Profit Squeeze - Eric W. Mood, *Moderator.*

Thomas Burkhard, Vice Pres., Borden's Mitchell Dairy, Bridgeport.

Patrick Carroll, Meat Sales Mgr., Hartford Div., First National Stores, Inc., East Hartford.

Anthony Pegnataro, Jr., Pegnataro Markets, New Haven.

Paul Petersen, A. C. Petersen & Sons, West Hartford.

MICHIGAN ASSOCIATION OF SANITARIANS

18th Annual Meeting
Michigan State University, East Lansing, Michigan
March 6, 7, 1962

(*Secretary*: R. Lyons, Ingham County Health Dept., 221 W. Washtenaw, Lansing, Mich.)

Medical Aspects of Hepatitis of Importance to Sanitarians - George Agate, Div. of Epidemiology, Michigan Dept. of Health.

Suburbia's Problems of Water Supply, Sewage Disposal and Ground Waters - Mort Hilbert And Sam Stock, Wayne County Health Dept., Eloise, Mich.

Testing for Ground Water Polution - LaRue Miller, Engineering Div., Michigan Dept. of Health.

A Chemical Treatment of Individual Water Supplies - T. L. Vander Velde, Engineering Div., Michigan Dept. of Health.

Poultry Plant Sanitation - Ray W. Schultz, Technical Services, Wyandotte Chemical Corp., Wyandotte, Mich.

Sanitation and Public Health in Relation to Handling Red Meats - James H. Stewart, Meat Inspection Div., Agriculture Research Service, U.S.D.A.

Improving Environment Through A Housing Program - W. L. Ettesvold, Grand Rapids-Kent County Health Dept.

The Need of Methodology in the Microbiology of Frozen Foods - W. L. Mallman, Dept of Microbiology and Public Health, Michigan State Univ.

Insect Control in Dairy and Food Plants - Phil Shirley, Ingham County Health Dept.

Ventilation Problems in Restaurants, Dairy Plants and Slaughter Houses - B. Bloomfield Div. of Occupational Health, Michigan Dept. of Health.

Making a Dairy Plant Inspection - Gale Smith, Technical Service, Wyandotte Chemical Corp., Wyandotte, Mich.

Community Commissaries for the Vending Industry - Carl Gregory, Head Health Inspector (food), Detroit Dept. of Health.

The Cleanability of Stainless Steel - Charles Pheil, Food Science Dept., Michigan State Univ.

ANTI-LITTER PROGRAMS SHOW PROGRESS

As the national public service organization for the prevention of litter, *KEEP AMERICA BEAUTIFUL, INC.* works with some 7,000 communities throughout the United States, that are actively engaged in litter-prevention efforts.

"People are becoming more and more concerned about the growing litter problem," states *Keep America Beautiful.* "More important — they are doing something about it — but there's still a long way to go. Primary factor is just ordinary thoughtlessness. The one big way to eliminate that is with an all-out educational program."

Progress has been made. Cleaner city streets, parks, highways and waterways have been noted in many places: Some notable examples are:

The Detroit Public Works department reports better cleaning and sanitation service, at a savings of more than $1,000,000 annually, as a result of a city-wide educational program.

In Oregon, costs for litter removal from roads and highways were reduced nearly fifty percent since initiation of anti-litter efforts in that state.

Cleanup figures for removing trash from Maryland highways show a drop of 63% since a statewide anti-litter and beautification program was started.

A New York City survey in 1955 showed only 8.1% of the city sidewalks were rated "Excellent" for cleanliness. In 1961, 60.3% had a cleanliness rating of "Excellent."

Here's how *you* can help!

1. Keep your own home and premises litter-free; carry a litterbag in your car.
2. As a member of the International Association of Milk and Food Sanitarians, Inc., set a good example for others by always disposing of trash in a proper receptacle. Also, cooperate with city agencies and civic groups working to eliminate litter.
3. Alert your friends to their personal responsibility for the appearance and sanitary condition of private and public property.
4. Work with municipal officials to provide adequate sanitary collection and disposal facilities. A clean city provides a quality of living which promotes health and security.

LESLIE CARL FRANK
A MAN OF PRINCIPLE — A MAN OF VISION[1]

The foundation of our heritage in the field of sanitation has been laid by men of vision and high principles. It is fitting, therefore, that during this Golden Anniversary of our Association, we recall to memory those men who contributed to this - our heritage.

The life of Leslie Carl Frank is a modern saga of American achievement of which we are justly proud. He was one of seven children. He was born in Baltimore, Maryland of German-American parents in 1886. The income of his father, a musician, did not permit many pleasures of youth. He was withdrawn from the German-American school at the end of his eighth grade. He went to work with a grain firm as an apprentice and advanced to treasurer in five years. During these five years he graduated from high school by attending night school. In 1911 he graduated from Cornell University with the degree in civil and sanitary engineering. He enjoyed few

[1]Prepared by H. E. Eagan, Milk and Food Program, Public Health Service, U. S. Department of Health, Education, and Welfare, and presented at the 48th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS INC., at Des Moines, Iowa, August 14-17, 1961.

of the usual college pleasures as he spent the normal leisure hours working to pay his expenses. He described his youth as a long, dull period of drudgery.

Following graduation he was appointed Assistant Engineer for the Baltimore Sewerage Commission. He later studied the design, construction and operation of sewage treatment plants in Germany as an associate of Dr. Karl Imhoff, Director of the Emscher River Federation. He returned to Baltimore where he completed a major extension of the Baltimore Sewage Treatment plant.

In 1914 he accepted an offer of the U. S. Public Health Service to become one of six sanitary engineers engaged in field investigations at the Ohio River Investigation Station at Cincinnati, Ohio. These six men provided to a large extent the leadership and backbone for the expansion of environmental activities of the Public Health Service during the following five decades.

During the period of 1917 to 1922 he was in charge of malaria control activities and general health of the Mississippi Coastal District; Director of Public Health for the City of Dallas, Texas and was a vice-president of a pasteurized milk distributing plant in Texas.

In 1922 he was placed in charge of milk investigations of the Public Health Service. In 1923 he was assigned to cooperate with the Alabama State Board of Health in the development of a statewide milk control program. The stimulus developed from this endeavor inaugurated the activities of the Public Health Service, Office of Milk Investigations under his direction. *The Milk Ordinance and Code* recommended by the Public Health Service offers concrete evidence of his foresight and enthusiasm for the extension of new ideas.

During the period of 1923 to 1937, over 800 American municipalities adopted the provisions of the Milk Ordinance and Code. Today it is the basic program for the control of communicable and infectious diseases disseminated by milk and milk products. A record of which the public health worker and the milk industry can be justifiably proud.

From 1923 through 1937, Mr. Frank, in association with two other Public Health Service officers, undertook extensive investigations of the efficiency of the commerical pateurization equipment. These studies indicated that some of the equipment then in use could not be depended upon to pasteurize milk effectively. Many of the standards for pasteurization equipment and thermometric controls, that now exist, are due to the modifications developed during this study.

From 1937 until his retirement in 1941, for reasons of poor health, he was in charge of the Sanitation Section of the Division of Public Health Methods of the National Institutes of Health. The work of this section included studies of the sanitation problems of milk, ice cream, restaurants, water ,sewage and stream pollution.

During his lifetime Leslie Frank authored or coauthored more than 31 publications. These articles included discourses on water and sewerage sanitation, malaria control, milk sanitation and general environmental sanitation. These publications have been instrumental in alerting the American public to the environment in which we live.

He became a member of the International Association of Milk and Food Sanitarians in 1923. His committee assignments were numerous. In 1924-1925 he served on the Committee on Pasteurization of Milk and Cream; from 1926 through 1937 he was a member of the Committee on Communicable Diseases Affecting Man. During 1926 he served the Committee on Transportation of Milk and Milk Products; the Committee on Serving Milk and Milk Products; Committee on Serving Milk in Schools and a Special Membership Committee. From 1927 through 1937 he served the Committee on Dairy and Milk Plant Equipment. In 1935 and 1936 he served the Committee on Milk Ordinances. From 1937 through 1939, he was Chairman of the Committee on Methods of Improving Milk Supplies in Small Communities and in 1939 the Committee on Education and Training.

He was elected third Vice-President of the International Association of Milk and Food Sanitarians in 1937. He served as second and first Vice-President from 1938 to 1940 when he was elected President for the year 1940-1941.

He was a man of deep interest in our Association as well as a man of achievement in the aims and accomplishments of this organization.

Leslie C. Frank and one other sanitary engineer were the first sanitary engineers to be commissioned in the Regular Corps of the Public Health Service Commissioned Corps as of July 23, 1930.

A life so intensely lived must be increasingly rewarding. In July 1914 he married Ethelwyn Harris of Moresly Island, British Columbia, Canada. Two children were born of this marriage, Lucy and Karl.

Although his father refused to give him musical training he played the piano by ear and at the age of 45 he learned to play the cello which was of great personal satisfaction. Photography was also a hobby which provided many hours of relaxation. Three years before his death of cerebral hemorrhage in Toronto, Canada in 1941, he designed and supervised in every detail a very comfortable and beautiful home in Rockville, Maryland.

Although he met strong opposition to his efforts to advance milk sanitation standards as expressed in a uniform set of regulations, he made no personal enemies. His intense interest in new ideas and his ability to inspire in others his own enthusiasm made for a life of achievement. His philosophy of trusting a man until he proves untrustworthy is our heritage from a man of principle - a man of vision.

(Acknowledgement is made of the information furnished by Mrs. Leslie C. Frank and Mr. A. W. Fuchs.)

Editor's Note — From time to time during the past few months, mention has been made in the Journal of the so-called Gross Committee, or, using the complete title, the Committee on Environmental Health Problems. The completed Committee report is now in printed form and totals nearly three hundred pages. In this month's issue of the Journal we will publish the second third of the report by the Sub-Committee on Milk and Food. The last one third of the report will be published in the June 1962 issue. We believe this is a highly significant report and that our members should know the findings and recommendations of this expert Committee. For those wishing the complete report covering all phases of environmental health, copies may be procured from the Public Health Service.

REPORT OF THE SUBCOMMITTEE ON MILK AND FOOD

CURRENT RESPONSIBILITIES OF THE PUBLIC HEALTH SERVICE AND ITS RELATIONSHIPS WITH OTHER GOVERNMENTAL AGENCIES

The Milk and Food Program derives its statutory authority from the Public Health Service Act of 1944, as amended, particularly Sections 301, 311, 314, and 361 of Public Law 410 (42 U.S.C. 241, 243, 246, 264). This broad authorization provides for the Public Health Service to assist states and localities and to carry out interstate quarantine activities, primarily directed at the control of communicable diseases. Public Law 410 does not specifically direct the Service to conduct programs related to food protection in relation to infectious disease control nor does it address itself to the problems of nonliving disease-producing agents. Under its mandate, the Service is now engaged in milk, shellfish, and food service activities designed to assist the States and local authorities in the development, operation, and maintenance of programs for the prevention and control of foodborne disease. To implement this role and to provide national leadership in this area, the Milk and Food Program *(a)* conducts research and field investigations, *(b)* evaluates the public health significance of new processes, techniques, and equipment, *(c)* develops recommended sanitation standards, technical procedures, and program guides for State and municipal adoption, *(d)* provides technical and advisory assistance to governmental agencies and food industries on food sanitation, *(e)* conducts specialized training courses for public health workers and industry personnel engaged in sanitary control of milk, shellfish, and food service operations, and *(f)* participates with the States in cooperative programs for the certification of interstate milk shippers and interstate shellfish shippers.

In this program, working relationships and agreements are maintained not only with the States, but with elements of the Public Health Service, other Federal agencies, and various domestic and foreign organizations having responsibilities for the U. S. food supply. A review of these numerous relationships indicates that they are mutually beneficial, and do not lead to duplication of effort. At present, the Milk and Food Program is heavily dependent on the Communicable Disease Center at Atlanta for epidemiological investigation of disease outbreaks, and when these occur on interstate carriers, both groups frequently assist the Interstate Carrier Program with studies necessary to enforce the Interstate Quarantine Regulations. Research and surveillance related to radionuclides in milk and other foods are coordinated closely with the Division of Radiological Health, which, in fact, provides fiscal support for the activities of the Milk and Food Program in this field.

In 1959, a document, entitled *Shellfish, Milk and Food Service Sanitation Activities of the Public Health Service and the Food and Drug Administration*, was developed jointly by the two agencies and the Office of the Secretary of the Department of Health, Education, and Welfare. It identifies and compares the activities of these agencies, and in addition, summarizes the cooperative agreements, understandings, and working relationships between PHS and FDA in the areas of milk, food, and shellfish sanitation. A similar document was developed in 1961, *Public Health Service and Food and Drug Administration Activities Concerned with Pesticide Hazards.* These analyses indicate that the enforcement efforts of FDA against adulteration and misbranding of foods in interstate commerce are, in fact, strengthened by the collateral efforts of PHS to support intrastate and local food protection programs. The differences in responsibilities and objectives of the two agencies are effective deterrents to duplication, even in research, where both frequently work on different facets of the same problem to the mutual advantage of all concerned. Additional work is necessary *(a)* to make these relationships more effective in areas of food safety above and beyond the present scope of the Milk and Food Program, *(b)* to keep pace with the rapid developments in food science and technology which have been and are continuing to be made, and *(c)* to keep abreast of the needs, requirements, and desires of the American people.

The Public Health Service also has a memorandum of agreement with the Fish and Wildlife Service of the Department of Interior relative to the certification of interstate shellfish shippers, as well as a bilateral agreement with Canada on the sanitary control of shellfish. These are supplemented by informal liaison and collaborative research efforts. All of this is cited to illustrate the cooperative and integrated effort undertaken for the protection of the American people in this portion of their food supply. It is an extremely important one from the food protection point of view, since so much of our shellfish is consumed raw.

Working relationships with the U. S. Department of Agriculture are concerned principally with protection of dairy and poultry products. Currently the Service is a participant with the U. S. Atomic Energy Commission and the U. S. Department of Agriculture in cooperative research on the development of a feasible process for the removal of radioactive contamination from milk. The present successful method of treatment with ion-exchange resins to remove radionuclides was devised by the Milk and Food Research staff of the Public Health Service, and pilot plant operations are in progress at the Beltsville laboratories of the Agricultural Research Service.

A variety of relationships is maintained with the Department of Defense, which range from individual consultation to formal agreements. For example, Milk and Food Research receives support for investigation of properties of paralytic shellfish poison under an inter-agency agreement with the U. S. Army Chemical Corps. These two agencies are also cooperating informally with several other groups, including the Food and Drug Administration and the Food Research Institute of the University of Chicago, to study staphylococcal enterotoxin, which is the most commonly reported cause of food poisoning in the United States. Rather intermittent and casual relationships are maintained with other components of the Department of Defense, including the Armed Forces Food and Container Institute of the Quartermaster Corps.

INDUSTRY CONTRIBUTIONS TO FOOD PROTECTION

In addition to the development of new products and processes, the food industry is making noteworthy contributions to public health, particularly in those areas which directly affect sales or where governmental agencies have taken the initiative. The competitive nature of private enterprise is a barrier to acceptance by industry of full responsibility for food protection, but it willingly cooperates with health agencies to protect the consumer from any foreseeable hazard.

For example, industry participates with public health agencies in the 3A Sanitary Standards organization for the design of dairy equipment. Similar voluntary standards are being developed by industrial groups concerned with bakery equipment, restaurant equipment, vending machines, pickles, olives, mayonnaise, confections, and the like. These and other groups may also provide engineering and microbiological data for common use in the development of new processes.

The food industry frequently supports projects in universities and privately owned laboratories on problems relating to health and welfare, such as sanitary requirements, foodborne diseases, nutrition, engineering performance of processes, chemical composition, microbiological content, toxicology of additives, and consumer acceptance of new products. The findings are generally published in the technical periodicals of professional and trade associations, which industry also assists in supporting.

Most firms recognize the importance of inhouse sanitation and quality control programs; however, the smaller manufacturers, in particular, frequently lack the technical knowledge and resources to determine their needs in this area. It is, therefore, essential for protection of the consumer to provide reliable sources of such information. At present, many local health agencies are unable to render this service, and the industry is, understandably, reluctant to reveal its difficulties to enforcement agencies. The manufacturer often depends on advice from the technical representatives of other firms which sell sanitizing agents or equipment. Although the contributions of the latter groups to food protection are invaluable, experience has shown that they cannot cope with the total problem. This situation presents a challenging well suited to extend its leadership along the lines opportunity for collaboration between industry and government, in which the Public Health Service is already developed with the dairy and shellfish industries.

Examples of work which needs to be done in this area are:

1. Development of standards of sanitary quality for procurement, processing, and distribution of foods comparable to those contained in the various PHS recommended ordinances, codes, and guides dealing with milk, shellfish, and restaurant sanitation.

2. Reevaluation of existing standards in terms of (*a*) their application to products produced by new procedures or processes and (*b*) possible simplification or improvement on the basis of new scientific knowledge.

3. Evaluation of engineering limits to performance precision of food process equipment as it relates to (*a*) control of microbiological contaminants, (*b*) maintenance of desired temperatures, pressures, flow-rates, and other physical conditions.

4. Formulation of requirements for the quality of air and water used in food processing.

5. Establishment of design and construction criteria for

food equipment which minimize handling of the product, opportunity for contamination, growth of micro-organisms, and difficulty of cleaning.

6. Development of precise simple methods for examination of foods with respect to their sanitary quality, which may be applied uniformly by both industry and health agencies.

BORDEN NAMES RESEARCH & DEVELOPMENT DIRECTOR

Joseph H. Petersen, director of development research, central division, The Borden Company.

Joseph H. Petersen, 5622 Edgewood Avenue, La Grange, has been named Director of Development & Research for the Central Division of The Borden Company, it has been announced by O. N. Koenig, Central Division President. Petersen was formerly Director of Quality Control.

Petersen started with the dairy firm in 1953 as a Laboratory Technician for the Company's Chicago fluid milk operation. In 1954 he was placed in charge of the laboratory, and a year later, was made Laboratory Supervisor. He was appointed Director of Quality Conrtol for the Central Division, which covers Illinois, Indiana, Iowa and Wisconsin in 1956. In his new position, Petersen will devote his time and talent to the development of new products and product improvement. The Borden Company, nationally, has placed a great deal of emphasis on Research & Development in recent years.

A graduate of Iowa State College with a Bachelor of Science degree, Petersen also holds a Masters Degree in Public Health from the University of Minnesota. He is a veteran of World War II as well as the Korean conflict. He is a member of the International Association of Milk and Food Sanitarians, American Dairy Science Association, American Public Health Association, and a Past President of the Chicago Dairy Technology Society.

Petersen is headquartered at Borden's Central Division office at 1821 S. Kilbourn Avenue, Chicago.

LETTER TO EDITOR

I have read with some concern the item entitled, "When is a Food Additive Not a Food Additive"? on Page 97 of the March Journal, and suggest that you reconsider some of the conclusions reached therein. I believe it is important that we have only *one* definition for "food additive", and that to be the definition used by FDA under the Act.

Gradually the scientific and regulatory communities are coming to use this single definition. As you have pointed out, food additives are those substances *not* generally recognized as safe, hence the term has a very specific and important meaning, and should not be used loosely. For those substances that are GRAS, FDA uses the terms "food components" or "food ingredients" which are otherwise not defined in the Act. It is *these* terms which should take on new meaning in the scientist's vocabulary.

I agree that the confusion has been compounded recently by what appears to be a trend to include in some petitions substances that are GRAS, and also substances cleared by prior sanction, neither of which are subject to the Act. This perplexing maneuver has resulted largely from customer demands for formal FDA clearance of all materials by published regulations. This would make it possible to present complete lists of permitted ingredients to customers, even though it is not necessary to include safe substances and prior sanction substances.

On another point the proposed division of food additives into "intentional" and "incidental" is without basis under the Act. By statutory definition, which you quoted, there can be no such thing as "unintentional" additives, hence "intentional" becomes irrelevant.

All additives are added "on purpose", as you say, but for the different reasons that you helpfully point out. If for convenience a division is needed, I suggest adhering to that used in FDA regulations. That agency uses the terms, "direct" and "indirect" additives.

Since food additive legislation involves a continual educational process, it is important to have the facts correct. It does not seem right therefore that "the legal definition be left for the exclusive use of legislative and legal lights."

When the term, "food additive" is used everyone should be talking about the same thing – substances which are not generally recognized as safe under the terms of the Act. This is a definition established by Congress — not an obscure legal interpretation.

In summary, I reiterate that we should: cease using the term "intentional additive"; employ the terms "food component" or food ingredient" for GRAS substances; and apply the definition as established by Congress for "food additive".

Sincerely,
D. H. Williams
Technical Director
Dairy Industrial Supply Association

BARNUM TAKES NEW POSITION

The Board of Directors of the Dairy Products Improvement Institute with headquarters in Ithaca, New York announce the appointment of Harold J. Barnum to the position of Executive Secretary of the Institute effective April 1, 1962. Dr. A. C. Dahlberg will continue as Advisor to the Board.

Mr. Barnum is on leave of absence for a year from the Denver, Colorado Department of Health and Hospitals where he is Chief of Milk Sanitation Services. He will serve in two capacities while at the Institute. In addition to his duties as Executive Secretary he will activate the work of the National Committee on the Coordination of Definitions, Standards, Nomenclature and Labels for Dairy Products, in fact this labels project will be his major activity. This is a project which was originated by and was developed through the Committee On Ordinances And Regulations of the *International Association of Milk and Food Sanitarians.* Mr. Barnum is on loan from his department in Denver for the specific purpose of activating the labeling project. He was chosen for the work because of his interest and experience in the development of uniformity in the public health field and his success in coordinating public health activities of regulatory agencies with the dairy industry. His long experience in public health and active participation in a number of activities have given him wide acquaintance. His appointment to these positions has brought enthusiastic approval.

"Barney" began his public health career as a milk inspector in Detroit, Michigan in 1929. In 1930 he moved to Ann Arbor, Michigan, as Milk Sanitarian and City Chemist. From 1944 to 1947 he operated his own quality control laboratory in Ann Arbor. In 1947 he moved to Denver as Chief Milk Sanitarian. He has been very active in milk and food sanitation associations. He became a member of IAMFS in 1931 and has served as chairman and member of several committees. He was a member of the Executive Board from 1950 to 1955 and was

Harold J. Barnum is Executive Secretary of the Dairy Products Improvement Institute with headquarters at Ithaca, N. Y.

President of IAMFS in 1953. He was the recipient of the *Sanitarians' Award* in 1957. He was Chairman of the National Conference on Interstate Milk Shipments from 1959 to 1961 and a member of the Board since 1953. He is the author of a number of articles on milk sanitation and has presented many papers on the subject before state and national dairy industry and public health groups.

Mr. Barnum will have the opportunity in New York of utilizing his long experience in working closely with groups to bring about better uniformity in the regulatory field through the elimination of costly duplication and conflict in sanitary regulations. His appointment to the position in Ithaca means that the labeling project is under way.

KENTUCKY USES BEAUTIFICATION PROGRAM FOR HEALTH TEACHING

Kentucky's clean-up and beautification program is beginning to show results as more and more Kentuckians are becoming aware of the benefits of such a program. It is most important to the future progress of Kentucky if we are to attract new industry, increase tourist travel, and keep our young people as citizens of our State.

Many organizations are involved in the efforts to "Make Kentucky A Cleaner, Greener Land" a reality.

Working in cooperation with the State beautification committee are the Kentucky State Department of Health and the Department of Education. They are sponsoring a "School Cleanup and Sanitation Project." Through this program they hope to help teach school children the basic facts about the need for good school sanitation, and to get school children actively involved in improving sanitation conditions. They also hope the information will be carried into the home and community through the children's interest.

This project got under way last fall and by now involves some 13,500 children in one or more schools in 23 counties. Other schools and counties have plans to start this project and it is hoped it will extend statewide soon. Working with principals and teachers, *the sanitarian and health educator from county health departments* went into the schools and helped them establish JUNIOR SANITARIAN CLUBS. In most instances, committees were set up in each club to handle the different aspects of litter control and school sanitation. The county health department personnel has assisted by giving the students helpful instruction and demonstrations on how to carry out the work assignments.

Age has been taken into consideration in assigning children to the various committees. For example, children in grades one, two, and three pick up paper in their own rooms and help keep them clean. They are taught why it is important to do this and why school grounds and buildings need to be clean. They also help pick up in certain parts of the school grounds such as around their swings.

Grades four, five, and six are often responsible for clean room, halls, toilet rooms, and grounds. The health department sanitarian has taken many of these children on observation trips to learn about the city water supply, sewage and garbage disposal methods, lunchroom sanitation practices, etc.

Older students have taken responsibility of a more technical nature. They actually inspect water supplies, sewage disposal, lunchrooms, etc. with a view toward correction of unsatisfactory conditions. They fill out inspection sheets, set up improvement goals, and make reports to student councils, school health councils, P.T.A., and to school authorities. They also take responsibility for keeping grounds and buildings clean and oversee the younger children.

In one remote rural county an initial survey showed that many of the schools had unprotected water supply, toilet tissue was lacking in most schools, outside toilets ranged from poor condition to fair, handwashing was not evident, and although the majority of the schools had electricity, many had bulbs too small, too high, or burned out.

When the water supply was unprotected the sanitarian held a conference with the teacher on how to treat it so it would be safe to drink. A general cleanup program is also being carried out. The health educator, with the use of films and other visual aids, has talked to the children on personal hygiene and home, classroom, and playground cleanliness.

In some of the smaller schools the health educator discussed with the children the importance of bringing a packed lunch to school and gave suggestions of some foods grown locally that are nutritious and easy to prepare for a packed lunch. The sanitarian had a diagram of a lunch shelf to show teachers so they could arrange for packed lunches to be kept off the floor and away from dust and insects.

"Don't Be a Litterbug" pledge cards have been signed by the school children taking part in the Junior Sanitarian Clubs and they have been given Junior Sanitarian membership buttons. There are even "Captain" buttons for committee chairmen. These cards and buttons have been supplied by the Kentucky Rural Electric Cooperative Corporation.

Teachers and principals feel that this program has proved interesting to the children and will be of lasting value. They believe the children are learning the importance of clean-up and beautification as well as proper sanitation.

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CALENDAR OF MEETINGS

1962

June 6—The Holstein-Friesian Association of America, Annual Convention, Hotel Roanoke, Roanoke, Virginia. Administrative Officer, Robert H. Rumler, Brattleboro, Vermont.

June 7-9—Annual Meeting Rocky Mountain Association of Milk and Food Sanitarians and the Wyoming Dairy Association, University of Wyoming, Laramie, Wyo. Administrative Officer, William R. Thomas, Dairy Section, Univ. of Wyo.

June 10-15—VIII Congress of the Inter-American Assn. of Sanitary Engineering, Washington, D. C. Administrative Officer, Edmund G. Wagner, c/o Officer of Public Health, I.C.A., Washington 25, D. C.

June 11-12—Milk and Ice Cream Accounting Conference, Sheraton Hotel, Louisville, Kentucky. Administrative Officer, Wm. L. Carter, IAICM, 1105 Barr Bldg., Washington 6, D. C.

June 12-14—Wisconsin Dairy Foods Association, Inc., Summer Conference, Dell View Hotel, Lake Delton, Wisc. Administrative Officer, A. E. Van Thullenar, 222 S. Hamilton St., Madison 3, Wisc.

June 12-14—Indiana Association of Sanitarians, Annual Meeting, Rice Hall, Indiana State Board of Health, 1330 W. Michigan St., Indianapolis, Ind. Secretary Karl K. Jones, Indiana State Board of Health.

June 16—Southeast Seminar on Sanitation, sponsored by National Association of Frozen Food Packers, Diplomat Hotel, Hollywood, Fla. Administrative Officer, H. P. Schmitt, 919 18th Street, Washington 6, D. C.

June 17-21—The American Dairy Science Association, Annual Meeting, University of Maryland, College Park, Maryland. Administrative Officer, H. F. Judkins, 32 Ridgeway Circle, White Plains, New York.

June 17-21—National Association of Retail Grocers, Annual Convention, Auditorium, San Francisco, California. Administrative Officer, Marie Kiefer, 360 North Michigan Ave., Chicago 1, Illinois.

June 17-22—American Association of Food and Drug Officials of the U. S., Hollywood, Fla.

June 18-20—Grocery Manufacturers of America, Inc., Mid-Year Meeting, Greenbrier, White Sulphur Springs, West Virginia. Administrative Officer, Paul S. Willis, 205 E. 42nd Street, New York 17, N. Y.

June 18-21—National Dairy Council, Summer Conference, Sheraton-Chicago Hotel, Chicago, Illinois. Administrative Officer, Milton Hult, 111 North Canal Street, Chicago 6, Illinois.

June 18-22—Annual Educational Conference of the National Association of Sanitarians, Sheraton-Gibson Hotel, Cincinnati, Ohio. Administrative Officer, Nicholas Pohlit, Box 51, Denver, Colorado.

June 28—Evaporated Milk Association, bi-monthly meeting of the Industry, Builders Club, Chicago, Illinois. Administrative Officer, E. H. Parfitt, 228 N. LaSalle Street, Chicago, Illinois.

July 12-13—Pennsylvania Dairy Fieldmen's Conference, Annual Meeting, Pennsylvania State University, University Park, Pa. Administrative Officer, Dr. F. J. Doan, Pennsylvania State Univ., University Park, Pa.

August 5-8—West Virginia Dairy Products Association, Annual Meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia. Administrative Officer, S. J. Weese, West Va. University Dairy, Morgantown, W. Va.

Sept. 10-12—Association of Ice Cream Mfgrs. of New York State, Annual Meeting, Whiteface Inn, Whiteface, N. Y. Administrative Officer, Peter F. Rossi, 405 Lexington Ave., New York 17, N. Y.

Sept. 11-13—University of Minnesota, Dept. of Dairy Industries, Dairy Products Institute Meeting, Dairy Industries Bldg., St. Paul Minnesota. Administrative Officer, S. T. Coulter, Head, Dept. of Dairy Industries, University of Minnesota, St. Paul 1, Minn.

Sept. 12-13—National Dairy Council Board of Directors Meeting, Sheraton-Chicago Hotel, Chicago, Illinois. Administrative Officer, Milton Hult, 111 North Canal Street, Chicago 6, Illinois.

Sept. 17—Wisconsin Creameries Association, Annual Convention, Whiting Hotel, Stevens Point, Wisconsin. Administrative Officer, Oscar Christianson, 1 West Main Street, Madison, Wisconsin.

Sept. 18-20—American Dairy Association Board of Directors & State Managers Meeting, Olympic Hotel, Seattle, Washington. Administrative Officer. M. J. Framberger, 20 N. Wacker Drive, Chicago, Illinois.

Sept. 24—Dairy Mixers, Inc., of Philadelphia, Annual Outing, Aronimink Country Club, Philadelphia, Pa. Administrative Officer, Ernst J. C. Fischer, 2809 W. Queen Lane, Philadelphia 29, Pa.

Sept. 24-26—American Dairy Association, Board of Directors & State Managers Meeting, Olympic Hotel, Seattle, Washington. Administrative Officer, M. J. Framberger, 20 N. Wacker Drive, Chicago 6, Ill.

September 24-26—National Dairy Council of Canada, Annual Convention, Empress Hotel, Victoria, B. C. Administrative Officer, W. K. St. John, Journal Bldg., Ottawa, Canada.

Sept. 27—Evaporated Milk Association, bi-monthly meeting of the Industry, Builders Club, Chicago, Illinois. Administrative Officer, E. H. Parfitt, 228 N. LaSalle Street, Chicago 1, Illinois.

Oct. 2-3—Minnesota Creamery Operators' and Managers' Association, Annual Convention and Business Sessions, Hotel Lowry, St. Paul, Minnesota. Administrative Officer, Floyd Thompson, 416 New York Building, St. Paul 1, Minnesota.

October 8-12—12th Annual Instrument Symposium and Research Equipment Exhibit, National Institutes of Health, Bethesda 14, Maryland. Administrative Officer, James B. Davis, National Institutes of Health, Bethesda 14, Maryland.

Oct. 10-11—Vermont Dairy Industry Association, Annual Meeting and Educational Conference, University of Vermont, Burlington, Vt. Administrative Officer, Henry V. Atherton, Dairy Bldg., Burlington, Vt.

Oct. 10-11—Washington State Dairy Foundation, Statewide Convention, Chinook Hotel, Yakima, Wash. Administrative Officer, Robert J. Keyser, 550 Skinner Bldg., Seattle 1, Wash.

Oct. 13-16—National Automatic Merchandising Association, Brooks Hall, San Francisco, Calif.

Oct. 19-20—Iowa Creameries Association, Iowa Milk Producers Federation, Iowa Milk Driers Ass'n., State Convention, Hotel Roosevelt, Cedar Rapids, Iowa. Administrative Officer, Arthur Kirchhoff, P. O. Box 377, Ames, Iowa.

Oct. 21-24—National Association of Food Chains, Annual Convention, Denver Hilton & Brown Palace Hotels, Denver, Colo. Administrative Officer, Clarence Adamy, 1725 Eye Street, N. W., Washington 6, D. C.

Oct. 24-27—International Association of Milk and Food Sanitarians, Inc. Annual Meeting, Ben Franklin Hotel, Philadelphia, Pennsylvania. Administrative Officer, H. L. Thomasson, P. O. Box 437, Shelbyville, Indiana.

Oct. 28-30—International Association of Ice Cream Mfgrs., Annual Convention, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Administrative Officer, Robert H. North, 1105 Barr Building, Washington 6, D. C.

Oct. 28-Nov. 2—Dairy Exposition, Atlantic City, New Jersey. Administrative Officer, Joseph Cunningham, Dairy Industry Supply Association, 1145 - 19th St. N. W., Washington, D. C.

Oct. 29-31—National Association of Retail Ice Cream Mfgrs., Inc., Annual National Convention, Hotel Haddon Hall, Atlantic City, N. J. Administrative Officer, E. M. Warder, 2223 Detroit Ave., Toledo 6, Ohio.

Nov. 7-8—Wisconsin Cheese Makers' Association, 71st Annual Meeting and 1962 Worlds Championship Cheddar Contest, Northland Hotel, Green Bay, Wisc. Administrative Officer, Joseph J. Bauer, 115 W. Main St., Madison 3, Wisc.

Nov. 12-14—Grocery Manufacturers of America, Inc., Annual Meeting, Waldorf Hotel, New York, New York. Administrative Officer, Paul S. Willis, 205 E. 42nd Street, New York 17, N. Y.

Nov. 19-20—South Dakota State Dairy Association, Annual Convention, Sheraton Cataract Hotel, Sioux Falls, S. Dakota. Administrative Officer, Ervin Kurtz, Brookings, S. Dakota.

Nov. 26-29—Southern Association of Ice Cream Manufacturers, 48th Annual Convention, Americana Hotel, Bal Harbor, Fla. Administrative Officer, Edward J. Koontz, Box 5107, Biltmore, N. Carolina.

Nov. 27-28—Northwest Association of Ice Cream Manufacturers and Minnesota Milk Council, Annual Convention, St. Paul Hotel, St. Paul, Minn. Administrative Officer, D. T. Carlson, P. O. Box 72, Willmar, Minn.

Dec. 6—Evaporated Milk Association, bi-monthly meeting of the Industry, Builders Club, Chicago, Illinois. Administrative Officer, E. H. Parfitt, 228 N. LaSalle Street, Chicago, Illinois.

Dec. 12-14—Wisconsin Dairy Foods Association, Inc., Annual Convention, Schroeder Hotel, Milwaukee, Wisc. Administrative Officer, A. E. Van Thullenar, 222 S. Hamilton St., Madison 3, Wisc.

TAFT CENTER TRAINING COURSE BULLETIN AVAILABLE

The annual edition of the *Training Program Bulletin*, the "catalogue" of graduate-level courses offered by the Public Health Service through the Training Program of the Robert A. Taft Sanitary Engineering Center, was released May 1, a month in advance of the usual publication date.

Both the cover and the contents of the Bulletin reflect the major changes, growth, and advancement of the current and projected needs of training in the field of the environmental sciences and engineering. The 68 courses offered include training in water supply and pollution control, air pollution, radiological health, milk and food protection, metropolitan planning, and occupational health.

Distribution of the Bulletin is greatest among the health and health-related agencies of Government at all levels, industries whose operations affect the government, and engineering and public health departments of universities. The Bulletin also goes to many similar agencies in foreign countries, especially in Central and South America. Copies are available without cost on request to the Chief, Training Program, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio

MONTANAN JOINS WSU STAFF AS DAIRY BACTERIOLOGIST

Dr. Lloyd O. Luedecke, Corvallis, Mont., (CQ) has joined WSU's dairy science staff as dairy bacteriologist.

Dr. T. H. Blosser, chairman of the dairy science dpartment, said that Dr. Luedecke fills the vacancy left by the retirement of Professor C. C. Prouty last July.

Dr. Luedecke will hold a joint teaching-research assignment with the rank of assistant professor of dairy science.

The new staff member comes to WSU from Michigan State University where he has been a graduate assistant since 1956. He was awarded an M. S. degree in 1958 and the PhD degree this year by Michigan State. He was graduated from Montana State, Bozeman, in 1956.

Dr. Luedecke's research at Michigan State dealt with the effect of early lactation on skim milk used in making cottage cheese, and the influence of milk fat on heat-resistant bacteria.

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49th ANNUAL MEETING

OCTOBER 24, 25, 26, 27, 1962

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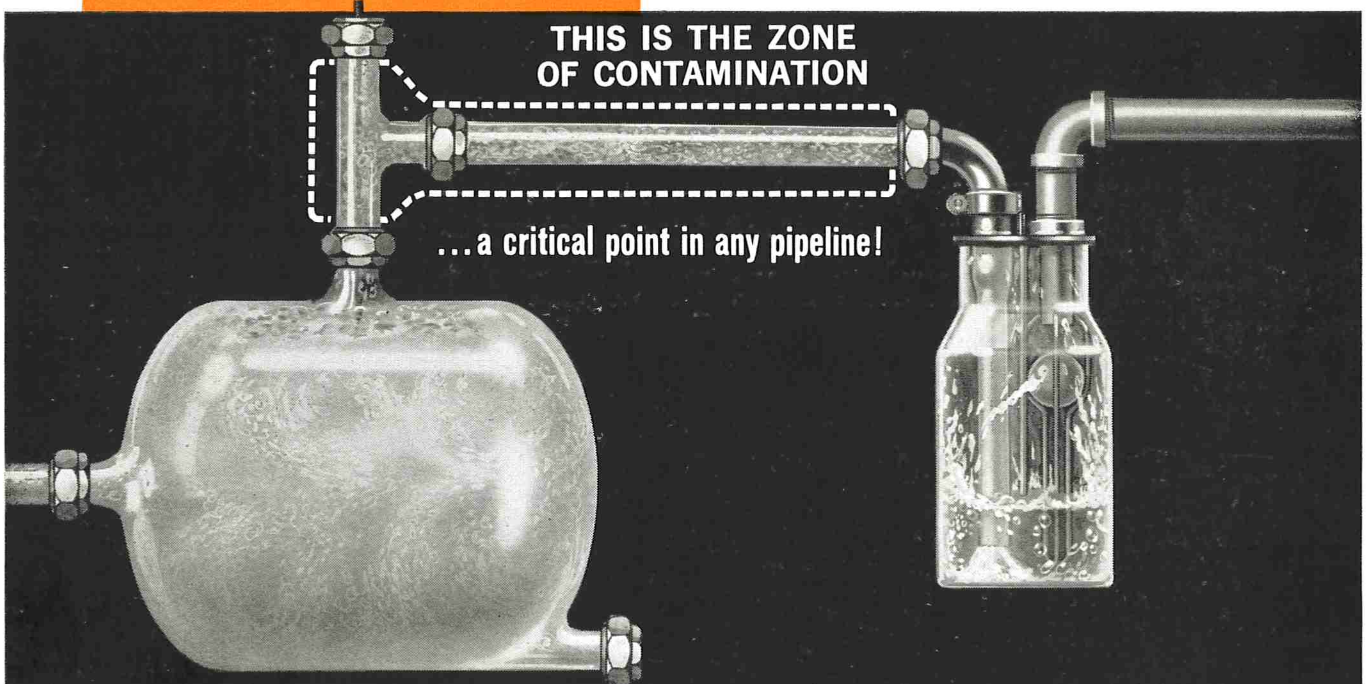
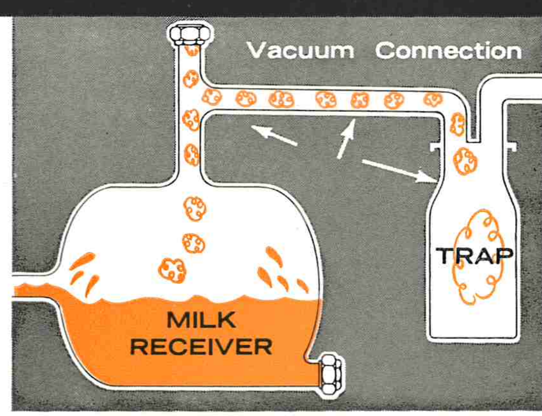


Arrows point to "ZONE OF CONTAMINATION" . . . an area that must be cleaned. This vacuum connection and trap, located between the vacuum pump and the milk receiver, is subjected to both milk and milk vapor during the milking operation. After a good hot SURGE bath, this area is really clean and dairymen may rest assured their entire milking system is sanitized and ready to go for the next milking.



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