DECEMBER, 1962
Vol. 25 No. 12

Journal of

MILK and FOOD TECHNOLOGY

Official Publication

International Association of Milk and Food Sanitarians, Inc.

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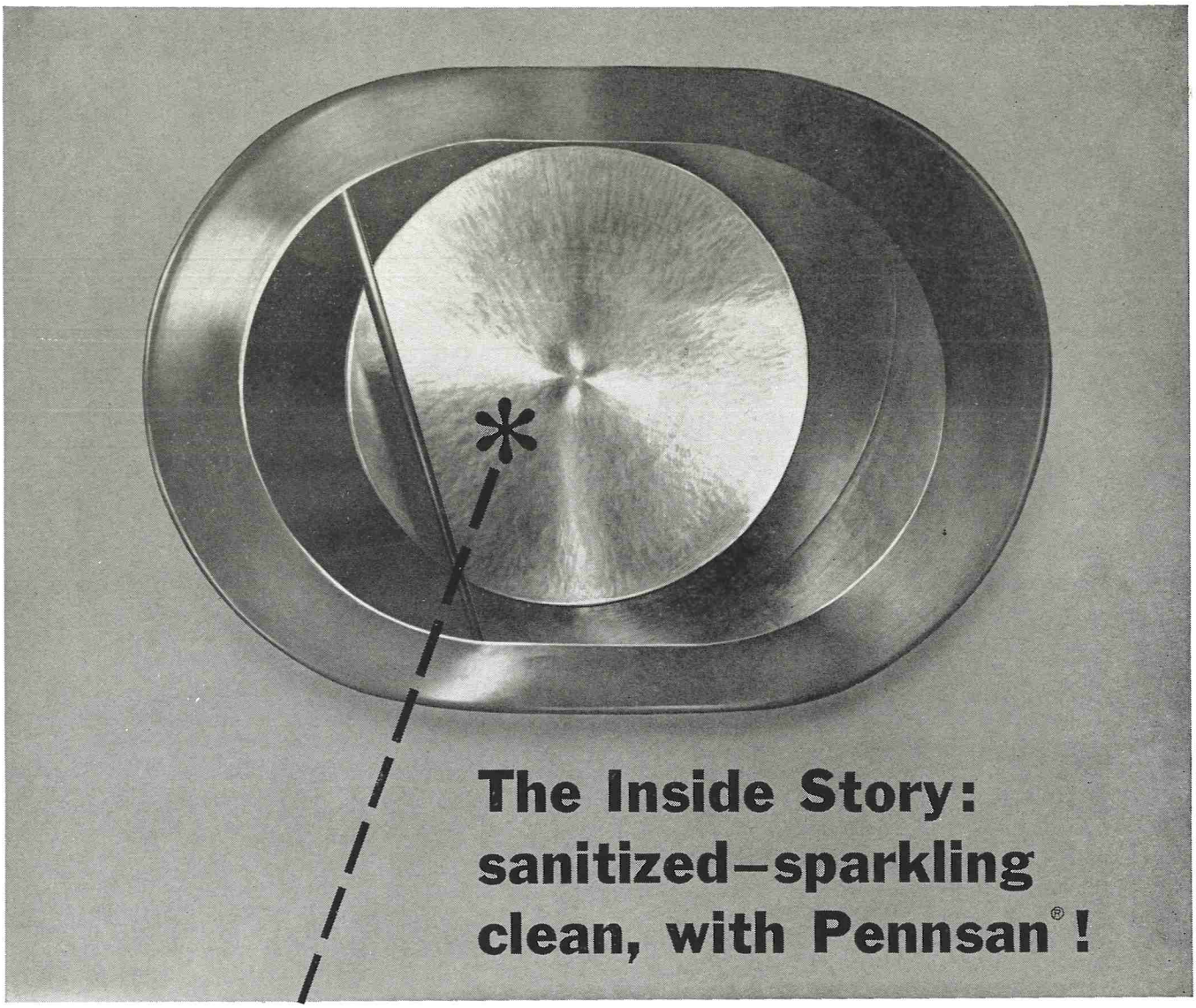

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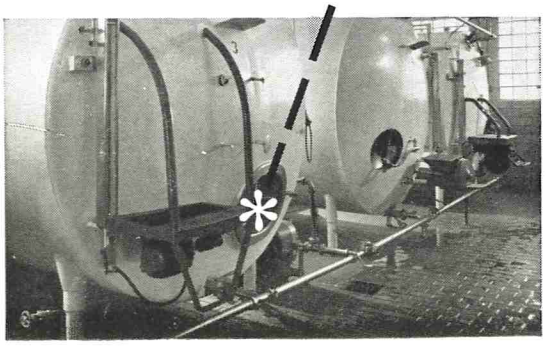

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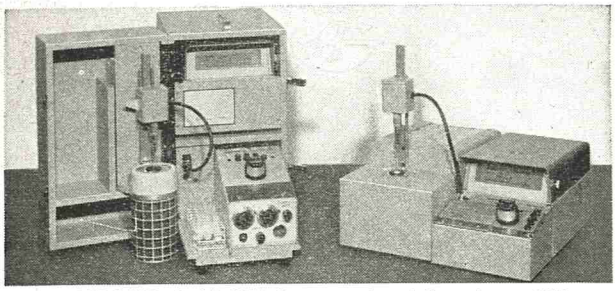

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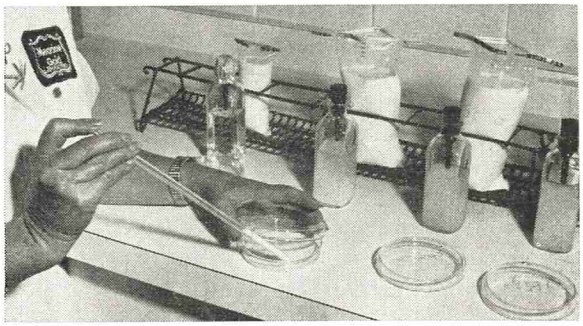

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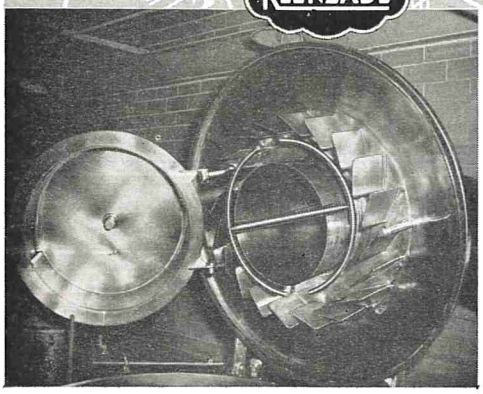

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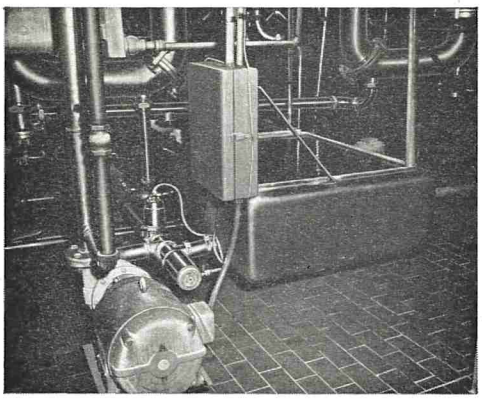

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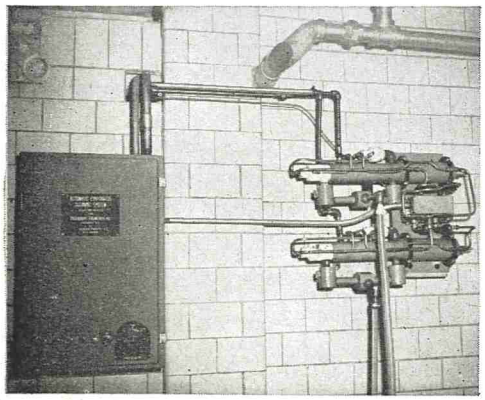

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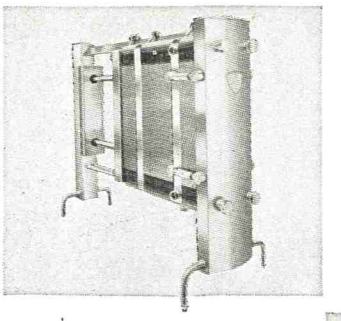

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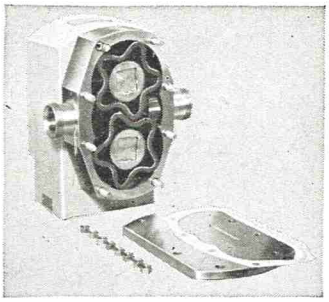

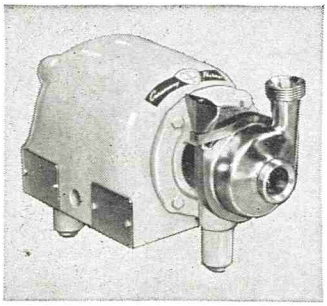

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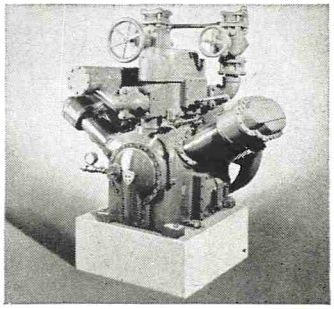

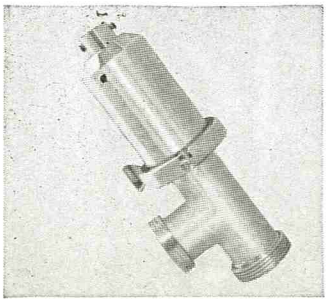

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Vol. 25 December, 1962 No. 12

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Editorial

Is A Low Milk Count Enough?

Most milk sanitarians believe that a low count on milk indicates that the milk has been produced and handled under sanitary conditions. Unfortunately, this is not true, as a simple calculation shows. A neglected milking machine can contribute 100,000,000 bacteria to 110 lbs. of milk passing through it and only raise the count by 2,000 per ml. Thus even the most stringent of current standards can be met with equipment that is far from clean bacteriologically. This is not generally appreciated, although it has long been recognized in Britain.

In the light of the above we must consider just what we want of the milk producer. Various authorities in Britain take the view that if cows, stable and equipment look reasonably clean, and the milk pasteurizes out all right and has adequate keeping quality, there is no justification for requiring the producer to spend any more time, money or effort in order to produce a low count milk. If this view is accepted, then our standard for an acceptable milk would have to be very lenient, for recent work in Sweden[1] indicates that the acceptability of pasteurized milk is not adversely affected until the raw milk count exceeds twenty million per ml.

If we agree that we want bacteriologically clean equipment, and that we cannot rely on counts from the milk to give this assurance, what can be done? To visit each farm frequently and carry out swab or rinse tests as they do in Britain would be very expensive. The only other course that suggests itself is that we modify our testing procedures so that bacterial contamination can be more readily detected. That this view is receiving support is indicated by the following resolution passed at the 16th International Dairy Congress in Copenhagen in September; "Where milk has been cooled at low temperatures for long periods it is desirable to pre-incubate samples before carrying out tests. Further, it would be helpful both from the point of view of hygiene and the assessments of milk for processing to develop new and simple tests for the identification and determination of the species of bacteria concerned." Perhaps we too should be thinking alone these lines.

C. K. Johns, *Head*
Dairy Section
Canada Department of Agriculture

(1) Storgards, T. Relationship Between Quality of Producers' Milk and Market Milk. Dairy Ind. **26**(12): 909, 1961.

PLANNING A TOTAL ENVIRONMENTAL HEALTH PROGRAM[1]

P. W. Purdom, John A. Locke and Louis R. Simeoni

Division of Environmental Health,
Community Health Services,
Philadelphia Department of Public Health, Pennsylvania

Program planning is a basic responsibility of all environmental health administrators. Whether in a large municipal or state health department or a small county or semi-rural department, thoughtful and orderly planning is a necessary task if the administrator is to direct the environmental health program, rather than be directed by it.

The mechanics of program planning have been well described in the literature and in texts on public administration. They are familiar to most practitioners of environmental health. This discussion, therefore, will not deal with the fundamental steps of program planning, rather, it will stress some of the less apparent planning considerations which frequently have a great influence on the shape and direction of the final program.

The administrator must first of all recognize the possible conflict between the environmental health needs of the community as viewed by himself, as an environmental health professional, and as viewed by the citizens. The two points of view may vary considerably! The environmental health professional is accustomed to assessing environmental needs in terms of potential dangers of disease transmission, contamination, insanitation or other conditions with a known or probable effect on human health. Citizens, on the other hand, may show concern for entirely different reasons. Noise, odor, inconvenience, and cost may loom as important considerations in the mind of the average citizen. This is not to make light of the citizen's sense of values or to suggest a lack of interest or concern for serious health effects. It simply reflects the fact that the citizen and the environmentalist are viewing the community from positions which differ in terms of training, experience and overall understanding of environmental health.

When Philadelphia's air pollution control program was first inaugurated it was very evident that the type of service in which the citizens were primarily interested was the investigation of complaints. To meet this demand, twenty-four hour, seven day a week field coverage was established with inspectors in radio controlled vehicles to provide rapid investigation of reported conditions involving excessive smoke, offensive odors or other air pollution problems. This extensive surveillance program has been effective in meeting a definite need and in learning much about the sources of air pollution problems throughout the city. Continuous surveillance is particularly useful in dealing with air pollution problems many of which arise from intermittent emissions which can sometimes be observed only if a field investigation is made promptly after the condition is reported.

It was necessary, however, for those responsible for the air pollution control program to recognize that this was not enough if the community's air pollution problem was to be met. A complaint-centered program fails in that it deals with conditions only after a problem has developed; it is like fighting fires rather than preventing them! What was needed, in addition to an efficient complaint service, was a positive, engineering approach to the control and prevention of air pollution so as to bring about permanent improvements in air quality. The introduction of such activities as the review of plans for the installation of air pollution control devices and commercial fuel burning equipment, engineering surveys of major types of industries or industrial processes, and the provision of technical consultation on various aspects of air pollution control has given far better balance to the overall program. To accomplish this redirection of program it was necessary to release selected staff members from some of their responsibilities for daily program operations. Only through a positive decision to detach one or more persons from some or all of their operating duties can time be found to permit this type of planning and program development. If we permit ourselves to be absorbed by daily operations, there is no doubt that our total efforts can be consumed by these demands. Even in a one-man department, some fragment of time must be set aside to deal with overall program planning.

This type of resolution or compromise between agency views and community views is an essential aspect of program planning. In order to make intelligent decisions in these areas, the administrator must have knowledge of community views on environmental health needs. In addition to the many public contacts which are normal in the operation of any environmental health agency, a technique which may be especially helpful in determining community sentiment is the use of a citizen advisory

[1]Presented at the 49th Annual Meeting of the International Association of Milk and Food Sanitarians, Inc., in Philadelphia, Pennsylvania, October 24-27, 1962.

committee. This type of citizen participation in an environmental health program has been described in a previous paper *(1)*. A particular advantage of this approach is that it provides a two-way channel for communications by which the agency can not only learn what the community is thinking but also through which the agency can interpret to the community its plans, objectives and needs. Through the use of responsible and respected community leaders in this advisory role a better informed community may be developed, with a higher level of responsibility for achieving improved environmental standards. An informed community more likely will provide the continuing budget support so necessary to the administrator in carrying out a comprehensive environmental health program.

In addition to the differences between the environmental health wants of the citizens and the health department, conflicting values also may be found within the governmental family itself. Hence, the health department may seek additional funds with which to itensify its food sanitation program or to improve its industrial hygiene services only to find administration officials and legislative leaders more interested in an expanded rat control program or better radiation protection. The environmental health administrator should not be surprised by this reaction and may even find it helpful in learning more about community thinking, since political leaders frequently are very adept at knowing the wishes of the citizens. Where this conflict jeopardizes a program which he considers imperative, the administrator must resolve his differences with the political leaders through negotiation, persuasion and education. Similar conflicts may exist within the health department itself with the environmentalist facing competition from program directors in the other health disciplines. Here again, the administrator will find salesmanship, coupled with patience and perseverance, an important asset.

Not all of the conflict facing the administrator comes from external sources, since it will be found that frequently he must resolve conflicting values within himself as a preliminary to final program planning. For example, the administrator may wish to utilize specialized field personnel in order to have the maximum technical competence in the field to deal with the many technical problems confronting the present-day environmental health agency. The lack of sufficient numbers of technical specialists together with the need for more comprehensive field services has made it desirable for many administrators to utilize personnel on a generalized basis rather than as specialists. In this case, the practical gains offered by generalization, in terms of more intensive field coverage with reduced travel time and less duplication of effort, are of such immediate value as to offset the technical advantages of specialization. This is the type of compromise which every administrator must make with conflicting values.

Another example of compromise between two conflicting and partially desirable administrative patterns is the choice between centralization or decentralization of program operations. In facing this choice, many administrators will be tempted by the advantages of centralized program control since they feel they are better able to "keep their hand on the reins," and are more likely to have a successful program if they are able personally to make the numerous day-to-day decisions regarding operational aspects of their program.

The experience with decentralization of health services in the Philadelphia Department of Public Health is probably typical of other agencies where this issue has been faced *(2)*. While it is perhaps still too early to assess decentralization in terms of improved quality of field services, there have been some distinct benefits to overall program operation. One important advantage has been the release of the technical specialists in the Division's central office from the burdens of directing daily operations. They are now able to spend more of their time on creative planning and program development, while dealing with technical problems as specialized consultants. In those program areas where decentralization has been minimal, the central office specialists still deal with many operational problems and frequently "just can't find the time" to devote to program development.

Another factor which does much to determine the final shape of the overall program is the weight of traditionalism. There is a real tendency for environmental health administrators to continue to carry out programs developed some years ago, while seldom, if ever, pausing to consider whether a program continues to serve a useful purpose, or whether the need which a program was established to meet still exists in the community. A recent report states that ". . . for a number of years, local health departments have devoted about forty per cent of their time to programs related to the safety of milk and food" *(3)*. This does not leave much time with which to approach the newer problems which arise from the increasingly complex relationships between man and environment. A number of these were identified by the late Professor William C. Gibson *(4)* as: "expanding metropolitan centers; the competition for, and the conflicts arising from, the use of environmental resources of land, water and air for community development; the toxicological problems caused by nonliving contaminants in air and water; the potentially increased exposures to ionizing radiation; the changes

in the food production-processing-marketing cycle and the problem of chemical food additives; the unfolding epidemiology of viruses, helminths and fungi; and the devastating toll from the chronic diseases, mental abnormalities and accidents."

In view of the findings of the Gross Committee *(5)* that, while many other disease rates have gone down, food-borne diseases have not declined in eight years, it is not suggested that less time be spent on food protection activities. If new responsibilities are to be met, greater resources must be made available for environmental health programs. If local agencies approach new demands by curtailing present activities, ineffective programs in both the traditional and newer program areas probably will result. What must be done, however, is to carefully appraise every program activity to determine its effectiveness and the need for its continuance. Care must be taken that "sacred cow" programs are not perpetuated long after their usefulness has passed and that "pet projects" of the administrator or the technical staff do not consume a disproportionate share of time and resources. Throughout the full spectrum of environmental health activities, we must seek new methods of operation, explore entirely new approaches with imagination and bring about program redirection as needed.

The resolution of competing program needs is a problem which complicates both planning and program operation. A common example is where existing codes or statutes require the quarterly inspection of restaurants and the inspection and approval of septic tank installations. If the availability of personnel and resources is such that both services cannot be sustained, it is clear that some administrative action must be taken to resolve the dilemma. Without wishing to split hairs or engage in semantics, it is suggested that a legislative action establishing a minimum frequency of inspection, but which is not accompanied by an appropriation measure to provide the manpower for its implementation, may be properly viewed by the administrator as directory rather than mandatory. In the light of this interpretation, the administrator is compelled to provide the service only to the extent permitted by other program needs.

Another basis for making a proper choice between competing needs is to consider the relative benefit to the community to be derived from each activity. Because of their basic orientation, health departments usually will give emphasis to preventive measures rather than to those of a largely regulatory nature. In the situation mentioned above, higher priority perhaps would be given to the inspection of septic tanks than the quarterly inspection of restaurants since a septic tank control program seeks to prevent the subsequent occurrence of severe sewage problems which have plagued so many urban and suburban communities. In this case the administrator is literally exercising the ancient adage, "An ounce of prevention is worth a pound of cure."

There are times, however, where in using this particular logic the administrator merely will deceive himself and render poor service to the community. From many previous unfortunate experiences, we have ample reason to recommend against the use of septic tanks in highly congested urban areas. If the environmentalist believes that the construction of sanitary sewers is the best answer to the community's sewage disposal problem, should he not take a firm stand and initiate steps to prevent further construction on building sites which would require the use of septic tanks? If the community cannot look to its health department for this kind of leadership, to whom can it turn?

This discussion has attempted to explore some of the considerations and conflicts which must be faced in the planning and execution of an environmental health program. Program planning is not a decorative sophistication to be practiced when the demands of program operations slacken momentarily and allow a few idle moments for thought. To the contrary, planning is an essential element in a sound program for which sufficient time must be made available. Those who feel that planning is a superficial chore requiring only the manipulation of a few generalized formulas and mathematical factors will be disillusioned. Planning is a tough, demanding task requiring the full imagination and energy of even the most gifted administrator. Even when new proposals face opposition or rejection, the administrator must renew his planning efforts with persistence and determination. The opportunity to better meet the environmental needs of the community through improved program planning presents a real challenge to all of us engaged in the field of environmental health.

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DAIRY PLANT PRECAUTIONS TO AVOID ADDED WATER IN MILK[1,2]

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and

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(Received for publication October 25, 1962)

Reasons for milk adulteration and prolonged flushing time during processing were deduced by noting the time required to reach the normal freezing point on milk used for flushing sanitizing solutions from clarifiers, balance tanks, and HTST pasteurizers. Pasteurizer flushing time varied considerably depending on the efficiency of clarifier flushing and balance tank drainage, type of balance tank, placement of clarifier, and occurrence of diversion or recirculation while flushing. Adulteration appeared to be caused by the use of uniform time allotments for flushing without proper consideration of the factors causing the variable flushing times. Recommendations are made to avoid adulteration and minimize flushing time or loss of milk while starting processing equipment.

Water added to milk, even unwittingly, is considered an adulteration under most milk control ordinances or regulations. In spite of careful production and processing practices on the part of most producers and processors, respectively, the bottled product is at times detected as having been adulterated with water.

One means of inadvertent adulteration may occur during the starting or stopping of milk processing equipment. High-temperature, short-time (HTST) pasteurizers, clarifiers, balance tanks, fillers, etc., are potential sources of water addition to milk during these periods. This is particularly true at the beginning of the day's operation since the equipment normally is sanitized with hot water or chemical sanitizer solutions followed by flushing with milk to remove the water. Admixture of milk and water during this flushing could result in adulteration. Information is not available indicating the time required and the correct procedures for flushing equipment. Consequently, the time necessary for proper flushing is frequently an estimated value. Thus, a study was undertaken to determine the length of time required to flush clarifiers, balance tanks, and HTST pasteurizers. The purpose of the study was to develop recommendations for dairy plant operators so that they might use milk for flushing water from their equipment without adulterating the product.

EXPERIMENTAL PROCEDURE

The study included 15 dairy plants throughout the State of Connecticut with HTST pasteurizer capacities of 2500 to 30,000 lb/hr. Studies were made of 28 processing runs on HTST pasteurizer flushing. Clarifier flushing was checked at six plants for a total of eight runs. Balance tanks of two types, with and without sump, were checked at seven plants during twelve runs.

In all of the plants but one, the flow of the milk was from the storage tank to the clarifier, balance tank and HTST pasteurizer. One plant had the clarifier located within the HTST system. The equipment at 14 of the plants was started according to the normal routine of each plant. The plant operators were not cautioned regarding proper flushing. In one plant the starting procedure was closely supervised.

In all plants, the sampling of milk from the clarifier and pasteurizer commenced when a milky appearance first showed in the sanitizer solution coming from the respective discharge lines. Sampling of milk in the balance tank started with the first addition of milk from the clarifier. The samples were taken at 15-sec intervals for 17.5 min. Samples of the milk being processed were taken from the raw storage tanks and used as controls (unadulterated milk).

The Fiske cryoscope was used to determine the freezing point of the milk samples. The freezing points were plotted against time of sampling and from the resulting curve the required flushing time was determined. This was defined as the time for the freezing point of the milk used in flushing to reach and maintain a value deviating no more than ± 0.002 C. from that of the milk in the plant storage tank.

[1]Supported in part by the George H. Walker Foundation, Boston, Massachusetts.
[2]Study instigated by the Dairy Industry Committee of the Connecticut Association of Dairy and Food Sanitarians, Inc.

RESULTS AND DISCUSSION

Survey of HTST Pasteurizers

A survey of the flushing time for various capacity HTST pasteurizers may be noted in Table 1. The flushing time varied from 2.5 - 10 min, with maximum times resulting when diversion or recirculation of the milk occurred before the pasteurizer was completely free of water. This diversion or recirculation while starting resulted in the return of watered milk to the balance tank, a process which prolonged the flushing time. There does not appear to be a relationship between either HTST capacity or make of pasteurizer and the flushing time. However, these pasteurizers were operated according to normal plant routine. Carefully controlled processing under standard conditions with various capacities and types of pasteurizers might indicate a correlation between capacity and/or type and flushing time. The variability in flushing time among plants may be accounted for partially by the differences in efficiency of clarifier flushing and balance tank water drainage. Starting procedures which would not permit proper flushing of the clarifier and drainage of the balance tank would result in mixing milk and water in the balance tank and, consequently, prolonged pasteurizer flushing time. The variability among plants also indicates possible differences in the starting procedure of various HTST operators. It also emphasizes the importance of educating these operators in careful processing techniques.

A typical poor start resulting in excessive loss of milk during flushing of an HTST pasteurizer may be noted in Figure 2. This plant required nine minutes of flushing before normal milk was obtained. Diversion occurred twice causing the two pronounced dips in the freezing point curve. Unless flushing time is increased to compensate for it, diversion while starting may account for at least some adulterated milk reaching the market.

TABLE 1. TIME TO FLUSH WATER FROM PASTEURIZERS

Plant	Make of pasteurizer	HTST capacity	Flushing time for pasteurizer
		(lb/hr)	(min)
A	W	2500	6.00
B	W	4000	8.75[a]
C	X	4000	9.00[a]
D	W	5000	5.50
E	Y	6000	2.75
F	Y	6500	4.50
G	W	6500	10.00[a]
H	Y	6750	4.00
I	Z	8000	6.50
J	Z	10000	9.00[a]
K	Z	10000	2.50

[a]Diversion and/or recirculation while starting

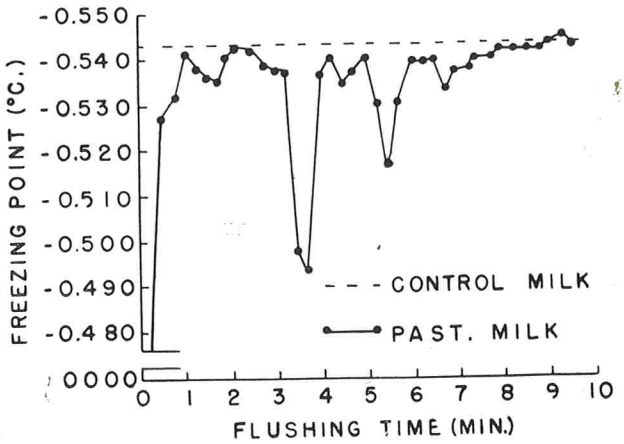

Figure 2. Time to flush water from plant J pasteurizier.

Flushing of Clarifier, Balance Tank Without Sump, and HTST Pasteurizer

In the discussion of the results shown in Table 1, it was indicated that the efficiency of clarifier flushing and balance tank drainage may be reflected in the HTST flushing time. Consequently, such equipment at each of four plants was checked for flushing time. The results are shown in Table 2. The clarifier in plant A was located within the HTST system and thus clarifier flushing times were not determined. Such a location for the clarifier enables it to be flushed at the same time as the pasteurizer which minimizes the amount of milk lost during flushing. The reason for the excessive amount of time to flush the clarifiers at plant K and L is not known. Possibly water was not properly drained from the pipe line between the storage tank and clarifier. In these two instances (plant K and L) the milk from the clarifier was allowed to enter the balance tank prior to the 10-and 7-min times, respectively, resulting in excessive time to flush the balance tanks and HTST units. Plant I readily flushed the clarifier, but apparently allowed milk to enter the balance tank before it was properly drained of water resulting in six minutes for flushing the unit and therefore prolonged the flushing of the pasteurizer. There is no apparent reason for the discrepancy in results of the two trials at plant A (Table 2), in which approximately equal times were required for flushing the balance tank and markedly different times were required for flushing the pasteurizer. Pockets of water at dead ends with-

TABLE 2. TIME TO FLUSH WATER FROM MILK PROCESSING UNITS

Plant	HTST capacity	Flushing time		
		Clarifier	Balance tank	Pasteurizer
	(lb/hr)	(min)	(min)	(min)
A	2500	-	4.50	10.00
A	2500	-	4.25	4.75
I	8000	1	6.00	7.00
K	10000	10	12.50	13.50
L	20000	7	7.00	6.00

in the pasteurizer may have admixed with the milk and prolonged the flushing time to ten minutes for the first trial. However, in this trial, as well as in all other plant trials, there was no indication that pockets of water, as evidenced by unexplained dips in the plotted flushing curves, were mixing with the milk.

Flushing of Clarifier, Balance Tank With Sump, and HTST Pasteurizer

It was observed throughout all the studies that if timing pump primes were to be maintained, the conventional type balance tank without sump did not allow for proper drainage of the water. The water remaining in the balance tank tended to mix with the incoming milk, increasing the adulterated volume and time necessary to flush the balance tank. Consequently, a study of the time to flush the sanitizing solution from processing units was made using balance tanks with sump, such as that represented in Figure 1. The results of this study are shown in Table 3. The marked improvement, except for the second trial in Plant N, in the time to flush the balance tanks and pasteurizers (Table 3) when compared with the results in Table 2 was considered to be primarily the result of the sump type balance tank. This tank allows for complete drainage of the water into the sump before milk is allowed to enter without mixing of milk and water within the balance tank proper. Obviously, the shorter flushing time required with the sump type balance tank results in less milk loss. Such a savings in many cases would warrant the purchasing of the newer sump type balance tanks.

Controlled Processing

The previous surveys discussed in this paper all were made at plants where the starting of the equipment was done according to the usual routine of each plant. Thus, the flushing time for the processing equipment was to a large extent dependent upon the methods used by the pasteurizer operators. A study was deemed advisable in which the operator

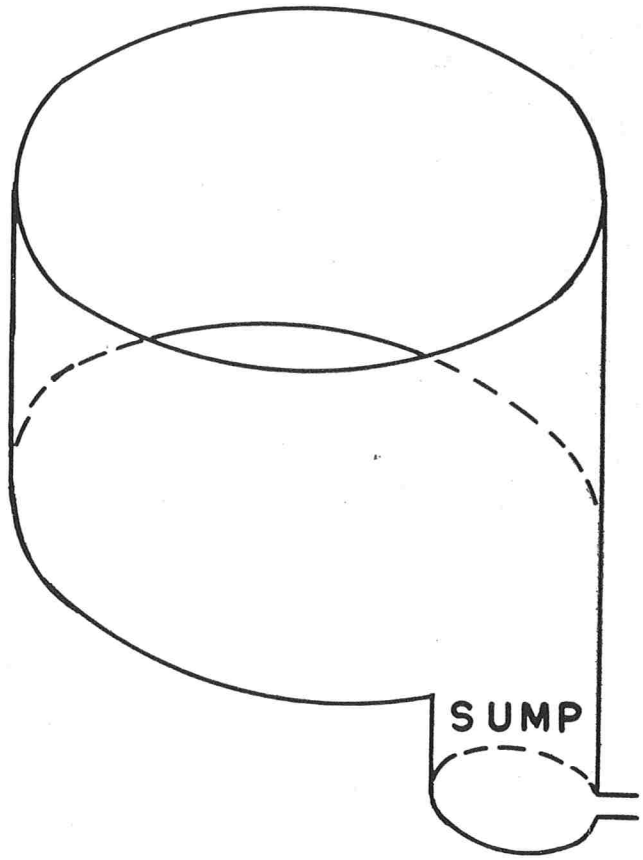

Figure 1. Balance tank with sump.

was instructed regarding proper starting procedures and was closely supervised during the flushing period. For this study, three preliminary trials were run which indicated that 2.5 min were required for proper flushing of the clarifier. Thus, milk from the clarifier was not allowed to enter the balance tank until this length of time had expired nor was it allowed to enter before the balance tank was drained of as much water as possible. The results of controlled flushing using balance tanks with and without sumps are presented in Table 4. A typical flushing curve for Trial 2 representing the sump type

TABLE 3. TIME TO FLUSH WATER FROM PROCESSING UNITS USING BALANCE TANKS WITH SUMP

Plant	Trial	HTST capacity	Flushing time		
			Clarifier	Balance tank	Pasteurizer
		(lb/hr)	(min)	(min)	(min)
M	1	30000	-	2.25	2.50
M	2	30000	3.25	3.50	2.00
N	1	30000	1.25	3.25	2.00
N	2	30000	6.75[a]	2.50	5.50[a]

[a]Starting problems

balance tank and the corresponding pasteurizer flushing may be observed in Figure 3. The results shown in Table 4 when compared with Tables 1, 2, and 3 indicate the short period of time necessary to flush

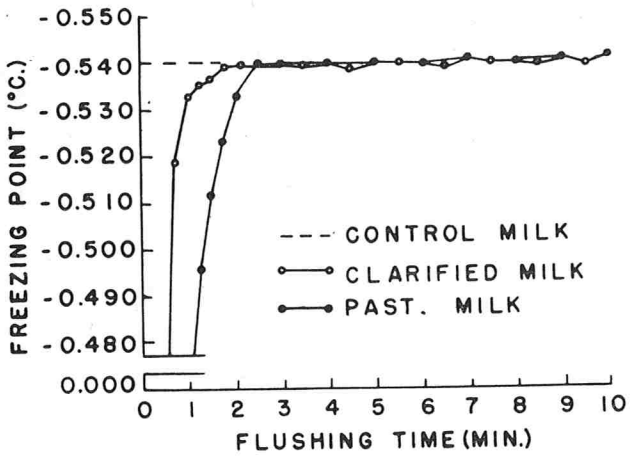

Figure 3. Time to flush water from clarifier and pateurizer. (supervised processing)

TABLE 4. TIME TO FLUSH WATER FROM PROCESSING UNITS UNDER SUPERVISED PROCESSING

Plant	Trial	HTST capacity	Flushing time		
			Clarifier	Balance tank	Pasteurizer
		(lb/hr)	(min)	(min)	(min)
		Balance Tank Without Sump			
0	1	3450	2.75	2.25	2.50
0	2	3450	2.50	1.75	2.00
		Balance Tank With Sump			
0	1	3450	2.5	0.25	1.50
0	2	3450	2.5	0.25	1.75

water from processing equipment when close supervision and proper education of plant personnel is applied. This education results in less loss of milk during flushing and the assurance that the milk going to the bottle filler has not been adulterated with water.

RECOMMENDATIONS

The following recommendations should aid in the avoidance of milk adulteration with water and should minimize flushing time or loss of milk during starting of processing equipment. These suggestions are based on the content of this manuscript and observations noted during this study.

1. Studies should be made at each processing plant to determine the length of time to flush water from the clarifier and pasteurizer. These time figures should then be used to determine when to allow milk from the clarifier to enter the balance tank and when to save the pasteurized product for bottling.

2. Education of the processing operator is fundamental to the problem.

3. Placement of the clarifier within the HTST system will minimize the amount of milk lost during flushing.

4. Extreme care should be taken to allow as much water as possible to drain from the balance tank before milk is allowed to enter.

5. The use of a balance tank with sump is highly recommended since some tanks are not constructed with sufficient pitch of proper outlet ports to allow for adequate drainage.

6. By-pass circuits (homogenizer by-pass, diversion line and all lines that may contain water) should be adequately flushed with milk at the beginning of flushing.

7. Diversion should be avoided once milk enters the system until all water has been flushed from the balance tank and the HTST system.

8. Although it was not a part of this survey, it is obvious that equal care should be taken in flushing or draining water from pipe lines, surge tanks and bottle fillers during the starting operations and in flushing milk from the equipment with water at the end of the processing.

THE CONTROL OF WATER QUALITY IN SWIMMING POOLS[1]

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Swimming pools have been popular for recreation use for many years and their number has increased rapidly for the past several years. Formerly they were provided by municipalities and institutions, but presently they may be found at motels, in subdivisions, at apartment houses and in many back yards. In that swimming pool water can be a mechanical transmitter of pathogenic organisms the ever increasing number of swimming pools causes an increase in their public health problem.

The primary function of swimming pool sanitation is to prevent the transmission of communicable disease in the pool water, and in carrying out this function the sanitarian and or the pool operator is confronted with several problems. These include the control of chemical, physical and bacteriological quality of the swimming pool water.

Physical Properties

The physical properties which need consideration are temperature, turbidity and color.

The control of the temperature of swimming pool water is practical only where an artificial heating unit is provided or by the addition of warmer or colder make-up water. The temperature of swimming pool water should not exceed 78F or be less than 65F *(6)*. It should be neither 8F colder nor 2F warmer than the surrounding air temperature.

Turbidity, a measure of the interference presented by suspended matter to the passage of light, can be caused by soil particles, finely divided organic matter, microscopic organisms and chemical precipitates.

The turbidity in swimming pool water should be low enough so that a six inch black disk on a white background is visable in the deepest part of the pool from a distance of 30 feet *(1)*. Filters, sand or septum type, which are properly constructed and operated, should remove all perceptible turbidity. Where lime is used to raise the pH, turbidity may result. After batch dosing with soda ash the mat on the sand filter may dissolve and the suspended matter which has accumulated on the mat may be carried to the pool. This can be prevented by slow feed techniques or batch dosing just after back washing and before beginning alum feed to form the mat. Batch dosing of soda ash also can cause precipitation of hardness compounds which will result in a turbid water. This can be prevented by feeding the soda ash ahead of the filters. The presence of algae in swimming pool water also can cause turbidity. The prevention and control of algae will be discussed later in this paper.

The only visible color which should be present in swimming pool water is a slight blue hue. The water should be clear and sparkling at all times. Objectionable colors may be caused by the presence of iron or manganese in the make-up water which will precipitate with chlorine. Algae growths may cause objectionable color.

Chemical Properties

The addition of the proper amount of a disinfecting agent to swimming pool water is considered to be the most important step in pool operation. Chemicals such as bromine, chlorine, chloramine (ammonia plus chlorine), and ironized silver have been used for swimming pool disinfection. Of these chlorine is the most widely used and its use has proved to be satisfactory.

Chlorine is commonly added to swimming pool water as chlorine gas or as hypochlorite solution. Sufficient chlorine or chlorine compounds should be added to the water to maintain a continuous free available chlorine residual between 0.4 and 1.0 ppm *(6)*. Experience has shown that the residual chlorine may be maintained at approximately 2 ppm with an accompanying pH level of 8.0 without causing irritation to the mucous membranes of the bathers. The importance of maintaining an excess of free available chlorine lies in the fact that the free chlorine will oxidize microorganisms much faster than chlorine which is in combined form such as chloramines.

The addition of chlorine to swimming pool water will perform functions other than disinfection. Maintaining a free chlorine residual will prevent the start of algae growths. Chlorine will precipitate iron in the water which can be taken out by the filters. Free chlorine will prevent the production of nitrites and destroy any that may be present *(4)*.

The control of a free available chlorine residual depends upon several factors. In order to maintain the proper level of chlorine residual, the chlorine gas or hypochlorite solution must be fed continuously to the water at a rate which will satisfy the demand and provide for a residual. This can be accomplished only by frequent testing of the water for chlorine residual. The demand for chlorine will vary according to the bather load and other factors, and

the chlorine feed must be varied accordingly. It is also important that sampling points be carefully chosen so that an over-all picture of the distribution of chlorine in the pool can be obtained. The amount of organic matter in the swimming pool water will directly effect the amount of chlorine required to maintain an adequate residual in that the chlorine oxidizes the organic matter. A high pH will reduce the effect of the chlorine. Sunlight acts as a dechlorinating agent *(3)*. Chlorine demand varies directly with the bather load due to agitation of the water and the addition of organic matter. Continuity of recirculation and filtration is an important factor in maintaining a chlorine residual in that the demand is lowered and as a result chlorination becomes more efficient.

Batch chlorination with sodium or calcium hypochlorites is practiced extensively for pools which do not have means of feeding chlorine gas or hypochlorite solution continuously. A constant level of residual chlorine is difficult to maintain where batch chlorination is used. Unless the hypochlorite is added frequently and in the proper amounts the residual chlorine will vary considerably from the desired level. Without careful control the residual could easily drop to zero. All artificially constructed swimming pools should be equipped with a device which can provide a continuous feed of disinfectant to the water.

In testing for the free chlorine residual the procedure as outlined in the latest edition of "Standard Methods for the Examination of Water, Sewage, and Industrial Wastes" should be used. Iron, manganese and nitrite nitrogen will interfere with the orthotolidine test when present in certain amounts, and it may be necessary to use the orthotolidine arsenite procedure. It is important that the amount of free available chlorine be determined rather than the combined chlorine.

Another property of swimming pool water which needs close attention is the pH level which is a measure of acidity or alkalinity. Control of the pH level is needed for good floc production where sand filters are used, for effective disinfection with chlorine, to prevent irritation to the mucous membranes of the bather, and to control the carbon dioxide content which is necessary for algae growth.

Where sand filters are used to remove turbidity, color, and other finely divided matter from the swimming pool water, sulfates of aluminum are most commonly used to form the mat on top of the filter sand. The formation of hydrated oxides of aluminum, a solution of aluminum sulfate with the alkalinity, is sensitive to the pH of the water. The optimum pH for floc formation in swimming pool water is normally between 7.2 and 7.6 *(6)*.

Free available chlorine in swimming pool water is in the form of hypochlorous acid and hypochlorite ion and the relative distribution of each depends upon the pH of the water. The percentage of hydrochlorous acid present is greater at lower pH values, and conversely the percentage of hypochlorite ions is greater at higher pH values. Studies have shown that lower concentrations of chlorine are required at lower pH levels for effective bacteria kills, therefore it is desirable to maintain the pH as low as possible (considering other effects of pH) for a higher percentage of hypochlorous acid which has a higher killing efficiency than does the hypochlorite ion.

The mucous membranes of the eyes and nose are sensitive to an acid or high alkaline environment, and with pH levels below 7 or above 8.4 irritation may result *(6)*. For this reason it is desirable to maintain the water slightly alkaline.

Carbon dioxide which is necessary for the growth of algae does not exist in water at a pH above 8.1, therefore it would be desirable for this reason to maintain a pH level above 8.1.

Considering the various effects which pH has on swimming pool water, an optimum level for an individual pool should be somewhere between 7.2 and 8.0. There is some difference of opinion among authorities as to what the proper pH level is, but in the final analysis a satisfactory level must be determined for a given swimming pool.

Chlorine gas when added to water forms acids which react with the natural alkalinity tending to lower the pH level. When hypochlorites are used the pH tends to be higher. Coagulants such as alum tend to lower the pH.

Soda ash (sodium carbonate) is commonly used to raise the pH of swimming pool water and has proved to be satisfactory. The soda ash solution should be fed to the water by a feeding device at or near the recirculation outlet to the pool. Batch feeding of soda ash should not be practiced because close control of the pH level is difficult. Compounds such as caustic soda or lime may be used to raise the pH. Extreme care should be taken in handling caustic soda, and lime can cause filter clogging. Dilute acids may be used to lower the pH of swimming pool water, but their use is hazardous due to possible injury to the operator, bather or equipment. Sodium bisulfate is much safer to use and will aid in the removal of calcium deposits from piping and equipment *(6)*.

If the make-up water is excessively hard, calcium deposits may result in the piping and recirculation equipment the removal of which is mentioned above. The presence of iron and manganese may cause color problems in the presence of chlorine. If there is

more than 0.3 ppm of iron, 0.01 ppm of manganese or 0.1 ppm of nitrite nitrogen there will be interference with the orthotolidine test for chlorine residual.

BACTERIOLOGICAL QUALITY

Swimming pool water can become an efficient transmitter of communicable disease since pathogenic organisms can exist in a wet environment for a considerable length of time. Persons who have a disease, who are carriers of a disease or who are in the incubation period of a disease can contaminate the swimming pool water. Diseases which can become hazards in swimming pools include infection of the upper respiratory tract, infections of the ear, skin diseases and intestinal infections. The disease organisms have access to the human body through the eyes, ears, nose, throat and skin injuries. A susceptible person could easily get a large enough dose of virulent microorganisms to cause infection from swimming pool water if steps are not taken to prevent the presence of these organisms.

Conditions which may lead to bacterial contamination of swimming pool water include lack of swimmer control, inadequate disinfection, inadequate or defective recirculation equipment, rough or dirty pool surface and inadequate quality control of the water. Faulty sampling and testing procedures for bacteriological quality could cause false test results. Make-up water should be of drinking water quality. All persons who have signs or symptons of illness should be prevented from using a swimming pool. All bathers should be required to take a cleansing shower before entering the pool; and if this is not accomplished the swimming pool simply becomes a "public bathtub." The above are difficult to obtain without close supervision and good cooperation from the bathers.

In that it is difficult to detect the presence of pathogenic organisms in water the bacteriological quality of swimming pool water is tested for the presence of the coliform group of bacteria. The test for the coliform group is relatively simple and these bacteria are normally bound in large numbers where pathogenic organisms would be found. The coliform bacteria are equally sensitive to their environment as other bacteria.

The membrane filter technique is commonly used as the test to check for the presence of coliform organisms in water. It is preferred over the lactose broth fermentation method chiefly because of the time involved in running the test. Only about twenty hours are required as compared to forty-eight to seventy-two hours for the fermentation method. The membrane filter provides for a direct count.

The swimming pool water should be sampled and tested as frequently as possible. The samples should be collected at various points in the pool and under the most adverse conditions such as at the time of the heaviest bather load.

The bacteriological quality of swimming pool water should meet the U. S. Public Health Service Drinking Water Standards which are in part as follows:

> When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed one per 100 ml. Coliform colonies per standard sample shall not exceed 3/50 ml, 4/100 ml, 7/200 ml, or 13/500 ml in:
>
> (a) Two consecutive samples:
>
> (b) More than one standard sample when less than 20 were examined per month; or
>
> (c) More than five % of the standard samples when 20 or more are examined per month.
>
> When coliform colonies in a single standard sample exceed the above values, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be satisfactory quality.

The control of algae growths in swimming pool water can be considered along with the control of pathogenic organisms because similar steps must be taken to keep the water free of these organisms. Algae can gain access to the pool water by wind, in make-up water or by the bathers from the swimming pool area. There are many forms of algae varying in size from 3 microns to filaments which are visible to the naked eye *(5)*. Some forms of algae swim about freely in the water and others cling to the walls of the pool.

The presence of algae in swimming pool water causes serveal objectionable features. In that algae are organic they have a high chlorine demand using chlorine which could otherwise be used to oxidize pathogenic organisms. Some algae cause color and turbidity which are esthetically objectionable, and others cause objectionable odors. The algae that cling to the walls and floor of the pool cause the surface to be slippery which could easily cause a safety hazard. Pathogenic organisms can be protected from attack by chlorine by the filamentous algae.

In most instances routine chlorination will keep swimming pool water free of algae. Pool shading, temperature below 80F and a smooth pool surface will also assist in keeping down algae growths. In case algae do gain a foothold in the pool the addition of 1 ppm of copper sulfate or 10 ppm of chlorine should kill or oxidize the algae. If this does not work, the only other alternative is to empty the pool, scrub it with a 5 % solution of hypochlorite, and rinse thoroughly.

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SANITATION IN THE SPACE AGE[1]

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The classic concepts of environmental sanitation have become an integral part of our way of life in this age. The advent of the space age requires an expansion of these concepts. We are faced today with phenomenal advances in transportation and communication. Are our sanitary surveillance techniques and regulations, basically geared for parochial communities, adequate to maintain the public health in a world served by supersonic carriers? Is our knowledge and training sufficient to meet the demands for ultraclean environments imposed by advances in medicine and industrial technology? We must be ready to consider such new problems as cleaning and disinfecting the hardware and materials being developed for space travel and exploration. We must gain a perspective of the environmental health problems of people confined in sealed capsules for long time periods. We must start thinking about the control of exotic and as yet undiscovered disease agents from other planets, the control of microbial dissemination from our world to others, the logistics of interplanetary quarantine. In addition to all of this, we must continue to provide the inhabitants of this world with a safe, clean and healthy environment.

SANITATION AS A WAY OF LIFE

Mankind's progress from the level of barbaric brute to the state of ethical civilization has been slow and arduous. One of the hallmarks in this evolution has been his increased awareness of and dependence on the benefits of a sanitary environment. It might easily be said, though not as easily documented, that the sanitary level of the environment can serve as a yardstick of the level of a civilization. In our mind we constantly associate the sight of "filth" with the description "backward", the image of "privy" with the adjective "primitive". Indeed, interspersed generously among the moral and spiritual laws of the Bible, are found principles and directives about environmental sanitation, which, if followed, would improve the level of public health in many lands even today. Thus regulations about food sanitation were intimately associated with rules about moral conduct even in antiquity. Laws about waste disposal and personal hygiene were closely allied with laws about social justice and humanitarianism.

In our land, and in this age, the concepts of environmental sanitation have become deeply woven into the fabric of our way of life. Americans expect and demand pure food, clean and safe milk and sanitary waste disposal. It has become part of our heritage, and it is no longer revolutionary to presume that every American family is entitled to live in decent housing, to eat in a restaurant without danger of food poisoning, to drink unpolluted water and to breath clean air. We expect management to provide a safe and healthy factory environment, government to provide safe and healthy schools, entrepreneurs to provide safe and healthy recreational facilities. The American taxpayer considers it his just due to live in communities free from smog, mosquitoes and unpleasant odors. He expects his government to defend him from radiologic hazards, his hospitals to defend him from germs, his landlord to defend him from rodents. The up-to-date housewife today must become an expert in sanitary housekeeping. The quantity and variety of soap, cleaners, detergents, germicides, bleaches, water conditioners, laundromats, dishwashers, rug shampoos, and mouthwashes offered for sale is overwhelming. The fraction of our budget, and the amount of space in the supermarket devoted to environmental sanitation increases yearly. In brief, the various facets of environmental health

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are today considered the universal property of free man, and rightfully so. Professional workers in public health and professional sanitarians have been indoctrinating us with these ideas for many years. It is fundamental but true to consider sanitation as an integral aspect of our way of life.

THE DANGER OF COMPLACENCY

Under the circumstances described above, it is tempting for those engaged in professional sanitation work to relax and contemplate a job well done. We can take at least some of the credit for advancing civilization to this level. Ours is a noble and gratifying occupation which, if not exceptionally well rewarded financially, at least is recompensed by an atmosphere of public service and a feeling of historical significance. We feel that the maintenance of the status-quo, or even the gradual pushing forward of the classic concepts of environmental sanitation will justify our jobs, satisfy our collective conscience and consolidate our professional image. Granted that some among us, in editorials and speeches and private conversation, display an uneasy awareness that the world is rushing headlong past us. Granted that the occasional radical in our midst preaches the need for re-appraisal of our traditional mission. Most of us continue to do our daily jobs with tools and concepts that have been hallowed by tradition. For most of us, the future is next weekend and the distant future next summer's vacation. We have carved out a neat little niche in the public health structure and guard our bailiwick with valor. No outsider can do our job, and in return, we will not venture out of our little universe. And all too often we follow the paths of least resistance.

Just as a stream which meanders in its bed diverts its flow around the rocks and erodes through the softer clays instead, so have we been guilty of a meandering and uneven application of the limited knowledge and power in our grasp. The Dairy Industry has acceded to our regulations. Therefore, we regulate them into absurdity. Other industries show a little resistance. Therefore, we turn our heads and pretend that they aren't there. Our sanitary codes are a jigsaw of inconsistencies, in which the standards for milk products are spelled out to the last microbe per milliliter, while the hamburger stand next door is subject to a cursory examination, and the hospital kitchen is completely out of bounds.

But these arguments are not new, and certainly not a challenge of the space age. They are merely introduced as a preamble to the topic at hand, in order to permit us to retain our perspectives during a discussion of rockets and Martian microbes. It is essential that we remember the job left to do here on earth, in our own little communities and in our own cities before we take off into the blue and beyond the blue.

THE CHALLENGE OF A RAPIDLY CHANGING TECHNOLOGY

In many respects, the challenge of the space age is something that should have been considered yesterday instead of today. In our rapidly changing world, in the age of technological advance, the person or profession which seeks solutions after the problem arises is already hopelessly behind. It is admittedly difficult to anticipate problems of the future and devise answers for questions not yet asked, but this is the paradox of our age. The primary single qualification for a space age sanitarian is imagination. Our lack of this commodity has already engendered some serious problems with which we are living today.

We are faced at this very moment with the sanitation problems resulting from the phenomenal advances in transportation and communication of the past decade. In some respects, these problems are precursors to those that will confront us during the advent of space travel, and we should examine them with deliberation. We all know how the world has shrunk. We are all aware that a man can board a jet in Karachi or Lhasa or Manila or Melbourne this morning and can attend our convention tomorrow morning. Yet this seemingly simple statement of a seemingly commonplace event is fraught with public health implication. No longer can we conveniently point to certain remote areas of our planet and say with assurance that the plague is endemic there, that cholera is ravaging there, that smallpox is breaking out there, and that we have nothing to worry about in Philadelphia because our sanitation laws are adequate to protect us.

Supersonic carriers and communication satellites have truly made our planet one community. The typhoid carrier in a Tokyo restaurant exerts as close an influence on the health of a San Francisco resident today, as did his grandfather in Oakland across the bay 50 years ago. The yellow fever harboring mosquito which bites an American sailor in Panama City today, is as close to Minneapolis as the International Airport where the sailor's jet plane lands. The staphylococcus toxin being elaborated on a cream puff in Vienna is less than 10 hours away from New York.

Yet our surveillance schedules and our regulatory laws and agencies are still geared to an age when horses pulled the wagons and county and state lines were significant boundaries. The first challenge of the space age, therefore, is the realization that our world is a tiny one. That continents are closer

today than countries were yesterday. That public health is not parochial and local, but world-wide. That the sanitarian must expand his dimensions and comprehend the big picture.

A second challenge of our technological age is posed by the imperative demand for ultraclean environments in medicine and industry. Every sanitarian thinks he knows what clean is. Consider then this situation. A surgeon wants to transplant a kidney from one patient to another. In order to ensure the success of this graft, he must neutralize in the recipient those antibody-producing mechanisms which would reject the "foreign protein". He accomplishes this by massive radiation treatment. Unfortunately, these antibody-producing mechanisms which are destroyed are the major defense mechanisms of the host against bacterial infections. Since the host now has absolutely no built-in defense, even one microorganism is a potential killer. The doctor then asks for something simple: "Provide this patient with an environment that is completely sterile for the length of time necessary for the graft to take." Can we grasp the significance of this demand? A sterile environment? No bacteria in the air to be breathed? No bacteria in the food? The water? The milk? No bacteria on the linens and utensils? Is it possible? This is a question that sanitary scientists must be equipped to answer. Is our knowledge and training sufficient to provide such an environment? Do we know enough about environmental sanitation to tell the engineers what to do?

One could elaborate at length about the environmental sanitation problems that challenge us in an era of rapid technological advance. One could discuss the problems of housing inspection in a country which is growing ever more urban. One could discuss the problems of insect and rodent control in cities that are built almost overnight. One could discuss the water and sewage problems of suburbia. One could discuss the influence of nuclear experiments in the Arctic on the iodine 131 level of Wisconsin milk.

And from these discussions would arise one overwhelming query. What are we, as sanitarians, as the profession charged with maintenance of environmental sanitation doing to improve our knowledge and our background and our abilities and our concepts to resolve these challenges?

And all of this, even before we enter the space age itself?

THE NEW DIMENSIONS OF SANITATION IN THE SPACE AGE

Once we enter the space age, we must be able to meet all of the aforementioned challenges, and then to expand our parameters once more. The dimensions of the new age, of the next ten and twenty years are inspiring indeed. The only limits to the problems that will be posed to environmental sanitation specialists are limits imposed by our imagination. Time will not permit more than a brief cataloging of some of these problems. And lest it be thought that these topics are "Buck Rogers" pipedreams, one can be assured that the subjects of this discussion are presently being investigated in many sober and conservative laboratories in this country, and that the pressure for data is often overwhelming.

One of the new dimensions of sanitation is introduced by the phenomenal development in recent years of new metals and materials and fuels.

Most of us know how to pasteurize a tank of milk or sterilize a can of corn. Most can disinfect a glass pipeline or stainless steel vat. Most can outline a fair set of rules to keep spoilage bacteria out of cottage cheese. Now let us use this knowledge to sterilize a five-story Titan rocket, and keep it sterile while it passes through the atmosphere into space. Let us use this knowledge to sterilize a vacuum tube, an electronic computer, a transistor. Can we apply our cottage cheese background to keep spoilage organisms out of jet fuel tanks? The first cousins of the bacteria and fungi which form slime on cheese grow in kerosene fuels and form slimes in fuel tanks. The first cousins of the bacteria which cause ropy milk grow in wing tanks of supersonic aircraft and form sludges which foul carburetors. If we can solve the problem of rusty milk cans, can we control corrosion of fuel lines in rockets? How does one disinfect germanium, a laser, a hundred different plastics, a piece of hardware containing 535 different electronic components?

Another new dimension of sanitation is introduced by new concepts of the human environment. Imagine, if you will, sealing a group of people into a rather confined chamber and isolating them from our world for several weeks. Think of the water and food supply problems in a capsule which has to find space and weight for every gram. Solve the problem of waste disposal in this isolated environment. Imagine the odor problem when the entire ventilation system is self-contained. What happens to perspiration and urine and the stools? What if one of them is incubating the flu virus when placed in the capsule? What about personal hygiene in a sealed capsule without a shower? Environmental sanitation certainly must consider these problems within its scope.

A third dimension of space age sanitation deals with the hypothetical but practical consideration of exotic and as yet undiscovered microbial parasites from other worlds. This concept might sound far-

fetched, but can be ignored only with a certain statistical amount of risk. We should admit at the outset that we do not know if life exists on other planets in our solar system, or in other systems in our galaxy, or indeed elsewhere in the universe. That is, we have no *proof* for or against. Nevertheless, a certain amount of responsible theoretical research, based on what is astronomically deducible about atmospheric, geologic and climatologic conditions on Mars and to a lesser extent Venus, has led many astrobiologists to concede that life forms on these planets are entirely feasible. Some very good laboratory research under simulated Martian environments has shown that terrestrial microorganisms can survive and even multiply under those severe conditions.

The astrobiological world is still debating the merits of reported discoveries of microbial entities in carbon containing meteorite fragments. Our own group at General Mills is conducting balloon-borne explorations of the stratosphere to determine the possible presence of microorganisms in this strange environment.

We live in exciting times, during which tomorrow shows that yesterday's dreams are realities. A comprehensive consideration of space age sanitation must certainly not exclude the possibility of extraterrestrial microbes.

Along similar lines, a fourth dimension of space age sanitation is introduced: The philosophy and techniques associated with controlling the dissemination of microbial contaminants between the planets during our first fumbling probes and later explorations. Most of us are aware of the epidemiological consequences resulting from the introduction of a new etiologic agent into a previously unexposed population. The bubonic plague in Europe, measles in Polynesia, the Dutch Elm disease in America — are all tragic historical examples. We must anticipate similar phenomena on a cosmic scale if life forms are actually present on other planets. Appeals have been made by astrobiologists to sterilize our space probes to avoid contaminating the moon. Serious attempts certainly will be made in the future to eliminate or minimize the possibility of transporting terrestrial microbes to other planets. Similarly, thought must be given to the problem of returning extraterrestrial organisms to our own earth. We submit that aspects of these problems are not dissimilar to the enforcement of quarantine regulations today. The logistics of interplanetary quarantine, however, are infinitely more complex. We do not now if organisms exist on Mars; how then do we know what the incubation period, or symptoms, or communicability is of a Martian disease? How can environmental sanitation contribute to a solution of these riddles?

We are privileged to live in a strange and exciting and wonderful era, with new and constant challenges ever before us. The experience and training of the professional sanitarian will be needed in this age, as they were in the past, to protect the public health on this earth, and to meet the challenges of the new dimensions revealed during man's quest beyond this earth.

POST-SCRIPT—THE FOREST AND THE TREES

Just as a review of the accomplishments of environmental sanitation encourages one to relax and contemplate a job well done, so does a glimpse into the future stimulate one to drop everything and plunge into the heady ferment of space-age sanitation. It might, therefore, be necessary at this time to return to earth and regain some perspective. While we must keep our eyes on the forest in the distance, it is still necessary to recognize the trees and the pitfalls of the woods in which we are now.

The challenge of the new era is real and significant. But just as real is the challenge of environmental sanitation today. We must be sure, during our attempts to provide astronauts with clean food and water, that the problem of foodborne intoxications and infections in restaurants and institutions is solved. Together with our efforts to provide a suitable and healthy environment in a space capsule, we must redouble our efforts to eliminate those nosocomial infections that are aggravated by unsanitary environments in our hospitals. We must spend some of the time necessary to solve waste disposal problems in a planetary rocket, on solving the problem of the suburbanite who drinks diluted sewage. We must plan for the future while improving our plan for today. This is a big order to fill. It will require a renewed dedication. It will require expanded training, imaginative programming, a more sophisticated education. It will require people who are dissatisfied with the status quo, and who cherish challenging the unknown. It is worth the effort.

PUBLIC RELATIONS IN PRACTICE

NORMAN MYRICK

Milk Industry Foundation, Washington, D. C.

On July 5, 1962, a full-page advertisement featuring a bottle of milk surmounted with a skull and crossbones of a death's head appeared on the back page of the New York Times. On August 23 Grade A Producers in Minnesota went on dry feed as a precautionary measure against radioactive Iodine 131. In June a series of three articles by Rachel Carson entitled *The Silent Spring,* which had as their theme the presence of poison residues in the nation's food supply, appeared in the New Yorker. The articles were later published as a book and appear again this month as the September selection of the Book-of-the-Month Club. During August New Jersey papers carried screaming headlines which declared that milk pricing practices in the Garden State were taking an unnecessary million dollars annually from consumers. On August 27 the Tampa, Florida, Tribune printed a long editorial on the milk business entitled *The Consumer Doesn't Count.*

The list could be expanded at length: Dr. Sacket, President of the Association of General Medical Practitioners, denouncing milk as a food beyond the first year of life; a nationwide television program billed as *The Fat American;* newspaper articles using "Americans are drinking less milk" as a lead or referring to the "distressed dairy industry." The catalogue of horrors is seemingly endless so that the inevitable annual statement by some athletic coach at some institution who solemnly assures a waiting world that athletes who drink milk can't spit appears as a welcome comic interlude. Indeed, as a distinguished public relations man in the dairy industry observed recently, it is getting so that whiskey is the only safe thing left to drink.

On the basis of these published reports, the milk business emerges as an industry maintained largely by a moronic price support program administered by empire building bureaucrats and perpetuated by vote seeking politicians; an industry that distributes a product loaded with radioactive material that will cause cancer, cholesterol that will cause heart attacks, fat which will make one fat and a mysterious ingredient that makes it impossible for All-American halfbacks to clear their throats. Furthermore, the stuff is grievously overpriced and, therefore, people are staying away from the dairy case in droves.

Bear in mind that the stories have been told and told again by all of the high-powered media of modern communications from New York Times to the Goose Corners Bugle, from Time Magazine to the Police Gazette, from the National Broadcasting Company to a party line in Nebraska.

EFFECT OF UNFAVORABLE PUBLICITY

In 1958 a study of the food preferences of men in the armed forces found that of 438 food preparations served to the nation's fighting men, the first choice, the best liked, the number one food preference of the men in uniform was fresh fluid milk. Since that time four different surveys, one made by the International Paper Company, one made by the American Dairy Association, one made by the Milk Industry Foundation and one made by the Ladies Home Journal have shown some awareness of the criticisms that have been directed at milk and dairy products, but none of the studies showed any clear and definite reaction on the part of consumers. Most of the studies showed no reaction at all.

Here is what the Ladies Home Journal had to say in a report dated May 1: "Half of the women we interviewed told us they were using more whole milk than formerly for two primary reasons: the increase in family size and growing children. The rest of the women were equally divided between using less milk and just about the same as formerly. The main reason the one group was using less was that the family had grown smaller in the last two or three years; several other women mentioned using powdered milk in place of whole milk." The latter group gave as a reason the fact that powdered milk was ". . . less expensive and the kids have learned to like it better than whole milk."

These findings correspond exactly with the attitudes revealed in the Milk Industry Foundation survey conducted in late April and early May this year. The Foundation was primarily interested in finding out the effect that the vast amount of sensational publicity on fallout had had on consumers. Not wishing to prejudice the respondents, these two questions were asked first:

1. Would you estimate that you are using milk more or less often than you did five years ago?

2. Do you think that you will increase your use of dairy products during the coming spring and early summer, decrease your use or will there be no change?

[1]Presented as part of a Symposium on Public Relations at the 49th Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., at Philadelphia, Pennsylvania, October 24-27, 1962.

Of the 463 housewives interviewed in eight cities north, south, east and west, 218 said they were using more milk than they did five years ago, 197 said they were using about the same, 46 said they were using less and two did not know how their present use compared with five years ago. Of the 46 who said they were using less milk, 28 said the reason they were using less was because the children had grown up and the family was smaller. Sixteen spoke vaguely of health.

Even more startling was the response to the second question. Remember, now, for three months the story of the "heavy fallout" in the spring had been blazoned across the front pages of the nation's newspapers. Consumer Reports had hammered at the subject in issue after issue. The Women's Strike For Peace had used the theme as a battle cry. Yet, of 480 responses to the question of anticipated changes, 115 said they would increase consumption, 337 said they would not change their pattern, one had no opinion and 27 said they would decrease their use of milk. And the reason? Of the 27 who would decrease consumption, 25 said they preferred other drinks in the summer, one said because they would be on vacation and one didn't really know why.

In subsequent questions interviewers raised the question of fallout. When the subject was raised there were some people who expressed concern; however, the striking characteristic was the fact that until the subject was introduced into the questioning not one single individual mentioned it as having any effect whatsoever on their use of milk. Note the response to the question on use of milk during the anticipated period of "heavy fallout." From 480 responses, 452 said they would either increase or use the same quantities of milk as before. Only 27 said they would change their pattern of consumption and the reason for that change offered by 25 of the 27 was that they preferred other drinks in the summer time. Nobody made even the slightest reference to fallout.

CONSUMER REACTION UNPREDICTABLE

In terms of the practical application of public relations theory, the apparent lack of reaction among consumers to the tremendous amount of publicity detrimental to fluid milk and dairy products is a baffling and somewhat disconcerting result.

A rather standard description of public relations says: "Public relations involves communicating information to many different groups factually and accurately and expressed so that it can be easily understood and accepted by people with a limited knowledge of the field."

Certainly the amount of space and time devoted to the shortcomings of milk and the dairy industry over the last few years have been of a sufficient volume and of sufficient intensity to satisfy the most exacting specifications on the matter of coverage. Certainly the ideas have been expressed in the simplest of terms—radioactive materials in milk will produce cancer—cholesterol found in animal fats will produce heart disease—the price of milk is too high—Americans are drinking less milk. These are straight-forward statements that can be easily understood by people with a limited knowledge of the field. By both of these measures—extent of communication and simplicity of the ideas being communicated—nobody in his or her right mind would drink milk. Yet this did not happen. Instead the men in the armed services declared milk to be their number one food preference, homemakers say they are either increasing their use of milk or are not changing the amount used, except for those whose families have grown up.

The answer can be but one or both of two reasons. Either the vast communications effort failed to communicate or, if it was communicated, the message was not accepted. Probably it was a combination of both, although the latter may have been more important than the former.

The description of public relations activity cited above uses the term "many different groups of people." This is a well-recognized principle in public relations. It is often simplified in the single word "publics" meaning that the general word "public" refers to a theoretical body that is in fact made up of many smaller "publics." The public is everybody possessed of a wide variety of conflicting and complementary ideas. The "publics" that make up the "public" on the other hand, are distinguished by one or more dominant ideas that set them apart from other groups. Thus, in the dairy industry there are consumers, producers, labor unions, management, regulatory groups, all a part of the industry but each with a different interest, a different relationship to the whole. Each group is a "public."

It is an extraordinarily difficult task to communicate with these various groups in terms that can be understood in the first place and accepted in the second. The tendency is to couch a communication in language that the writer finds meaningful rather than in language that the person to whom the communication is addressed will find meaningful. The most common result of a studied attempt to be meaningful for people who have but a limited knowledge of the field is to "write down." This is somewhat worse than no communication at all because it tends to give an impression of patronizing which builds up resistance rather than understanding.

The failure of consumers to react to the sensational treatment of dairy foods by the popular media may possibly have some relationship to the failure of the communicator to speak in a language geared to a particular "public." Certainly such new terms as micromicrocuries, polyunsaturated fats, and carcinogens are sufficiently formidable in their own right as to constitute matter not easily digested by less erudite folk. Examples of this problem are myriad. One of the more illustrative of these occurred in Providence, Rhode Island, several years ago. The newspaper had been conducting an investigation of the quality of milk in that city. In discussions of the subject the paper referred to coliform bacteria, always adding in parenthesis "a bacteria usually found in the intestinal tract." One lady called her milk distributor on the telephone and said, "Now I understand why my baby always goes to sleep after drinking your milk. You put chloroform in the stuff."

However, it does not appear that failure to communicate the potentially dangerous nature of radioactivity nor the possible relationship between coronary diseases and cholesterol was as important as the refusal of consumers to accept the allegations as reported. Perhaps the statement should be qualified by saying that it is not clear whether there was a refusal to accept or because people have been subject to such a torrent of unmitigated sensation for so long that they have built up a protective shell or a protective porosity. Since 1929 through the depression, through the rise of Hitler's Germany, through the blackness of the World War, through Korea, through the cold war, through the arms race, the news has been an almost uninterrupted train of disaster. Radioactivity and polyunsaturated fats may be just two more hazards in a life increasingly characterized by hazards so tremendous and so terrible that the mind hears without heeding or reads without absorbing the implications.

CONSUMER CONFIDENCE IN MILK

Perhaps there is a third element in the problem, a positive element which is of more significance than either the failure to communicate or the protective shell. This element is the esteem in which milk has been held for so many years. Call it the "image" if you will, although the term suffers from overuse. People like milk as the food preference study in the armed services demonstrates. People value it for its nutritional properties as study after study has shown. This appreciation of both the taste and nutritional properties of milk and dairy foods constitutes a bulwark that is enormously difficult to breach.

Furthermore, the adverse criticisms of milk and dairy products are not in accordance with every-day experience. Radioactive fallout is not apparent to any of the senses. Polyunsaturated fats as opposed to saturated fats can be distinguished such as the physical difference between butter and oleomargerine; but in terms of immediate and noticeable effects on personal health, there is no readily apparent difference. In the simplest form it is a matter of seeing and believing.

Finally, there is the matter of confidence. Such subjects as cholesterol, iodine 131 and strontium 90 are highly technical. The average consumer does not feel competent to make a judgement on such complex issues. However, consumers know that there are public authorities and private groups serving the public who are competent to make such judgments. Consumers place the greatest reliance, therefore, on the advice and actions of the public health authorities and the dairy industry. In practical terms the attitude is expressed in the statement "If it wasn't safe *they* wouldn't allow it to be sold."

The "*they*" is the sanitarian, the public health official, the milk processor. It is difficult to conceive of a more eloquent demonstration of public appreciation for the work of public health agencies and milk distributors than this. In the face of an intense and ceaseless barrage of the most sensational kind of criticism, public confidence in the integrity and responsibility of public health agencies and the dairy industry has remained unshaken.

There are two places where characteristics of some dairy products, generally considered to be undesirable, can be seen. In those two places a clear-cut and unfavorable reaction is readily observable. It is generally accepted, because it can be seen rather easily, that the consumption of substantial amounts of fat will make a person fat. Ergo, milk fat is fattening. With both male and female members of the population concerned with physique, there has been a decline in both butter and cream consumption as well as a gradual decline in the general milk fat content of whole milk. Ice cream remains a distinguished exception. Despite its undeniable fat content, the taste pleasure afforded by that inimitable delicacy, more than offsets whatever contributions it may make to unused energy.

A second obvious and undesirable aspect of dairy products, confined almost exclusively to milk fat, is price. With milk fat selling at more than three times the price of vegetable fat the price differential is something that can be seen and understood. A respondent in the Ladies Home Journal survey summed up the proposition when she said, "You mean real butter? Why I don't buy real butter at all because of the cost. It's more expensive and we just

use margerine." It should be emphasized that this reason for the use of vegetable fats rather than milk fat was given in May of 1962. After years of exposure to the endless discussion of a relationship between animal fat and heart disease, price was the justification for using margerine instead of butter.

If consumers did not react very markedly to the castigations of the dairy industry, there was one public in industry's complex that did react. That public was the management group. It is a logical and understandable phenomenon. No one is likely to sit still when the product of careful and strenuous effort is publicly criticized, and unjustly at that. Any organization producing merchandise for sale is naturally and properly sensitive where its virtues are involved. But when that virture is subjected to such a lambasting as dairy products have received it would be remarkable indeed if the reaction of the industry had been any less marked. As a facet of practical public relations it should be noted in passing that this management reaction posed one of the more acute problems to public relations men in the milk business. A major task has been to persuade the industry to keep its collective shirt on, to develop its public relations program on the basis of reality rather than on the basis of its own emotional reaction.

LESSONS—IN RETROSPECT

The principal public relations lessons that can be gleaned from the travail of the dairy industry during the last decade are these:

1. Volume of communication should not be confused with acceptance of the information communicated.
2. It is extremely difficult to change the habits and attitudes of large numbers of people.
3. The "general public" is in reality a great many smaller "publics" with extensive cross relationships.
4. People are conservative. What can be seen will be believed far more readily than what cannot be seen.
5. People most closely concerned with an enterprise are likely to be far more sensitive to the fortunes of that enterprise than are people who are not closely concerned with it.
6. The major factor adversely affecting attitudes toward dairy products is price. The solution to this problem lies with performance not with words.
7. Although customer reaction to the heavy punishment dairy products have taken is negligible, the situation is neither desirable nor healthy. Corrective steps involve the collection of the true facts and the dissemination of those facts in a manner commensurate with reality.

FEATURE

SOME REFLECTIONS OF A PAST-PRESIDENT OF I A M F S

W. V. HICKEY

After six years of service on the Executive Board of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., it may be well to reflect on these years and make some predictions for the future.

The opportunity afforded me to serve as an officer of IAMFS has been an opportunity for growth. This experience, along with others, has convinced me that we still have a potential for personal growth and development during and past our middle years. It is a fallacy to think that there need *ever* be an age when we can no longer learn, or that we should no longer make an effort to improve our knowledge or skills.

At the time of my election, I became associated with six other men—five of them elected officers and one of them our Executive Secretary, "Red" Thomasson. Over the intervening years this group has changed through the addition of one man and the retirement of another each year. That virtually indestructible man, "Red" Thomasson, stays on and believe me, this is a real tribute to him—he is most patient and long suffering. The abuse that he has taken from me alone, with patience, understanding and forgiveness is beyond comprehension. For this, "Red", I offer my sincere apologies, my regrets, and my thanks to you for being so understanding.

As for my fellow officers, both past and present, I extend my thanks and appreciation for the opportunity to work and associate with them. Make no mistake, not all of our relationships have been entirely pleasant. At the moment I cannot think of an officer with whom there has not, on one occasion or another, been disagreement—sometimes violent disagreement. This has in no way lessened my respect or my admiration for the dedication each has shown to furthering the cause of public health in general, and the IAMFS in particular.

Regarding controversy, Dr. George James, New York City's Acting Commissioner of Health, said recently: "Argument and c o n t r o v e r s y are part of the advance of medicine and public health. To be disturbed by it is to abdicate leadership, for it is in controversy that human values c h a n g e most. Where there is a subject that appears controversial,

it should be treated as important and deserving of full discussion. He who takes a firm neutral stand on a controversial question contributes the least to its ultimate solution." Those of us on the Executive Board have had plenty of argument and controversy, and out of it has come a number of solutions.

Enough of the past! Now a prediction for the future. IAMFS has great things ahead. It can go only up! I predict good things. How can you miss? I don't pretend to be any more farsighted than many others in our profession, so I can't claim that only I am foreseeing these things, but below are some of the advances I look for in the near future. Registration of sanitarians will be accepted in more and more states, and progress will be made toward national registration or at least a general reciprocity of state registrations. The various national groups representing our profession will draw closer together and work in greater harmony even if there may be no actual consolidation of membership and activities. There will be a general upgrading of requirements for persons entering public service as sanitarians, and salary scales likewise will tend upwards. Members of our profession will be involved more and more in planning ever-widening programs of environmental health, and there will be an increasing demand from industry for trained sanitarians to oversee and control their plant environment and manufacturing processes.

These and many other improvements are in the foreseeable future. How soon? The acceleration, deceleration, or temporary side-tracking of such events will be governed by our efforts.

IAMFS members, and other members of our profession will hasten these advances in direct proportion to the contributions they make specifically toward any of these objectives as well as in other areas of the total field of public health.

Sanitarians are both ordinary and extraordinary. Pass one on the street or highway and he looks much like the average business man or responsible citizen. My work in recent years has enabled me to meet and know sanitarians across the length and breadth of the land. To paraphrase a recent observation by Dr. Samuel Hopper, they were and are men before they were sanitarians, subject to all of the faults and follies of their fellow human beings. How then are they extraordinary? To learn this one must search beyond the exterior of these people. One must learn something of their thoughts, philosophies and ambitions.

Good sanitarians seem blessed, or perhaps cursed, with a strong sense of social consciousness. They very frequently place the health protection and safety of the community far ahead of any personal gain. You all know sanitarians employed by official agencies, for rather meager salaries, who devote time and effort far beyond the measure of monetary rewards they receive. But for these men there are other things more important than monetary gain. I say, "God bless you—may we never be without you."

This is not to say that *all* sanitarians are like this—remember they were men before they were sanitarians. And sad to confess we have within our profession sanitarians who are lazy, careless and unprofessional in their attitude. I doubt if they are here tonight; they usually are not sufficiently interested to belong to their professional society and attend its meetings.

During the past year I have been serving as Chairman of the IAMFS Recognition and Awards Committee. Again this year the Sanitarian's Award was made to a worthy recipient, Larry Gordon, and Frank Barber received the Citation Award (see November issue of the Journal). All too often we fail to pay tribute to those others who were nominated for the Association's awards. Nomination for the Sanitarian's and Citation Awards is in itself a very high tribute paid to such nominees by their professional colleagues. By nominating them, those who know them well are recognizing the qualities in them that characterize outstanding sanitarians. Having been privileged to see quite a few nominations, I cannot emphasize too strongly the belief that to be nominated for any of the Association awards is a most sincere compliment for anyone from his peers.

On your return home from this meeting, discuss with your fellow sanitarians the preparation of the material to nominate for the Sanitarian's Award for next year the most deserving sanitarian in your particular affiliate. Whether he is selected for the award is not nearly so important as the fact that you think him worthy of nomination. As to those who have been nominated for the award in the past, if your nominee was not selected as this year's recipient, why not renominate him for next year's award? Likewise, consider the men who have served the Association over the years and select from them a nominee for the Citation Award.

The Industry sponsors of the Sanitarian's Award give both time and money to this very worthy cause. The unpaid members of IAMFS Executive Board, and the Committee on Recognition and Awards, donate their time and effort to the cause. Unquestionably there are many well-qualified sanitarians who are unselfishly making valuable contributions to the advancement of environmental health and the aims and ideals of our profession who are deserving of consideration for the award. I hope that each of you as a member of your affiliate will devote thought and effort to the nomination of a worthy candidate for the 1963 award from within your own group.

News and Events

Wisconsin To Sponsor Two Sessions On January 30 For Dairy Personnel

The Annual Wisconsin Dairy Manufacturers' Conference and the Annual Wisconsin Conference of Dairy Plant Fieldmen and Laboratory Workers will be held on January 30 and 31 and February 1, 1963.

The Manufacturers' Conference will be held in Babcock Hall on Wednesday afternoon and Thursday; the Fieldmen and Laboratory Workers will meet in the Commerce Auditorium on Thursday afternoon and Friday morning.

Topics to be covered at the Manufacturers' Conference will be of general interest to the dairy industry and include:

Wednesday afternoon. Improvement of operations through cost accounting, application of product costs in distribution accounting, cost analysis, and record keeping in dairy plants for tax purposes.

Thursday morning. Mastitis control programs-their importance to the industry and how the state can help in control programs; and discussion of results of ice cream and cottage cheese surveys.

Thursday afternoon. Discussion of recent research developments related to dairy processing by members of the Wisconsin Agricultural Experiment Station. These include developments in sterile concentrated milk, vacuum treatment of cheese, improvements in ultrasonic measurement of fat and solids-not-fat of milk, utilization of whey, and rapid methods for determining solids-not-fat and protein in milk.

The program for the Fieldmen and Laboratory Worker's Conference include:

Thursday afternoon. Limitations in bacteriological counts in detecting abnormal milk, and experiences in detecting and preventing occurrence of abnormal milk.

Friday morning. Discussion of use of fresh versus composite samples for testing of fat, and discussions on handling of producer–plant relationship problems in testing of milk for fat.

Speakers for the Conference include representatives of Wisconsin Agricultural Experiment Station, Wisconsin Agricultural Extension Service, local health departments including Chicago, Wisconsin Department of Agriculture, laboratory certification agencies, Internal Revenue Service, Federal Market Milk Administration, Milk Industry Foundation, and Service Bureau Corporation.

The Wisconsin Dairy Technology Society will hold its meeting on Thursday evening in conjunction with the Conference. Russell Cook, President of Ambrosia Chocolate Company, will discuss the world's chocolate supply.

IDF SEMINAR

NUTRITIONAL VALUE OF MILK IS SUBJECT OF PUBLICATION

The International Dairy Federation (IDF) published recently a book of 242 pages entitled "The Nutritive Value of Milk and of Dairy Products," a general report with tables and figures on an International Seminar of IDF held September 1961, in Sweden.

This volume contains lectures and discussions on the following subjects: lipids in milk; proteins of milk; to what extent are milk and milk solids included in food in different countries?; fatty acid and cholesterol metabolism; disturbances in the fatty acid–cholesterol metabolism; essential fatty acid requirement; composition of food fat and its influence on the nutritive value with special regard to milk fat; protein metabolism and requirement of essential amino acids; disturbances in the protein metabolism of medical importance; amino acid make-up of the milk proteins in relation to their nutritive values; nutritive value of the non-fat, non-protein solids of milk; food as a combination of nutrients; milk in the human diet; possibilities of altering the composition of milk.

Some of the most eminent personalities of the dairy world attended the Seminar and contributed to its success: Professor Borgstrom (Sweden), Professor Halden (Austria), Professor Den Hartog (Netherlands), Professor Holman (USA), Dr. Kon (Great Britain), Dr. Auriol (France), Professor Morton (Great Britain), Professor Roine (Finland), Professor Swartling (Sweden), Professor Lembke (Germany), Dr. Ritter (Switzerland), plus many others.

The English edition of the book is available for $1.50 per copy, including mailing expenses, from the Federation's General Secretariat, 10, rue Ortelius, Brussels, Belgium.

Farm Chemicals Assure Food Supply[1]

D. E. H. FREAR, PROFESSOR OF AGRICULTURAL AND BIOLOGICAL CHEMISTRY

Agricultural chemicals, under investigation by the writer for 25 years, were a concern of this Station (Agricultural Experiment Station, University Park, Pa.) even before it was formally established. Materials of this kind may be conveniently divided into fertilizers and pesticides.

Production of wholesome food in sufficient quantities to satisfy national needs appears impossible without use of chemical fertilizers. Pesticides, likewise, are a necessity in modern agriculture; in fact, greater employment of both fertilizers and pesticides is in prospect.

Fertilizers, in general, are rather inert substances not likely to be injurious to users. Many pesticides, however, are dangerous poisons if ingested or handled carelessly. Every precaution humanly possible has been written into laws and rules governing their manufacture and application, but accidents happen occasionally, usually through errors in judgment of through ignorance.

Pesticides include (1) insecticides to control injurious insects, (2) fungicides to prevent or cure plant disease, (3) herbicides to eradicate weeds, (4) rodenticides to kill rats, mice and related animals, (5) antibiotics to cure virus and bacterial diseases, (6) regulators to make plants grow faster or slower, (7) and defoilants and desiccants to assist harvesting by causing leaves to drop off or plant tissue to dry out.

Pesticides, multifarious in numbers and uses, have become a boon to mankind. Through destruction of harmful mosquitoes, flies, lice or other carriers of harmful organisms, these chemicals protect people from epidemics of malaria, typhus, various fevers, sleeping sickness, and other dieases. They not only eradicate weeds that injure crops but destroy ragweed and other pollen-bearers and poison ivy which irritate humans. They improve livestock feeds, keep lawn grasses from dying, kill cattle ticks, and destroy "worms" that attack apples, sweet corn and other fruits and vegetables. At least 10,000 insects and uncounted plant diseases threaten American food supplies.

Inbred resistance sought

Perhaps the period of wide use of pesticides will be brief. Scientists in all of the biological fields have hopes that resistance to specific insects and diseases may be bred into crop plants and farm animals. Probably much more progress along this line has been achieved than is generally known. Hessian fly resistant wheat, blight resistant corn, and disease resistant grasses already are in common use. Irradiation and chemicals both have been successfully used to sterilize certain flies attacking crops and livestock. Since insects tend to develop a tolerance to some pesticides, sterilization as a conrtol procedure seems sure to receive a full measure of attention. Specific animal and disease organisms which attack harmful insects are in use. Selective pesticides, chemicals that destroy a single or a very few organisms, and materials less poisonous to man but effective in the control of insects or certain other organisms, are beginning to appear. Systematic chemicals, one of which prevents flies from breeding in manure, are being discovered.

Manufacturers of pesticides, in general, have resorted to precautions and warnings well beyond legal requirements. Development of a pesticide is a highly expensive procedure. Even after the merits of a chemical are known, three to five years of testing are necessary to determine correct formulations, dosages, and best conditions for use.

Precautions used

Best abilities of botanists, zoologists, plant and animal pathologists, physiologists, toxicologists, and other biological scientists are put to use in creating a useful pesticide. To recount their labors is beyond the scope of this article. In addition, when the job is done, the developer has to prove to scientists of the Federal Food and Drug Administration and the Department of Agriculture that the new pesticide is effective for the use intended and may be applied without hazard to consumers.

If the chemical is to be used on food crops, the data collected by the manufacturer is checked by Food and Drug scientists against work done in their laboratories. Any safe level of residue that may be left in or on a food product when sold is set by FDA officials. Such levels may be as low as 0.1 parts per million, or as in the case of toxicants in milk, none whatever. No products—not even pharmaceuticals—are more thoroughly tested than pesticides before being marketed.

[1]Reprinted from "Science for the Farmer," Vol. X, No. 2, Fall, 1962.

MILKING PARLOR BULLETIN PUBLISHED

"Types of Milking Parlors," a new Cornell bulletin, is offered to dairymen by the New York State College of Agriculture.

Professor R. B. Furry, agricultural engineering,

says a milking parlor is an absolute necessity in a loose housing system and has prepared the bulletin to help dairymen plan an efficient arrangement for milking cows.

Dairymen have a choice of several different plans depending on the size of herd, the number of people needed and whether the milking parlor is to be a single-level or elevated arrangement. Other factors discussed are working efficiency, construction materials, feed handling, heating, ventilation, lighting and costs.

For further information write: Bulletin E-1084, Mailing Room, Stone Hall, Cornell University, Ithaca, New York.

USPHS REPORTS GAIN FOR MILK SHIPPERS' PROGRAM

The October 1, 1962 list of "Sanitation Compliance Ratings of Interstate Milk Shippers" published by the U. S. Public Health Service contains the names and ratings of 869 shippers and their producing farms. This is a new total of participating shippers and represents more than a five-fold increase in number since the inauguration of the voluntary cooperative program in 1951.

The interstate milk shipper certification program, which has been praised by the Appropriations Committee of the House of Representatives as a program of "immense public health significance," was established to provide state and local agencies with reliable data on sources of high quality milk available to supplement local supplies.

Over 124 state-employed milk sanitation rating officers are authorized in the program to certify to the Public Health Service milk pasteurization plants and their producing farms and the ratings shown in PHS lists issued every four months.

Among advantages cited by the Service for the cooperative program are: the development of more sound and uniform milk sanitation programs in the states; greater reciprocity between the states because of acceptance of each other's inspection and laboratory results; and acceptance of uniform procedures as a basis for improved supervision and certification of interstate milk sources.

The program was originally initiated in 1951 after a National Conference on Interstate Milk Shipments convened by the Surgeon General. Similar meetings have been held periodically since then to make constructive improvements in the program and to clarify operating procedures. The next National Conference is scheduled for April 1963, Memphis, Tennessee.

Dr. Nathan E. Lazarus Passes Away At Age 72

November 19, 1962. Dr. Nathan E. Lazarus, president of Lazarus Laboratories, Inc., passed away at age 72. He had devoted his career to quality control work in the dairy industry.

Milestones of Dr. Lazarus' career are the contributions he made pioneering the use of various detergent-sanitizers and methods of quality control. His book, "Quality Control of Market Milk," first published in 1931 and revised in 1960, has been a standard text for the industry.

A graduate of the University of Connecticut and Columbia University, Dr. Lazarus introduced many procedures of long proven worth. Among his numerous accomplishments, he helped develop a test now widely used to trace tuberculosis in dairy cows; he, in the early 1900's was the first to introduce the use of chlorine as a sanitizer in New York City; in the mid 40's, he pioneered the use of quaternary ammonia detergent-sanitizers.

Dr. Lazarus was assistant quality control chief for dairy and food products for Army and Navy camps throughout the United States in 1920. In 1922, he founded Lacteal Analytical Laboratories in Buffalo where quality control work was carried on for the country's leading dairy firms.

Lazarus Laboratories, Inc., founded in 1946, became the proving grounds for the use of new type detergent-sanitizers for the dairy industry. Later, in 1951, the Laboratories became associated with West Chemical Products, Inc., at which time Dr. Lazarus began the use of "Tamed Iodine" detergent-sanitizers.

U. S. Stoneware Announces Promotion

Charles W. Kormanik, Jr. has been named manager of The U. S. Stoneware Company's Dairy and Food Products Department. His duties include the administration of marketing programs for flexible tubing and related products to the dairy, food processing and bottling industries, as well as assisting the tubing sales manager in the development of these programs.

A graduate of Akron University, Kormanik has been manager of the firm's Industrial Products Department for the past four years.

International Association of Milk and Food Sanitarians
Council of Affiliates

MINUTES OF MEETING, OCT. 24, 1962
BENJAMIN FRANKLIN HOTEL, PHILADELPHIA, PA.

Delegates and guests present:

Bob Sanders, Iowa; Richard E. Stedman, Iowa Affiliate; Frank L. Kelly, Kansas Affiliate; E. Marion Causey, South Carolina Affiliate; Sam O. Noles, Florida Affiliate; L. Wayne Brown, Wisconsin Affiliate; Curtis W. Chafee, Connecticut Affiliate; John J. Sheuring, Georgia Affiliate; Calvin B. Reeves, South Carolina; John L. Barnhart, Idaho Affiliate; Earl W. Cook, Pennsylvania Affiliate; W. R. Knutzen, Washington Affiliate; Joseph C. Olson, Minnesota; Orlow M. Osten, Minnesota Affiliate; Roy W. Stein, Oregon Affiliate; J. E. Norris, Mississippi Affiliate; R. M. Parry, Connecticut Affiliate; H. L. Thomasson, Indiana; John Simpkins, Indiana; Kenneth Johnson, Maine; Floyd M. Copenhaver, Missouri Affiliate; Shelby Johnson, Kentucky Affiliate; R. O. Brown, Indiana Affiliate; H. G. Ellsworth, Illinois Affiliate; C. M. Moss, Pennsylvania Affiliate; John R. Pattillo, Virginia Affiliate and R. P. March, New York Affiliate.

Minutes

The meeting was called to order by Council Chairman, Dr. Richard Parry, at 3:05 p.m. The minutes of the meeting of August 15, 1961, at Des Moines, Iowa were approved as mailed out.

Report of Affiliates

Twenty-one affiliates were represented at this meeting and each representative introduced himself and gave a brief report about his affiliate. He presented such information as the number of members, whether or not they all belonged to IAMFS, number of meetings per year, types of committees, affiliation with other organizations, types of special programs and projects, special problems and other general information.

Report of Journal Editor

Dr. J. C. Olson, Associate Editor, attended the council meeting and reported that the Journal this year published more scientific papers than ever before. They included topics on milk, food and environmental sanitation. These statistics will be included in the 1962 presidential address. Dr. Olson also reported that many affiliates are sending him notices of their meetings. He encourages all affiliates to send him such information including biographies and pictures of recipients of awards. High caliber papers presented at affiliate meetings which would be of interest to the Journal readers should also be sent to Dr. Olson for publication.

Brochure

Several delegates explained that the present IAMFS brochure which includes a membership application is not suitable for soliciting membership in their own particular affiliate. Mr. Thomasson suggested that two separate brochures might be desirable, one for direct, the other for affiliate membership. He would like to receive further suggestions.

Six Months of Membership?

It was asked if new IAMFS members could be accepted on a six months basis. Mr. Thomasson replied that in lieu of this, standard procedure is as follows: (1.) Those who join up to July 1st will be credited for the entire current year and receive back Journals through January. (2.) Those who join after July 1st will receive free Journals through the end of the current year and the dues will apply to the following year.

Decals

Some affiliates indicated that they would like to supply their membership with a free IAMFS decal, preferably with the word "member" at the top of the decal. Mr. Thomasson has been selling these decals for 25 cents each, but would be willing to supply an affiliate with them in quantity at cost which is approximately 11 cents. All interested affiliates should contact Mr. Thomasson directly.

Committee Membership Suggestions

Dr. Parry brought up the subject of greater affiliate participation in the suggesting of possible candidates for IAMFS committees. No doubt each state has some men who would be very well qualified to serve on one of the IAMFS committees. These names with supporting biographical material should be submitted to the president of the International to provide him with a reserve of names to use when making committee appointments or replacements. (A form on which to suggest committee candidates will be provided with these minutes to each delegate.)

Affiliate Award

Dr. Parry suggested that consideration be given to the development of an affiliate award. The purpose of this award would be to stimulate greater

activity within each affiliate and to give the affiliates greater recognition within the IAMFS. L. Wayne Brown and Orlow M. Osten have been asked to work with two members of the Executive Board to study all aspects of this proposal and report back to the Council.

Longer Council Meetings?

This year the meeting of the Council of Affiliates was scheduled on Wednesday from 3 - 5 p.m. In the evening the Council Chairman and Secretary met with the Executive Board to report on Council activities. All of the proposals which appear in these minutes were favorably received by the Board. The Council then reconvened at noon on Thursday to continue their discussion and hear a report from the Council Chairman concerning the reaction from the Board about Council proposals. It was the concensus of opinion that this type of program arrangement be continued for 1963 and that more time be provided for discussion on the first day.

Election of Officers

Professor R. P. March, Department of Dairy and Food Science, Cornell University, Ithaca, New York was elected Chairman and Mr. Sam O. Noles, Florida State Board of Health, was elected Secretary for 1963.

Badges

Mr. Thomasson is again requested to provide the delegates with a ribbon, preferably black with yellow letters which read "Council of Affiliates," for the 1963 meeting.

Suggestion for Speakers at Next Annual Meeting

This year the chairman of the Council of Affiliates will be asked to meet with the program planning committee so that the affiliates will be directly represented in the preparation of the program. Therefore, the delegates are requested to contact their association officers and members for suggestions and to submit these ideas to the Council Chairman as soon as possible.

R. P. March
Secretary

Shown here are three IAMFS Past-Presidents in attendance at the banquet of the 49th Annual Meeting in Philadelphia. Left to right are: C. A. Abele, H. S. Adams, (Mrs. Barnum), and Harold J. Barnum.

Recognition For Noted Achievement Given Dr. Hauptschein Of Pennsalt

Group leader in the Organic Research Department of the Pennsalt Chemicals Corporation, Technical Division, Dr. Murray Hauptschein, has been selected to receive the first American Chemical Society, Philadelphia Section Award for conspicious scientific achievement through research. The selection of Dr. Hauptscein for the honor was announced by Dr. James L. Jezl, chairman of the Philadelphia Section.

The ACS, Philadelphia Section Award will be presented annually to the member of the Section who has contributed most significantly to mankind's knowledge of the theory and practice of chemistry or chemical engineering, and has thereby aided public appreciation of the profession represented by the ACS.

The award was formally presented to Dr. Hauptschein at the Philadelphia Section Meeting October 18, 1962.

Dr. Hauptschein, who joined Pennsalt's Research and Development Department in 1955, is an internationally recognized authority in the field of organic fluorine chemistry. He is the author of more than 40 technical publications and of nearly 40 issued patents and an equal number of patents for which application has been made.

His undergraduate education was obtained at the City College of New York where he earned his B.S. in 1943. From 1943 to 1945 he was research chemist on the Manhattan Project, first at Columbia University and later with Carbide and Carbon Chemicals Corporation (now the Union Carbide Corp.). In 1946 he entered Duke University for postgraduate study in chemistry, holding a series of teaching and research fellowships. Upon receiving his Ph.D. in 1950, he was appointed Research Associate, and later Director of Organic Chemical Research, at the Research Institute of Temple University, a position he held until he joined Pennsalt Chemicals in 1955.

Dr. Hauptschein's honors include membership in Phi Beta Kappa, Phi Lambda Upsilon and the Society of Sigma Xi. He is a member of the American Chemical Society, the Philadelphia Organic Chemists Club, and the American Association for the Advancement of Science. He is listed in *American Men of Science, Who's Who in the East, World Who's Who in Commerce and Industry,* and the *Chemical Who's Who.*

NEWS FEATURE

Do-It-Yourself Dieters Advised By AMA On Fads

Cholesterol Believed Dangerous

Throughout the past several months much attention has been given the topics of cholesterol, heart disease, fat-free diets and numerous other specifics concerning nutrition and the daily diet. People have shown an increased interest in their food consumption with especial emphasis on milk and milk products, essentials of the diet, yet alleged to be a cause of excessive cholesterol in the blood.

For many years, doctors, nutritionists and researchers have been concerned with this aspect of the diet. Some five years ago, a book entitled 'Essentials of Nutrition," (fourth edition) was published in which this issue was approached. The authors, Sherman and Lanford, treated the topic in the following manner:

"In recent years, attention has been focused on the sterol, *cholesterol*, as the fatty material which is deposited in the arteries, liver and kidneys with the onset of hardening of the arteries. Since, as already noted, cholesterol is the principal sterol of the fats of milk, meat, and eggs, there has been in some quarters considerable anxiety lest consuption of these foods should contribute to the undesirable accumulation of cholesterol in the body and add to the risk of hardening of the arteries and attendant ills. It now appears that the body has the ability both to build up and to destroy cholesterol, and that the principal fault, when the body accumulates excess cholesterol (or when the blood level of cholesterol rises unduly), may be excessive consumption of total calories, or of total fat or both, rather than of cholesterol itself. Cholesterol metabolism and its relation to diet and to circulatory diseases are being actively investigated while this is written. . ."[1]

As is evident from the above passage, five years ago and longer, people were intently concerned about heart disease and related illnesses possibly resulting from dietary conditions. It is no wonder, however, that people are showing such a marked increase in interest. According to the National Office of Vital Statistics, 928,500 American deaths in 1961 were attributed to cardiovascular diseases. This figure represents 54.6% of all deaths.[2]

It is of interest here to relate the findings of a national survey conducted in 1957 by Opionion Research Corporation for the Milk Industry Foundation entitled "The Public Appraises the Fluid Milk Industry." From this survey, the section pertaining to peoples' attitudes about milk products causing ill health is of concern.

The replies to the question, "Why do you say that (milk with a little or average amount of cream is best for your health?)" indicated that *40% showed an avoidance of a "lot of cream" due to matters of health. Although 40% (of 69%) of the replies indicated a general attitude that too much cream is not good for one's health, *only 1% specifically mentioned that butter-fat consumption may be related to heart ailments.*[3]

With the foregoing as preliminary information about what cholesterol is and what people have felt about consumption of cholesterol-laden foods, the press release issued by the American Medical Association on October 12, 1962, should provide a better insight into the problem as a whole and specifically into the problem of individuals taking steps to correct their own "plight" (concerning excessive cholesterol consumption) without adequate knowledge or without the necessary information about a proper and nutritional diet.

LATEST FOOD FAD IS WASTED EFFORT[4]

"Scientific reports linking cholesterol and heart attacks have touched off a new food fad among do-it-yourself Americans. But dieters who believe they can cut down their blood cholesterol without medical supervision are in for a rude awakening. It can't be done. It could even be dangerous to try.

Problems of Cholesterol Control

For one, an individual cannot know how much cholesterol his blood contains until this is determined by laboratory tests. By the same token, he cannot know whether any diet changes have raised or lowered his blood cholesterol level unless it is scientifically measured.

In the second place, a person's entire food intake must be precisely regulated to lower blood cholesterol. Willy-nilly substitution of a few food items without overall control of the diet accomplishes little if anything in reducing cholesterol.

What is more important, the elimination of certain foods of proven nutritional value could be detrimental to heatlh.

Success in reducing blood cholesterol by dietary regulation so far has been achieved only in strictly

[1]Sherman and Lanford, "Essentials of Nutrition," The Macmillan Company, 1957 New York. p. 24.

[2]"*For Your Information,*" American Dairy Ass'n., Nov. 21, 1962.

[3]Opinion Research Corp., Princeton, N. J. "National Survey 1957—The Public Appraises the Fluid Milk Industry."

[4]Press release issued by AMA, October 12, 1962.

*69% of total respondents said little or average amount of cream is best.

controlled experimental groups, and use of this method remains largely experimental.

The carefully calculated diets used in medical research to lower cholesterol actually are not yet of practical importance to the general public.

There have been few investigations on the effect of different types of fat in the normal diet over a long period of time. For this reason, it is not known what type of fat, if any, may be beneficial in preventing heart disease, nor is it known that certain fats are harmful. Morever, it has not been determined whether a significant change in cholesterol levels can be obtained in the American population by dietary means.

Importance of Balanced Diet

While much remains to be learned about cholesterol and other aspects of nutrition, scientists do know that the American diet provides all the nutrients essential to health and that a varied diet is the best way of maintaining a high level of health. The virtual absence of dietary deficiency diseases in this country attests to this fact.

The American diet did not happen by accident. It resulted from much accumulated research and experience. Any changes in a diet of such proven worth must await much more study and experience.

It is for these reasons that neither the Food and Nutrition Board of the National Research Council nor the AMA Council on Foods and Nutrition has recognized the need for modification of dietary fat for the general public.

For good nutrition, the AMA council recommends a well-balanced diet chosen from these four basic food groups:

The milk group - milk, cheese, ice cream.
The meat group - beef, veal, lamb, pork, poultry, eggs and fish.
The vegetable-fruit group - fruits and vegetables rich in vitamins A and C.
The bread-cereal group - whole grain, enriched or restored.
(Butter, margarine, fats and oils also are needed.)

Even those on weight-reduction regimens need food from all these groups.

Research Needs

Although some day science may come up with a diet that can prevent heart disease, such a development appears to be well into the future.

It probably would take a generation to prove whether any diet can reduce deaths due to heart or blood vessel disease.

To test such a theory adequately requires a large-scale long-term study, Surgeon General Luther L. Terry said recently. Since scientists do not know whether such a mass study of diet modifications could be carried out, he said, the essential first step is to find out. The surgeon general announced that five medical centers would begin a joint effort this year to seek the answer. This preliminary study alone is expected to take two years.

In the meantime, advancing knowledge may reveal other factors of possibly more importance than cholesterol in heart disease. For example, the effect of various kinds and amounts of carbohydrates, such as sugars and starches, is being investigated, and there is some evidence they may be factors in this disease process.

At the same time, researchers are seeking other ways to lower cholesterol. Some experts believe drugs will eventually prove to be the preferred method.

It should also be remembered that an elevated blood cholesterol level is only one of the factors implicated in heart disease. Other important factors are heredity, high blood pressure, stress and smoking.

A Word of Caution

The anti-fat, anti-cholesterol fad is not just foolish and futile, however. It also carries some risk.

When certain foods are dropped from the diet, they must be replaced by foods containing the same nutrients, or the lost nutrients must be made up with additional foods, to achieve adequate nourishment. This requires, among other things, a precise knowledge of the nutritional content of specific quantities of a whole range of food products. And this is where the danger arises. Without this knowledge, the average person is unable to replace the nutrients he loses when he decides to stop eating certain foods and thus runs the risk of shorting his body of some essential nutrients.

The current concern about diet reflects a healthy interest on the part of the public. This interest should be directed away from hopeless pursuits to a worthwhile goal that can be attained by most individuals—maintaining normal weight. Overweight plays the villain in many diseases, and overweight can be avoided by not eating more calories than the body needs."

PENN STATE OFFERS FALLOUT COURSE

To teach shielding against nuclear radiation, Penn State University offers the course "Fallout Protection for Family, Food and Farm."

All kinds of nuclear explosions are discussed. Biological damage to humans, animals and plants are explained and instructions given.

Write to Correspondence Courses, 202 Agricultural Education Building, University Park, Pennsylvania.

O. T. LAW, PUBLIC HEALTH VETERAN, PASSES AWAY

December 2, 1962. At age 78, Otto T. Law, retired Indiana State Board of Health Sanitarian, died in St. Francis Hospital, Indianapolis. Mr. Law, who began his public health career in 1919 with the State Board of Health during its formative years, was retired in 1952.

He served, at the time of his retirement, as a sanitarian in the Dairy Division. Mr. Law's first contact with public health work occurred when he drove a truck carrying the first public health traveling motion picture on tuberculosis to be used for educational purposes in the United States.

A great deal of credit must be given, also, to Mr. Law for his work in helping to obtain Grade "A" milk for many Indiana cities.

The International Association of Milk and Food Sanitarians wishes to take this opportunity to pay tribute and thanks to a great sanitarian and a fine gentleman. Mr. Law was a long-time member of the International joining in October of 1944.

A 60-year resident of Indianapolis, he is survived by his wife, Mrs. Rose Law, a son, a daughter, step-brother, and several grandchildren and great-grandchildren.

Danish Scientist To Study On PHS Grant At Cornell

Professor Gotfred Haugaard, Danish-born scientist and co-discoverer of a unique light-scattering technique for determining fat in milk will attempt to use his system for analyzing blood at the New York State College of Agriculture, Cornell University.

Haugaard, who has just arrived at Cornell, has been granted $4370 by the Public Health Service to conduct this and related research.

In addition, he will continue his studies of milk, working with the light-scattering system he devised with J. D. Pettinati at the National Dairy Research Laboratory, Chicago. Haugaard said the technique, known as photometric milk fat determination, has caught the interest of medical and health authorities who want to see if it can be used on blood in much the same way it is used on milk. The technique consists basically of sending a beam of light into whole milk in such a way as to reveal fat content.

"Now, it seems we're going in a biochemical or medical direction," he said, "and health authorities are interested in my testing the ability of the system to analyze blood serum."

Haugaard was at the Carlsberg Laboratory, Copenhagen, for 17 years before coming to this country as a Rockefeller student in 1939. He followed this with three years of research at Harvard University, then continued research in science and industrial establishments. After his retirement in 1959, he returned to Denmark for a brief period as a Fulbright lecturer at the Agricultural School.

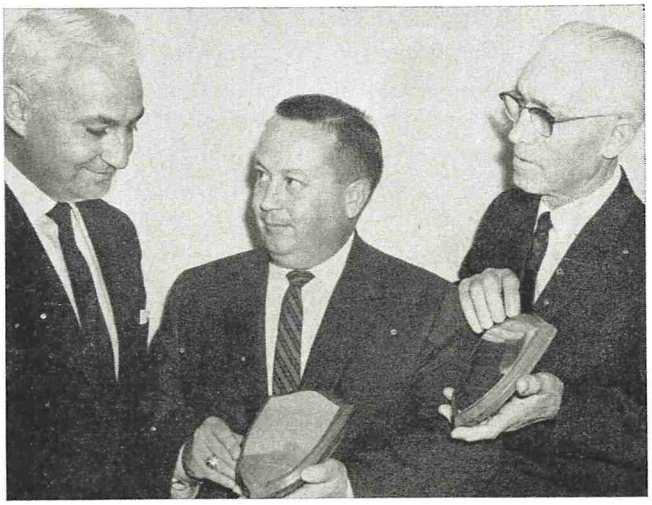
Hoover and Thuma Receive Kansas Association Awards

At the recently held meeting of the Kansas Public Health Sanitarians Association, two men were recognized by the Association for outstanding work and worth in the field of public health.

Clarence Thuma and Sam Hoover are the recipients of the Association's highest awards.

Thuma, sanitarian with the Food and Drug Division, State Board of Health, received the Annual Association Award for Meritorous Service in the Field of Public Health.

The special award for outstanding Public Health work in Kansas was presented to Hoover, formerly chief sanitarian with the Division of Local Health Services. He has since assumed duties with the United States Public Health Service, Atlanta, Georgia.



Frank Rowley (left), president of the Kansas Public Health Sanitarians Association, congratulates Sam Hoover (center) and Clarence Thuma upon receiving Association awards.

COMING EVENTS

January 13-15—Louisiana Dairy Products Ass'n., Inc. Annual Convention, Royal Orleans Hotel, New Orleans, La. Write: George F. White, P. O. Box 87, Homer, La.

January 14-16—Alabama Dairy Products Ass'n., Inc. Annual Convention, Grand Hotel, Point Clear, Ala. Write: Curtis H. Springer, 1207-8 First National Bank Bldg., Montgomery, Ala.

January 16-18—North Carolina Dairy Products Ass'n. Inc., Annual Convention, The Carolina, Pinehurst, N. C. Write: John E. Johnson, P. O. Box 10506, Raleigh, N. C.

January 20-22—Ohio Dairy Products Ass'n. Inc., State Meeeting, Netherland-Plaza, Cincinnati, Ohio. Write E. A. Graber, 1429 King Ave., Columbus 12, Ohio.

January 21-22—Virginia Dairy Products Ass'n., Inc. Annual Convention, Hotel John Marshall, Richmond, Va. Write: C. L. Fleshman, P. O. Box 918, Lynchburg, Va.

January 21-February 1—Short Course, **Cottage Cheese and Cultures,** Michigan State University. Write: Short Course Dept., Michigan State University, East Lansing, Mich.

January 21-30—University of Maryland, **Ice Cream Short Course,** Department of Dairy Science, University of Maryland, College Park Maryland. Write: W. S. Arbuckle, Dairy Manufacturing, University of Maryland, College Park, Md.

January 21-23—Protein Conference, New Orleans, La. Write: Dr. C. H. Fisher, Southern Regional Research Laboratory, U. S. Dept. of Agriculture, P. O. Box 19687, New Orleans 19, La.

January 27-30—National Dairy Council, 48th Annual Meeting, Hotel Utah, Salt Lake City, Utah. Write: Milton Hult, Pres., 111 N. Canal St., Chicago, Ill.

January 31—University of Maryland, Ice Cream Conference, Student Union Bldg., University of Maryland, College Park, Md. Write: W. S. Arbuckle, Dairy Manufacturing, University of Maryland, College Park, Md.

February 1-2—American Society for Quality Control, two day course "Evolutionary Operation: A Method for Increasing Industrial Productivity." Write: Norman A. Olson, National Canners Ass'n., 1950 Sixth St., Berkeley 10, Calif.

February 4-15—Short Course, **Ice Cream,** Michigan State University, Write: Short Course Dept., Michigan State University, East Lansing, Mich.

February 5-7—Mississippi Dairy Products Ass'n., Annual Convention, The Buena Vista, Biloxi, Mississippi. Write: James J. Edwards, Jr., Jackson, Mississippi.

CLASSIFIED ADS

POSITIONS AVAILABLE

DEPUTY HEALTH OFFICER

To assist the Health Officer in the direction and supervision of all activities. Salary range $6,600-7,800 plus liberal fringe benefits. Desire graduation from a college or university of recognized standing with major courses in public health administration, preferably supplemented by graduate study and three years of successful experience in public health administration.

PUBLIC HEALTH SANITARIAN II

To promote principles of sanitation and enforce public health laws and regulations in progressive city of 32,000. Salary $5,700-6,900. Excellent fringe benefits. Graduation from a college or university of recognized standing with major courses in public health sanitation and one year of successful experience in environmental sanitation desired.

Application blanks can be obtained from Personnel Office, City Hall, Fond du Lac, Wisconsin.

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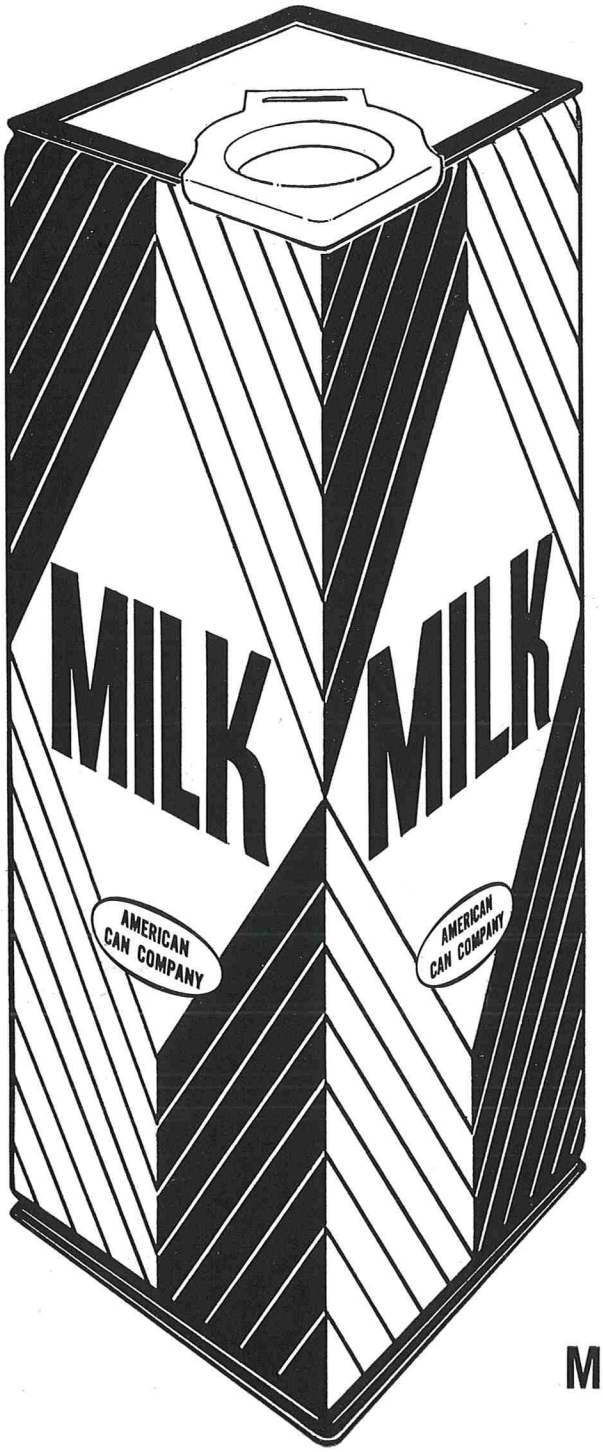

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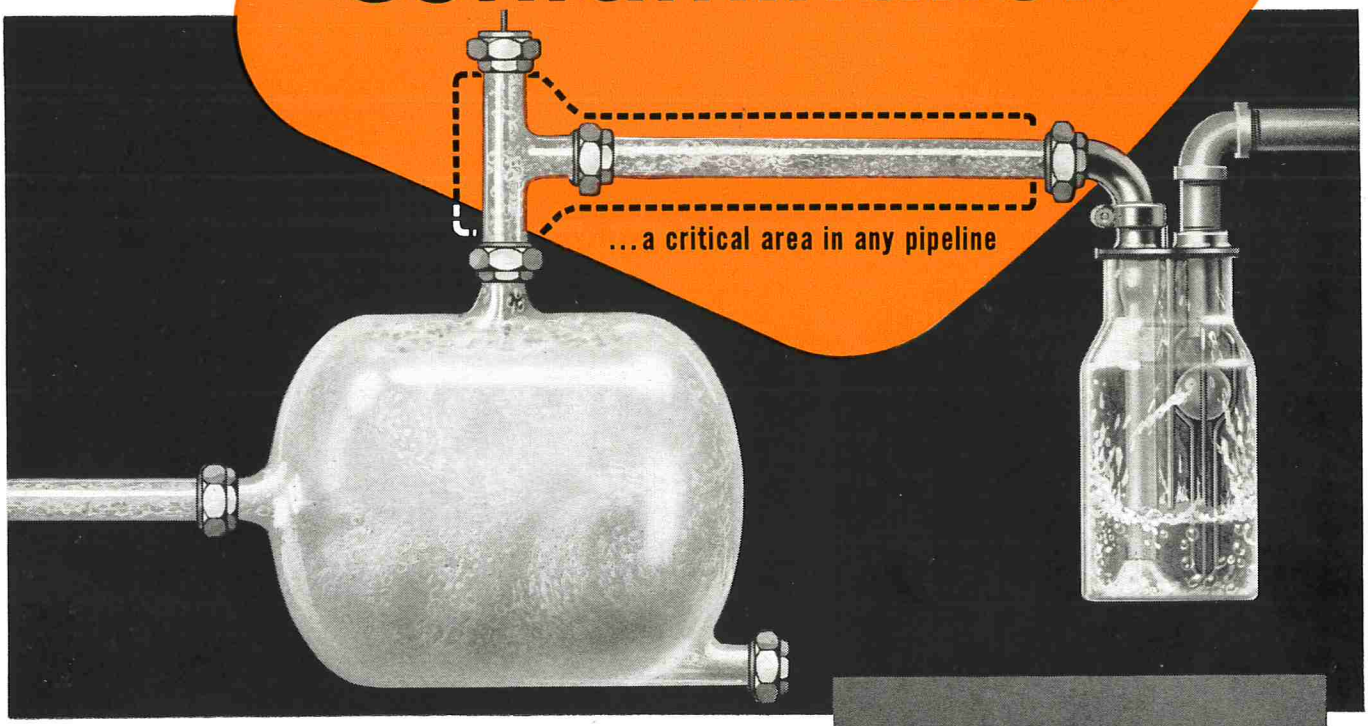
we call it...

the "Zone of Contamination"

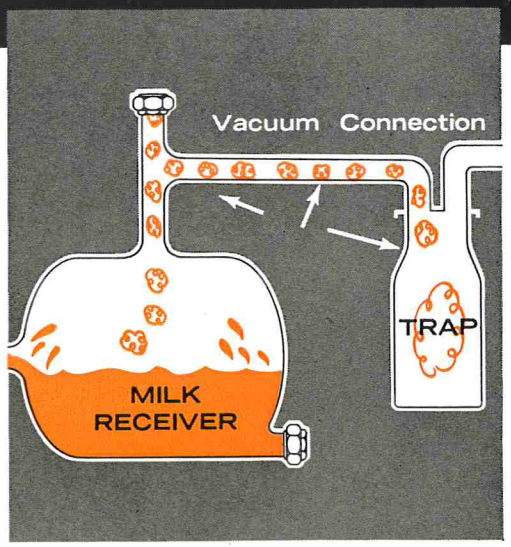


SURGE PIPELINE SYSTEMS CLEAN IT EVERY TIME YOU WASH THE MILK LINE

Sanitation can't be done halfway. A milking system is either clean or it isn't . . . there's nothing in between. Cleaning the milk line — but doing a halfway job on a vital point like the "Zone-of-Contamination" — isn't really cleaning at all.

SURGE Pipeline Systems completely and thoroughly clean-in-place the "Zone-of-Contamination" . . . that all-important vacuum connection and trap between the vacuum pump and the milk receiver. The "Zone-of-Contamination" gets a good hot SURGE bath every time the milk line is washed.

The TONGANOXIE Milking System cleans all three . . . the milk line, the vacuum line, and the "Zone-of-Contamination," every time you wash the system.



Arrows point to the "Zone-of-Contamination," a potential breeding place for bacteria. SURGE CIP design provides a thorough, turbulent 20-minute cleaning of this area... assuring protection of quality milk.

SURGE

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