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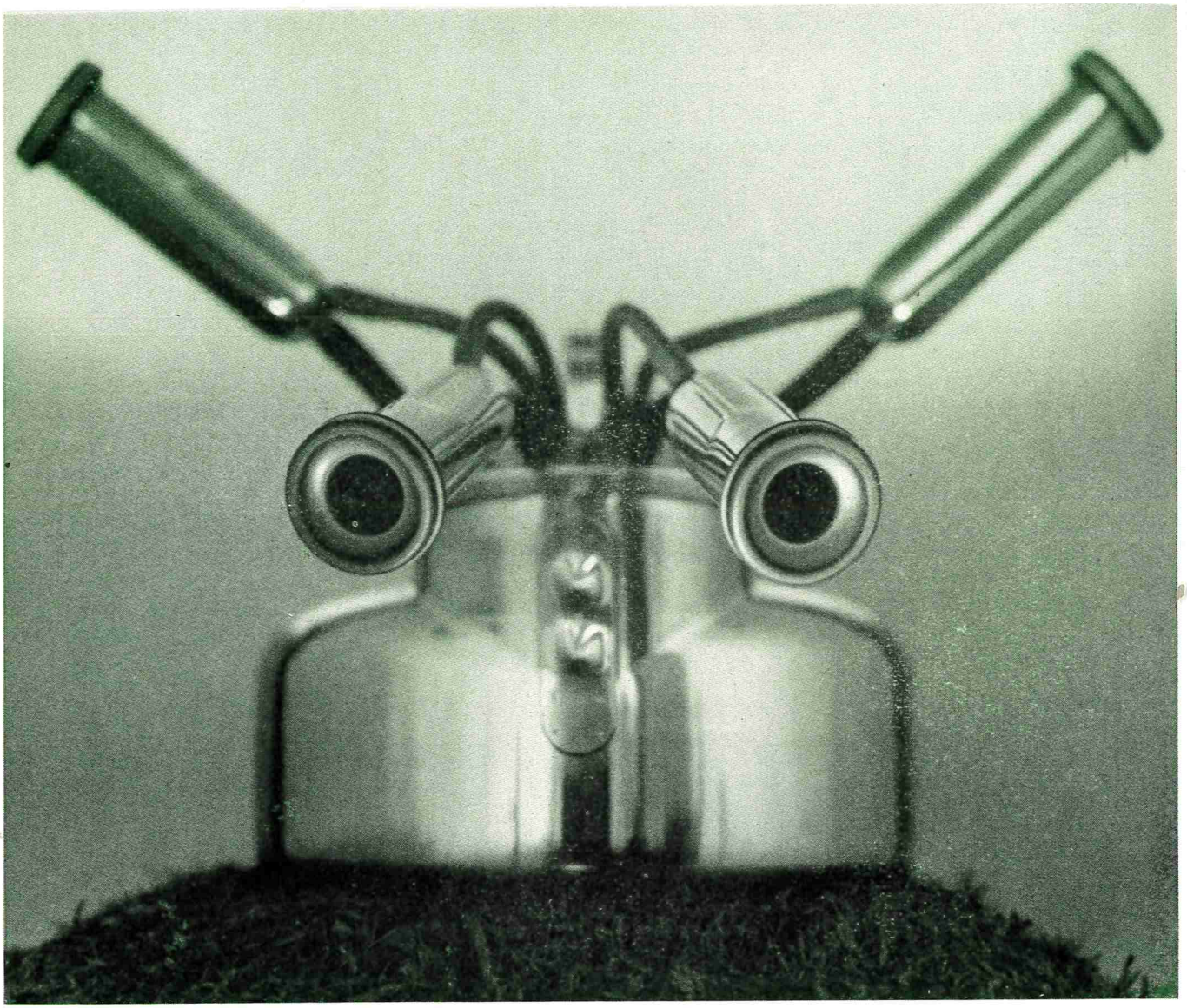
Journal of

MILK and FOOD TECHNOLOGY

Official Publication

International Association of Milk and Food Sanitarians, Inc.



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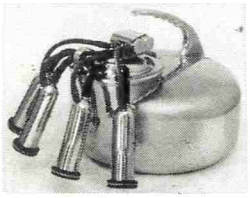

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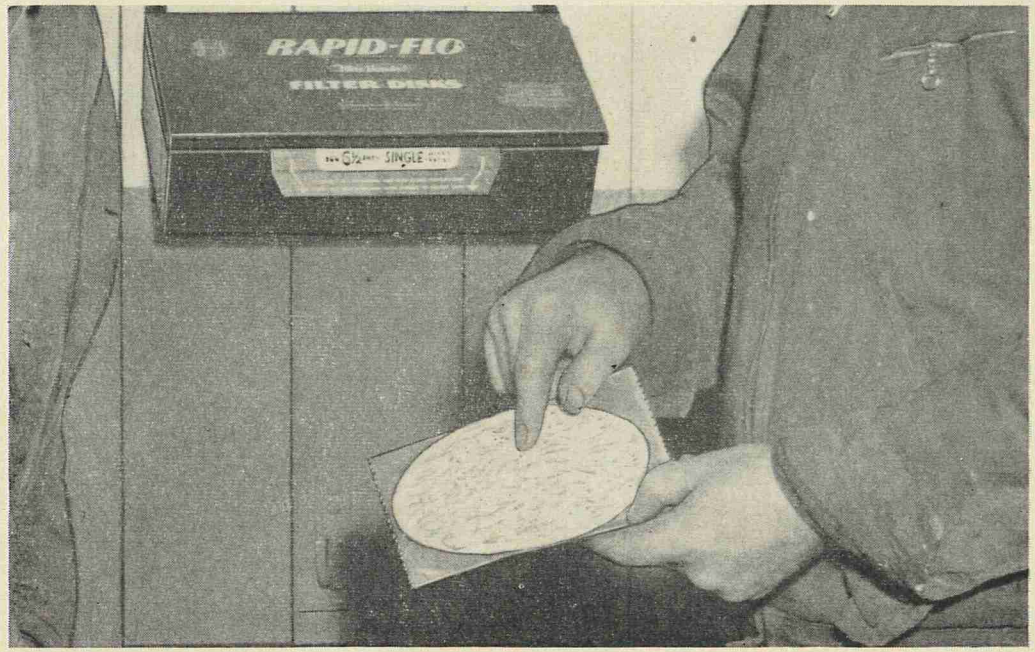

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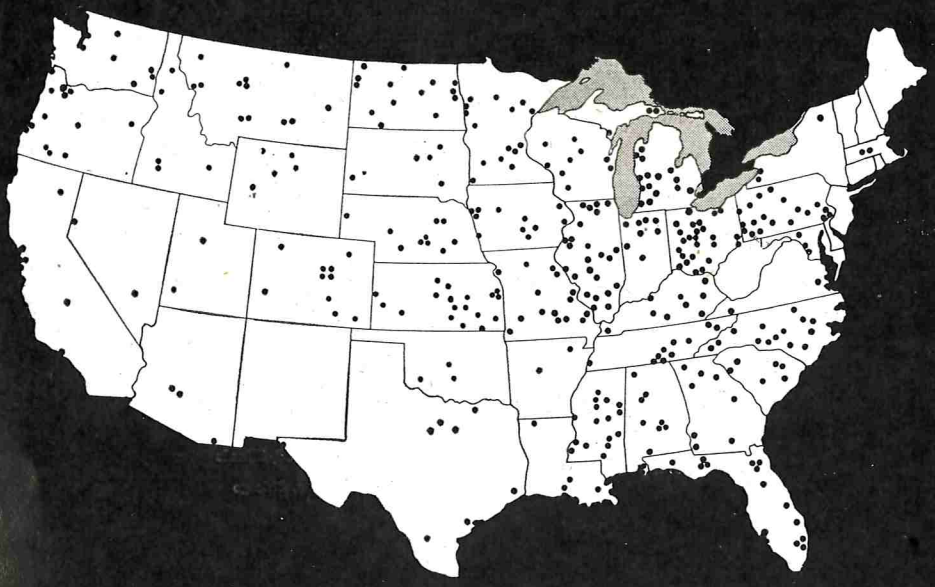

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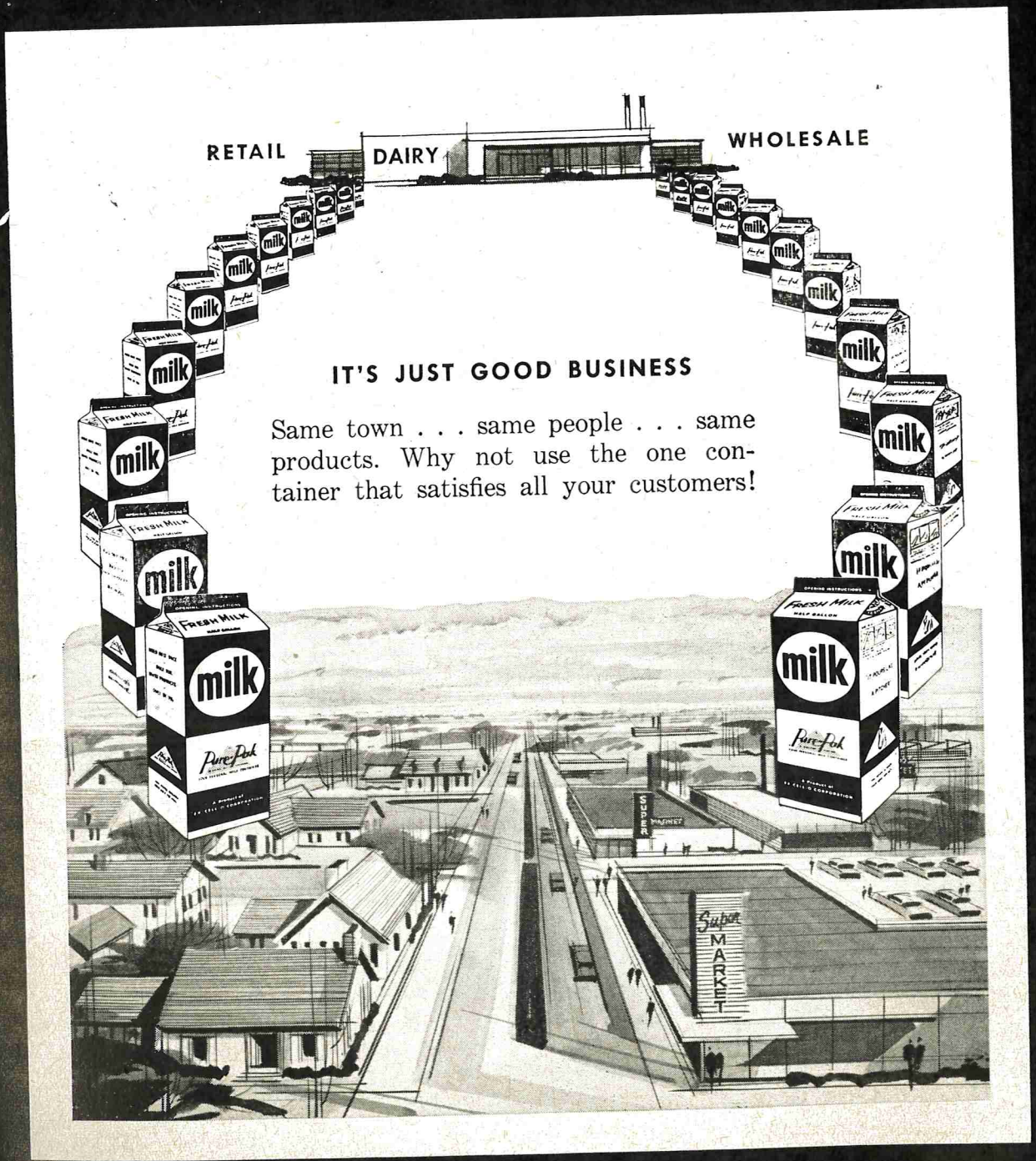

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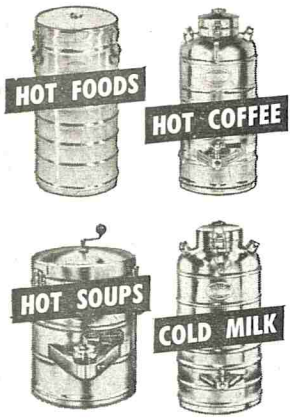

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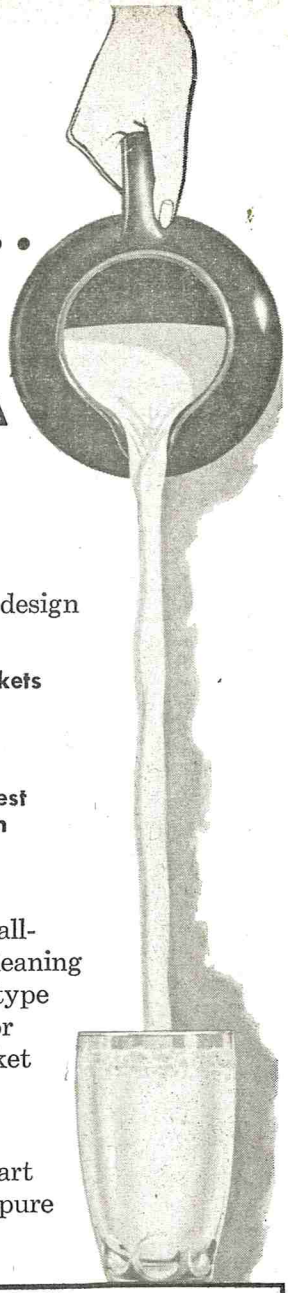

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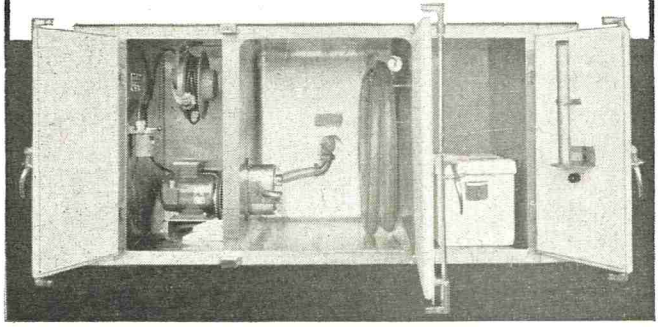

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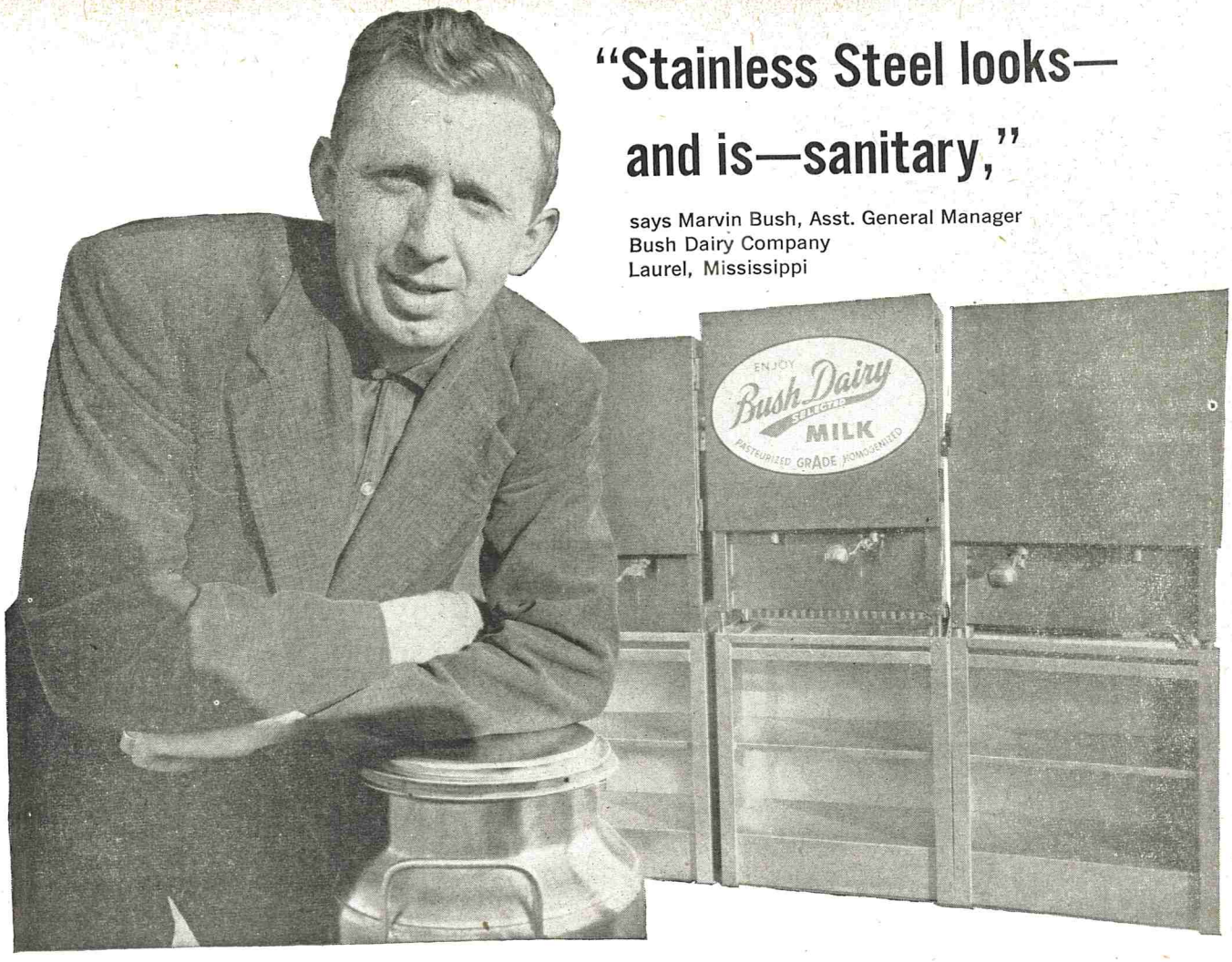

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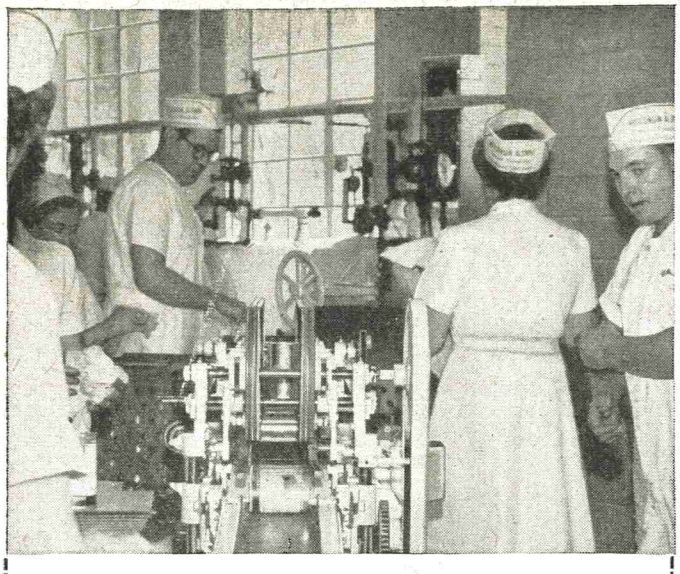

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SOME FUNDAMENTAL PROBLEMS IN THE INTEGRATION OF ENVIRONMENTAL SANITATION INTERESTS

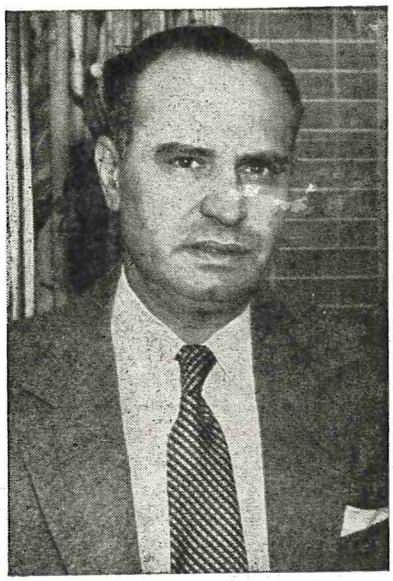
NICHOLAS A. MILONE

School of Public Health, University of Michigan, Ann Arbor

In the early days of sanitary science the medical sanitarian was self-sufficient largely because of the then narrow concept of what constituted environmental sanitation and the few fundamentals upon which it rested. With the evolution of the science from the relatively simple to the complex came the need for, and the realization of, specialized personnel competent in its various aspects. From these humble beginnings developed the multidisciplined science of today. Concurrently with this progress came the need for, and the establishment of, professional schools for the instruction and training in these disciplines resulting in what are known today as the public health professions. The modern broad perspectives of environmental sanitation have resulted in ever-expanding programs with many objectives still in the nebulous state but with many others already attained or on the way.

The broadening spectrum of the field of environmental sanitation is demonstrated in the recent proposal (9) for setting up a program in ergonomics or "human engineering" concerned with the study of human behavior in response to external stress with particular reference to the stress-strain problems of man at work. In brief, recognition of the great importance placed upon our physical environment requiring the cooperation of not only engineering but also the biological and social sciences in the man-job relationship. However, because of inherent differences in scientific methodology, goals and status of knowledge it remains to be seen if integration of the social sciences and the public health professions can be accomplished. In this respect, it is important to note that these differences have caused a Harvard Committee (8) to decline to make specific recommendations as to how this integration can become a reality.

In sanitary science, the concept of teams or integration of various related specializations has gradually taken root until today it is the generally accepted mode of operation known to lead to more efficient control activities. The team approach is by no means new and there are many past and present examples of fine team coordination and accomplishment. A recent example is the investigation of a milk-borne paratyphoid B epidemic in Lancaster, Pennsylvania in 1955 said to be a fine example of the integrated efforts of public health nurses, laboratory technicians, sanitarians, a public health veterinarian and a public health educator all supplementing the work of the directing public health physicians and contributing significantly to the control and solution of the problem (3).



Mr. Milone received the B. S. degree from Cornell University in 1929 and the M. S. degree from the same institution in 1951. Mr. Milone is a life member of the New York State Association of Milk Sanitarians and is a member of several other professional societies. In his present position as Resident Lecturer, School of Public Health at the University of Michigan, he is engaged in teaching and research.

For maximum integrative effect two requisites are necessary, one the individual's unrestricted inventiveness, the other the available composite knowledge of the group. Another important requisite, however, is cooperation. On the debit side, integration presents certain difficulties, primarily involving human nature, which cannot be ignored if it is to be a complete success. The writer has had considerable exposure to these difficulties during twenty-seven years of experience both in laboratory and field control activities and in academic and research pursuits, and proposes to consider and discuss some of the factors which can adversely affect the functioning of such teams and what can be done about them. These factors have to do with administration, specialization, professional

status, the team member's attitude and the team needs and functions.

ADMINISTRATION

Premise: *In many instances, administration fails to live up to its obligations by either ignoring them or by not realizing what they are.*

Management involves supervision of workers. A person who cannot get along with people should not expect to be considered for positions of administrative responsibility, regardless of specialization or technical training. The administrator, besides technical knowledge, must have the liking and respect of his workers, go along with forces of motivation, have high standards of morality, a broad attitude of mind and work into the social activities of the community. For efficient performance he should have economic security, serve to the best of his ability and have a keen insight on those forces which motivate human behavior.

The attributes resolve themselves to compatibility, training, talent, motivation ability and personality traits. The more emphasis we place on these requisites in filling administrative positions the greater the liklihood of a smoothly functioning team. There should be no question but that we frequently fail to act according to these precepts.

A man's scientific philosophy is largely determined by his talents, educational background, training and experience. Because of this the key figure in any scientific field of endeavor may enforce a program reflecting his scientific philosophy with the sometimes unfortunate realization of stresses on certain particular phases and strains on others. The ensuing relative success of *all* the phases of the total program then projects the man and not the system. Sometimes for the sake of expediency such action is justifiable but many times it is not. Such occurrences can be avoided if the men selected for such key positions have very broad perspectives and the ability, judgement and courage to apply them.

Another important responsibility of administration is the avoidance of wasteful procedures especially as they pertain to the utilization of available personnel. The writer has had direct experience with some organizations within which especially set-up groups of specialists in the various disciplines of the overall program are available and involve an appreciable outlay of money but are used sparingly, if at all, for any specialized problems arising within the jurisdiction. Sometimes the blame for such a situation lies with the negative attitude of the specialists concerned or it may be attributed to the using agency. It is reasonable to assume that both are at fault. Certainly, nothing engenders a feeling of frustration and uselessness as being ignored, and efficient administration will not tolerate such conditions.

SPECIALIZATION

Premise: *The rapid progress of scientific research and the trend toward increasing subdivision of specializations forces us to pool our efforts and wherever possible to synthesize and systematize.*

Some consider the present methodology of technical education directed to narrow ends instead of the development and ability to use scientific method in all fields of human betterment as a deplorable occurrence. It is presumed that specialized training hamstrings a person into neglecting its application to fields outside his calling. Scientific methodology should instead develop a scientific habit of mind so as to have broad applications.

Unfortunately there appears to be no escape from the specialization trend because of the rapid progress of scientific research. No phase of science appears to be sufficient to itself, but must borrow from most, if not all, of the sciences. The growth of the various fields of science and the tendency to separate branches has made it impossible for one human to embrace them all.

The eminent scientist, Vannevar Bush (*1*) states that today every scientist feels acutely the effects of what he terms over-specialization, feeling that the volume of publication is so vast that it is impossible to keep abreast of it even as the field of interest is narrowed. To combat this trend, he proposes to use individuals with the native skills to gather, summarize and interpret information as it becomes available, who can make masses of seemingly confused data clear, intelligible and useful. Eric Temple Bell illustrates the situation lucidly by observing that out of fifty mathematical papers presented in brief at a meeting, it is a rare mathematician who really understands what more than half a dozen are about, and these are near his own speciality.

The desirability, therefore, of coordinating, synthesizing and systematizing the component disciplines of the public health team far and beyond what has already been done is evident because it, too, is faced with the problems of specialization.

FORMAL PROFFESSIONAL STATUS

Premise: *Formal professional status breeds and stimulates pride in performance.*

At present certain groups composing the public health team have no formal professional status. However, informal recognition has been achieved by certain classifications. For example, sanitarians can be

considered to fall into this classification. The procedures by which formal professional status is usually attained generally envelop (a) a set of actions involving the development of a code of ethics primarily concerned with rendering unselfish service to society and the maintainance of high ethical standards within the organization; (*b*) the formation of an association of its members; (*c*) the action by academic institutions to formally recognized and establish educational standards and training programs, many at the graduate level; and (*d*) government recognition of qualifications and status and the issuance of technical publications for the information and development of proficiency by the group.

The Dictionary of Education considers a profession as an occupation involving relatively long and special preparation on the level of higher education and governed by a special code of ethics. Since the sanitarian is engaged in activities of immediate concern to the community and not on a competitive basis for material gain and the educational trend is toward the level of higher education with longer and specialized preparation, it is believed that the qualifications listed have and are being met to a great extent by this group. The realization of formal professional status by this and other groups in the team having these qualifications would be a great stimulus to morale, among other beneficial effects, and it is suggested that action be taken by the groups already enjoying such status to help these groups help themselves in the attainment of this goal. Certainly, helping team components helps increase the stature of the whole.

THE PUBLIC HEALTH WORKER'S ATTITUDE

Premise: *The total success of the team depends upon the selfless cooperation of its components.*

A recent Yale study (2) in public health administration showed that most public health workers are happy to be in public health work. However, some of the workers are unhappy to be in public health in general. Major sources of dissatisfaction are inadequate salaries, excessive clerical work, inadequate work facilities, lack of recognition and appreciation in the agency, lack of opportunity for advancement, lack of responsibility and freedom of action and the absence of a "sense of belonging" in the agency.

Athough the unhappy workers reflect the minority, perhaps, we cannot sidestep the feeling that the "gripes" indicate administrational inefficiency, although it is altogether possible that all the blame cannot be placed upon administration. Despite this, every effort should be made to at least alleviate these conditions because a dissatisfied member affects the sum total of performance. If these reactions are based on fact, administration should look deeply into them and come up with a solution.

THE TEAM'S NEEDS AND FUNCTIONS

Premise: *All scientific activities depend upon social institutions and the team is one of them.*

In the Annual Delta Omega Lecture at the School of Public Health, University of Michigan, Dr. B. D. Paul (*10*) made the following statement:

". . . any community has its *social system* (the way people group and relate themselves) and its *idea system*. The latter should be understood to include not only shared ideas but also attitudes, values and assumptions. Members of a health organization or a health team also have their social structure and represent an idea system. The success or failure of public health programs often depends on the degree of compatibility between the two sets of systems, those of the community and those of the team . . . Communities as such have their own anatomies and physiologies. Although a community is made up of individual human beings, the totality being more than the sum of its parts, it has properties of its own." However, we cannot completely ignore the individual in abstracting the essential traits from the whole. The idea of teams, composed of individuals with diversified backgrounds, while proven feasible, presents difficulties since in operation it requires forbearance, respect for the others' integrity and knowledge of his subject and motives.

The team functions incorporate the functions of its components. For the purpose of simplification the discussion will be restricted to a team composed of representatives of the following groups: sanitary engineers, sanitarians, public health veterinarians, sanitary bacteriologists, sanitary chemists and sanitary inspectors. These groups by no means represent all of the possible combinations which, by necessity, might be used since that would be determined by the nature and scope of the program involved. Certainly, the points being elaborated would apply to any combination.

The following excerpts taken from the educational qualifications series issued by the American Public Health Association (*4, 5, 6, 7,*) show the contributions of the specialized members of the team in reference to their special skills and knowledge.

The sanitary engineer, whose use of general engineering knowledge and skills are essential for the identification and control of environmental factors that may produce a detrimental effect on the physical, mental and social well-being of man. More specifically,

he conceives, designs, appraises, directs and manages engineering works and projects developed, as a whole or in part, for the promotion and protection of public health, particularly as it relates to the improvement of man's environment. He investigates and corrects engineering works and other projects that are capable of injury to public health by being or becoming faulty in conception, design, direction or management.

The role of the public health veterinarian in providing the necessary professional skill and direction for the specific activities relating to the control of those animal diseases communicable to man and participation in the planning, supervision and control of eradication and research programs.

The complexity of the sanitarian's duties touches all phases of community life, draws upon the knowledge of the physical, biological, engineering and social sciences, and is interwoven in nearly all activities of a complete public health program. Because of the many and varied contacts made by the sanitarian in his day-to-day duties, he exerts a significant influence upon the public's judgement and opinion of the entire health department.

The scope and nature of the work of the sanitary bacteriologist and sanitary chemist make them an important cog in the machine. Their function in examinations associated with diseases occurring among domestic animals transmissable to man, of water, sewage, shellfish, industrial wastes, milk and milk products, frozen foods and desserts, restaurant utensils, among many others, are of inestimable value in the efficient functioning of the team in accomplishing its objectives.

The sanitary inspector, who performs environmental sanitation inspections of a sub-professional nature whether in a supervisory or field capacity, should not be ignored. His contributions are as essential as any other to the proper functioning of the team.

Of great importance and directly bearing on the attainment of successful team work is the desirability of careful and judicial selection of the makeup of these components of the team and the adherence to certain fundamental requirements which are:

1. The speciality should be filled with the best qualified and trained individuals obtainable.
2. All members should have compatible traits, that is, the ability to get along with each other and the public.
3. The interests of the individual should be subjugated to the interests of the team.
4. The importance of good administrative procedures, with the interests of both the individuals and the team at heart should be recognized. These include the minimization or removel of the sources of dissatisfaction listed in the discussion of the findings of the Yale survey.
5. The team, itself, must cultivate compatibility with and educate and motivate the public.

Perhaps we can make a lucid and edifying comparison between the coordinated efforts of the specialized skills of the team and those of a symphonic orchestra. In a top flight symphonic assembly each individual is a master of his instrument and gives free rein to his artistry. He does this with the full knowledge that the rest of the members of the assembly are masters of their instruments and when molded by the interpretive skill of the conductor the result is a harmonious whole with each member giving the best he has in him. Here, the whole is greater than its parts but the parts do not lose their identities nor for that matter their personalities.

Cecil Grey wrote of Sibelius, Seventh . . . "It has one chief dominating subject, a fanfarelike theme which first appears as a solo trombone near the outset and recurs twice, more or less integrally, and in addition a host of small, pregnant, fragmentary motives of which at least a dozen play a prominent part in the unfolding of the action. The resourceful way in which these are varied, developed, juxtaposed, permuted and combined into a continuous and homogeneous texture is one of the miracles of modern music." A symphonic orchestra, worthy of the name, graphically illustrates the efficient application of administration, the wholehearted integration of specialities, professional pride, the healthly attitude of components, the fullfillment of needs and the maximum utilization of functions. Ideally, the functioning of a public health team need not divert much, if at all, from the team action of a symphonic assembly to attain a similar objective — a smoothly functioning, well coordinated, effective and interpretive machine. To become overly engrossed with the details and methodology of the sanitary sciences is to lose sight of their operation as disciplines, that is, their applied aspects, evaluation, acceptance by society and their integration leading to a united front and to a successful promotion of all its multidisciplines.

SUMMARY

In summary, it is believed that the need for continuous *promotion* of *well-functioning* environmental sanitation teams, integrating specialists in public health, both in routine and special work has been amply demonstrated. Some of the factors likely to adversely affect efficient team performance have been

evaluated and some solutions have been proffered. To deny that at least some of the defections discussed exist would be foolhardy. To overlook the fact that sanitary science has come a long way since its early beginnings would be equally foolish. The team, being organic in nature, must be healthy. The inducements should encourage each member to perform to the best of his ability. Dissensions should be ironed out by mutual effort so that there results a minimum of distrust, distraction and defeatism. The challenge is there to accept. It remains to be seen how it is met and resolved.

REFERENCES

1. Bush, Vannevar. We are in danger of building a Tower of Babel. Public Health Reports, **68**: 149-152. 1953.

2. Cohart, Edward M., Willard, William R., and Marr, Virginia R. How the public health worker feels about his job — The Yale Study. Public Health Reports, **70**: 1175-1184. 1955.

3. Editorial. Am. J. Public Health, **46**: 345-346. 1956.

4. Educational qualifications of sanitary engineers engaged in the field of public health. Committee on Professional Education. Am. J. Public Health, **45**: 1-9. 1955.

5. Educational qualifications of public health veterinarians. Committee on Professional Education. Am. J. Public Health, **41**: May, 1951.

6. Educational and other qualifications of public health sanitarians. Committee on Professional Education. Am. J. Public Health, **46**: 1149-1156. 1956.

7. Educational and experience qualifications of public health laboratory workers. Committee on Professional Education. Am. J. Public Health, **40**: 1-7. 1950.

8. Harvard Univresity: The behavioral sciences at Harvard Report by a faculty committee, June, 429. 1954.

9. Hatch, Theodore F. Proposed program in ergonomics. Mechanical Engineering, **77**: 394-395. 1956.

10. Paul, Benjamin D. The effect of cultural factors upon health programs. Presented at the Annual Delta Omega Lecture at the School of Public Health, University of Michigan, January 16, 1956.

AN INQUIRY INTO THE USEFULNESS OF THE STANDARD METHODS DIRECT MICROSCOPIC COUNT[1]

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Microscopic technics are not capable of yielding "accurate numerical estimates" of the bacteria in "market grade" raw milks, because of (a) the small number of cells available, and their random distribution; (b) the pattern of solids deposition and (c) the "working factors" dictated by the smear areas examined. While multiple strip viewing reduces working factors, the order of accuracy attainable is far short of that yielded by the agar plate method, and the effort which must be expended is much greater.

LAWS frequently stipulate that bacterial counts of raw milks, to be used as "a basis for payment, or for the public record, or for the determination of adherence to sanitary standards", shall be obtained by the agar plate technic as described in the current edition of Standard Methods for the Examination of Dairy Products *(6)*. In spite of this clear language, the direct microscopic count often has been substituted legally or otherwise for the agar plate method in many areas.

There are many who believe that the microscopic method, employed as detailed in the current Standard Methods text, is much more definitive in arriving at "accurate numerical estimates" of bacterial contents, than the agar plate method; that it should therefore be modified, to make it less arduous. More than three-quarters of the respondents to a questionnaire sent recently by the Pennsylvania Approved Dairy Laboratory Directors Association to its members considered the number of microscopic fields to be observed, required by Section 2.45 of the current tenth edition of Standard Methods, to be "more than necessary". The examination of only 10 fields has been proposed, to "establish" counts.

While many pages of the tenth edition are devoted to the microscopic method, the text does not anywhere, discuss the comparative accuracies of counts obtained by the agar plate and microscopic methods; furthermore, references to such studies are not cited. Public health officials and administrators, pressured to accept "substitutions" and "simplifications", need guidance; so too, do those who assume, without thought, that substitutions and simplifications are always meritorious, or even satisfactory.

[1]Presented at the Eighteenth Annual Meeting of the Pennsylvania Approved Dairy Laboratory Directors Association at Pennsylvania State University, University Park, Pennsylvania, April 17 and 18, 1957.

Dr. David Levowitz received the B. S. degree from the College of the City of New York in 1927, the M. S. degree in biochemistry in 1929 and the Ph. D. degree in physical chemistry in 1936 from Rutgers University. Since 1936 Dr. Levawitz has been Director of the New Jersey Dairy Laboratories. This laboratory supplies laboratory and consultation service to health departments and to the dairy and food industries.

How do Standard Methods agar plate and microscopic counts compare, sheerly from the standpoint of basic arithmetic? What about the "simplified" direct count? How useful is a microscope?

THE ARITHMETIC OF THE STANDARD METHODS COUNTS

"Raw milks to be pasteurized" are required, by the laws of the more liberal states of the Eastern Atlantic area, to contain "not more than 200,000 colonies per ml., by Standard Methods agar plate count". As a basis for comparison, note from Section 2.24 (p. 104) of the current Tenth Edition: "Where Standard Plate counts per ml. are expected between 10,000 and 300,000, prepare at least 2 plates per sample, selecting preferably 1:100 and 1:1,000 dilutions".

When this minimum direction is followed, the lower (10,000 count) level will exhibit 100 colonies on the 1:100 dilution, and 10 on the 1:1,000. At the higher

level, the 1:100 dilution plate would be overcrowded and uncountable. The 1:1,000 would yield 300 colonies. All of the colonies reported before multiplication by the dilution factors employed, are easily seen.

The Standard Methods direct microscopic count covers the same range (to 300,000) in two categories: "below 30,000", and "30,000-300,000". Section 2.45 (p. 124) details that for "below 30,000" counts, a "working factor" of 5,000 is to be employed. This means that 1/50 of the area representing the solids of the 0.01 ml. smear is actually to be examined by the microscope. The table enumerates the number of fields to be scrutinized as dictated by the microscope's standardization. Thus, 60, 80, 100 or 120 fields are to be investigated, when the field diameters are adjusted to 0.206, 0.178, 0.160 or 0.146 mm. respectively.

For the "30,000-300,000" range, the "working factor" is required to be "10,000". This entails the examination of 1/100 of the original 0.01 ml., or the examination of 30, 40, 50 or 60 fields by the use of instruments whose field diameters were listed above.

Consider a raw milk whose count is 10,000, to parallel the agar plate count arithmetic. The 0.01 ml. smear will contain 100 "clump units", within 3, 4, 5 or 6 thousand fields, depending on the field diameters used.

Possibly the 2 clump units to be expected may be found by the examination of the 60, 80, 100 or 120 fields. Assume none are located; that does not establish that the sample contained no bacteria. It means only that no clump units were seen in the number of fields examined.

One, 2, 3 or even 4 clump units might have been found. Multiplying by the "working factor" of 5,000, the sample would harbor from 0 to 20,000. To avoid "fictitious accuracy", the sample had best be reported (as Standard Methods suggests) as "less than 30,000", even after all the time spent, the eye strain and mental fatigue of selecting 60 to 120 fields at random, tallying them and focussing them with more or less manipulation of the fine adjustment control, to bring their contents into full view.

When "low count" milks are examined, the Standard Methods direct microscopic method requires much more application and concentration than the Standard Methods agar plating, and does not perform at all as well. The "working factor" is equivalent to a dilution level. It is hardly logical to plate a sample which might contain only 10,000 colonies at a single 1:5,000 dilution.

The agar plates of the low count milk, poured at 1:100 and 1:1,000 dilutions were both eminently useful. Section 2.33 f. (p. 110) details, concerning "plates with less than 30 colonies": ". . .record actual number of colonies, . . . but report computed count as "less than" 30 times corresponding dilution . . . ". The reason? One colony, plus or minus, on counts below 30, results in an experimental error too high to be tolerated. Think of the experimental error of the Standard Methods Direct Microscopic Count, as shown by the "low count" example above, even though 60-120 fields were examined!

Consider the "10,000 working factor" of the microscopic range "30,000-300,000". Who, seeking reproducible data, would pour only a single plate at a 1:10,000 dilution, of a sample which at best, might yield 3 to 30 colonies?

The review of the elementary arithmetic involved, shows that the microscopic method is completely inadequate to count the bacteria of "market grade" raw milks, even when the full number of fields recommended by Standard Methods (in Section 2.45) is examined.

Others have reached this conclusion, too. Robertson, Moody and Frayer summarized their study *(5)*: "The microscopic methods as herein described and used are not as accurate as the agar plate count in milk containing relatively few bacteria because of the failure to examine more microscopic fields on each preparation."

Black *(1)* states: "To equal in accuracy that of a plate count from lower count milk, with from 3,000 to 30,000 colonies per ml., where a 1:100 dilution should show 30 to 300 colonies on the plate, the resulting growth from the entire 0.01 ml. of milk being observed on the plate in counting, theoretically the entire 0.01 ml. of milk on the entire film on the slide used for the direct microscopic method should similarly be observed, amounting to 5,000 to 6,000 fields."

THE "10 FIELD" DIRECT MICROSCOPIC COUNT

It takes longer to examine a field which has nothing in it, than one which harbors a few clump units. When the center of the field is in focus, the rest is not. The fine adjustment control must be manipulated, and the examiner must concentrate carefully, on each portion of each field, as it is brought into focus.

If he does not, he may miss small clump units, which constitute the greater portion of those in "low count" milks. Independent mono and diplo forms are "clump units" by definition (Section 2.45c.).

To obtain a Standard Methods Direct Microscopic Count on a single sample of raw market milk is not to be considered relaxation. Depending on the count level, 30-120 fields must be selected at random; tallied; focussed once, twice, three or four times; attention must not be diverted. To examine many samples is quite a chore – especially if one has had to sample the milk out of weigh tanks, smear, dry and stain slides on a noisy receiving platform, which is too often hot and humid, or cold and clammy.

It might be kept in mind that motor-driven eyeballs, electronic-counting retinas and Univac computers are not yet standard, built-in equipment in laboratory-field men, technicians, or even bacteriologists and they are not available as optionals!

History does not record the identity of the pioneer who first rationalized that Standard Methods itself might be interpreted to provide the solution to the dilemma. Observe — in Section 2.45; it is all right to examine only 10 fields in some count brackets. Well, it is primarily recommended for counts "over 3,000,000", but "milk is milk". Just use the recommended working factors and everything comes out all right. It certainly takes less time; it certainly avoids headaches. So, the "10 field" working factors are 30, 40, 50 and 60 thousand. If no clump units are found in 10 fields, mark the sheet "less than 30,000"; what could be simpler?

Should a sample which may possess 10,000 colonies per ml. be plated at a 1:60,000 dilution? Are direct microscopic counts of this type, obtained on samples of raw milk for pasteurization, to be compared to agar plate counts? Why stop "rationalizing"? Focussing carefully on 10 fields takes time, too. It is really only the large groups that count; the small ones are probably debris that only look like bacteria. If there is nothing on the field when first brought into focus, move on to the next.

Slides stained so dark that they are inpenetrable, or so light as to be difficult to focus, or speckled or mottled to be troublesome to examine are no problem to the "10 field" specialist. No matter the reason — if no clump units are found in the 10 fields — the report goes in "less than 30,000". (It may be suspected that some have calculated that more time is saved by examining only single fields, too!)

Standard Methods direct microscopic counts, conscientiously performed, are hardly to be compared with data derived by agar plating. Counts reported by the "10 field" systems are just preposterous.

Shippers must follow efficient practices to earn counts of "less than 30,000", by agar plate method. How long will shippers continue efficient handling, once they find out that no matter what they do, they are quite certain to get "less than 30,000" by direct microscopic examination of their milks, by the "10 field" specialists?

Low "direct microscopic count" milks, shipped to processing plants where agar plate counts are made, are frequently rejected on the basis of "high counts". Shippers and receivers are both confused, and lose confidence in the ability of any laboratory procedure to assay anything.

The truth might as well be faced. The direct microscopic method is not designed for routine counting of raw milk for pasteurization. There is no doubt about it; the agar plate count is more accurate, practical and cheaper than a direct count, properly performed.

The "10 field" system is not a new development. Black reported *(1)* "Whereas in Standard Methods the number of fields to be examined for such milk is stipulated to be 60 or 120, depending upon the field diameter used, in practice our observation was that rarely 30 and usually 10 fields were used." With respect to the accuracy of such counts, Black continues *(1)* " . . . 10 such microscopic fields would roughly be comparable to estimating a bacterial plate count from only one of the nine smallest divisions of only one of the average 65 sq. cm. areas on the agar plate, whereas actually it is required that the entire 65 sq. cm. be counted for such a plate."

THE STRIP COUNT

The Standard Methods Direct Microscopic Count assumes that smears dry into flat layers of uniform density. They do not. Densitometrically they will be found to be slightly thicker at the center; fairly flat until near the edges where the thickness becomes greatest. The very edges themselves are thinnest.

Standard Methods assumes that bacterial clump units are distributed uniformly. They are not. Put a drop of milk on a slide and watch it dry through a microscope. Note that the larger fat globules remain quite securely fixed by gravity, but the smaller ones are shifted, in the areas not yet dry, by eddy currents. See how the smallest fat globules vibrate continually, through Brownian movement, as well.

Bacterial clumps range in size from 0.5 to more than 50 microns. The smaller ones are frequently adsorbed on fat globules. They will be deposited as heterogeneously as the fat globules themselves.

Shake a milk containing millions of leucocytes, to separate them into independent cells; smear and stain. Examine; note that in spite of the high concentration, you do not find the same number in adjacent fields very often, anywhere on the smear.

Standard Methods admits in Section 1.32 (p. 31) that in low count milks, no clump units may be found even after examining 100 or more fields, yet demands that should bacteria be seen in the area traversed between "random-selected" fields, they are not to be recorded. These aspects were not discussed before, but it can be appreciated how they further temper the ability of achieving data by means of the Standard Methods Direct Microscopic Count of raw milk for pasteurization.

The British evaluation of the Standard Methods Direct Microscopic Count, as summarized in "The Bacteriological Grading of Milk" *(7)* is pertinent.

"The errors of the method are discussed, and it is

concluded that the chief error is the irregular distribution of organisms in the preparation, leading, particularly with high-grade milks, to considerable variations in the counts of different fields."

"It is concluded that, for practical purposes, actual counts are not worth making by the Breed method unless there is an average of at least one organism per field. Under these conditions, if reasonably accurate counts are desired, at least 100 fields should be examined. As the average number of organisms per field increases, the number of fields examined may be diminished. To obtain the same degree of accuracy with different milks, the number of fields counted multiplied by the average number of organisms per field should be constant. In other words, the same total number of organisms should always be counted."

That last sentence is to be stressed. If a sufficient area of the smears of "low count" samples is examined to actually "see" a minimum of 30 clump units, plus or minus one will be attended by an experimental error equivalent to that of an agar plate holding 30 colonies. If the smear were "cross-sectioned" into "strips", and these carefully examined, not only is the chore of selecting fields and counting them eliminated, but the variation of clump distribution, through changing smear densities, is automatically corrected. (2)

Focus the oil immersion lens on the center of one edge of the smear. Move, to the other side, by means of a slow motion of the mechanical stage. Train your eyes to concentrate on a narrow strip in the center of the field, perpendicular to the travel of the slide. With the other hand, keep manipulating the fine adjustment knob, at the rate to match the eyeballs' attention to the peripheral and central sections of the center strip. It will take some time to get accustomed to the travelling field, but it is worth the effort. Do not try to look at the areas beyond the central strip of the oil immersion field; you should have seen the contents of what has just passed through your line of vision, and will soon see what is just about to appear.

With the 0.206 mm. field diameter, a single strip is 2.06% of the smear, and equivalent to 61 fields — a working factor of 5,000. A single strip is all that is required to be examined for milk whose counts could be very satisfactorily plated at a 1:5,000 dilution — thus 200,000 per ml., plus.

When the first strip examined yields less than 50, but more than 25 clump units, a second strip is to be traversed. Move a full field away from the first strip, and go across the the smear again. The "working factor" is now 2,500, and equivalent to a dilution level of 1:2,500.

For three strips, the working factor becomes 1,700; for four — 1,200, and for five — 1,000. To observe the Standard Methods caution against fictitious accuracy, where fewer than 30 clump units were observed in five strips (equivalent to 300 fields), the report should be made "less than 30,000". Note that even with this extremely laborious and lengthy examination, the accuracy is comparable only to that achieved by a 1:1000 dilution in agar plating.

The examination of a single strip is accomplished with much less fatigue than is produced by selecting and focussing 60 fields, but anyone who has conscientiously used a microscope knows that there are limits to how much can be done at a single sitting. The strip technic is not designed for the routine control of raw milk for pasteurization. It is at best less accurate than the Standard Methods agar plate count with two dilutions, and more costly than employing plates at three dilutions.

The strip method's primary utility is for those instances when the cultural technics are inappropriate, or entail so much time as to be impractical; to observe the reactions of cultures, the growth of psychrophiles and thermophiles, and the progress of plasmolysis, etc.

TOWARD GREATER BENEFITS FROM THE MICROSCOPIC METHOD

General

The microscope can be of great aid in ascertaining samples' histories. Some suggestions are offered, first, those which promote efficiency.

The microscope slides must be clean, to receive smears satisfactorily. Flaming and cooling the cleaned slides, just before applying the sample, promotes smear adherence.

Guide plates whose square centimeter and other areas are both colored, neither white, are easier to use than those whose backgrounds or measured zones are white.

The quantity of sample transferred from a "calibrated loop" is altered by the depth to which the loop's shaft is immersed, the angle at which it is inserted, and the composition and temperature of the sample. Automatic stainless steel syringes which deliver 0.01 ml. are to be preferred, but to avoid metal oxide from every stroke resulting in debris on the smears, be sure the "stop" is located beyond the plunger, and that the barrel length is more than twice that of the calibrated zone.

The microscope should be located in a room which is not illuminated brilliantly. An even, medium-intensity microscope light is essential. Such matched

lighting causes a minimum of pupillary dilation, when attention is shifted from the instrument to the data sheet or elsewhere.

A "wide field" ocular flattens out some of the lens distortion, and decreases the amount of manipulation needed to focus the entire field.

Low Power Objective Use

Larger clumps in smears are prone to provide useful information about the samples. The 0.01 ml. portion may contain only a few of these units; sometimes only 1 or 2. Hundreds of fields, or a dozen strips might be examined, and these clumps still may be missed.

A low power objective, perfectly parfocallized and centered, permits screening the entire square centimeter smear in seconds. Once the operator becomes accustomed to the appearance of the low power field, he can instantly "spot" unusual groups with the low power objective, swing to the oil immersion, and examine them carefully.

The concentration of independent leucocytes, and the ratios of their types to each other, are of no moment, being influenced by a number of factors which are not related to the mammary gland. The ratios of leucocyte types in clusters within which micioorganisms are also harbored may serve as indices of infection.

The presence of a single cluster on a smear is readily established by low power use. Since leucocytes may cluster outside the mammary gland, and bacterial cells may then adsorb onto them, very careful examination of the type ratios is essential before assuming the configurations in blended or aged milks really represent udder infections.

James M. Murphy's summary (*4*) of almost a lifetime of study of udder infection in dairy cattle is strongly recommended as a guide to current thought.

Samples for examination for the presence of udder infection should be drawn aseptically from animals' individual quarters, and should be smeared before and after four hours' incubation at 95°F. The slides should be stained critically. Such examinations are best left to those who have been carefully trained to do this work.

A Simple, Effective Stain

While Wright's and other differential formulas are generally employed to achieve the delineation between cytoplasmic and nucleoplasmic areas required to permit leucocyte typing, a simple single staining solution, developed years ago by modifying the constituents of Newman's No. 2 formula, is sufficiently critical to do this on milk samples.

This stain works as well on heat treated, homogenized and reconstituted dairy products as it does on raw milks. It stains normal bacteria deeply; plasmolized cells appear to be dyed with intensities proportioned to their lysis. It tints backgrounds lightly enough so that the peripheral staining of heavily lysed cells is not masked; yet with sufficient intensity to permit rapid focussing and keeping in focus. The dye does not precipitate out if the preparation is kept in closed vessels when not being used. Smears do not develop striations, debris or crystalline complexes if the simple use directions are followed.

This stain is currently being investigated by the Subcommittee on Stains of the Standard Methods Committee. Its formulation and instructions for employment were published (*3*) to permit those interested to try it, and to detail their observations to the Subcommittee.

SUMMARY

1. A comparison of the arithmetic basis of the Standard Methods agar plating and direct microscopic counting procedures shows that in the examination of raw milks for pasteurization, the microscopic method can never provide the order of numerical accuracy normally achieved by the agar plate method.

2. The "10 field" direct microscopic count is a hoax, when applied to market raw milks suitable for pasteurization. The examination of 10 fields is useful only when applied, as recommended by Standard Methods, to multi-million count samples.

3. The "strip method" can be used to count raw milks for pasteurization, but is too costly for routine practicality, but it may be extremely useful under special circumstances.

4. The microscope equipped with low power as well as oil immersion lenses, when used on carefully made, carefully stained smears, will provide information to complement that obtainable by agar plating.

5. Official control administrators are ill advised, to assume that the Standards Methods direct microscopic count, or any of the modifications proposed to this date, can take the place of the Standard Methods agar plate count, in the examination of "raw milk for pasteurization".

REFERENCES

1. Black, L. A. Surveys of Milk Laboratories in War Areas in the United States. II. Practices observed in making direct

microscopic examinations and methylene blue reduction tests. Public Health Reports, 58: 1641-1656. 1943.

2. Levowitz, D. Reproducible Data by Microscopic Method. Internat. Assoc. Milk Dealers. Assoc. Bull. No. 10, 139-150. 1944.

3. Levowitz, D. and Weber, M. An Effective "Single Solution" Stain. J. Milk and Food Technol., 19: 121. 1956.

4. Murphy, J. M. Mastitis — the Struggle for Understanding. J. Dairy Sci., 39: 1768-1773. 1956.

5. Robertson, A. H., Moody, Ruth I., and Frayer, J. M. Variability, accuracy and adaptability of some common methods of determining the keeping quality of milk. II. Observations in sextuplicate. Vermont Agr. Exp. Sta. Bull. 315. 1930.

6. *Standard Methods for the Examination of Dairy Products,* 10th Ed. Am. Pub. Health Assoc., Inc. New York, N. Y. 1953.

7. Wilson, G. S. *The Bacteriological Grading of Milk.* Medical Research Council. His Majesty's Stationery Office. London, England. p. 300. 1935.

PREPARATORY SANITATION AND QUALITY STANDARDS FOR PREFORMED MILK CARTONS[1]

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The preparation of sanitation standards normally has had gradual development in the various segments of the food industry. It is most gratifying to find a comparatively new industry developing such standards.

There has been a strong impetus behind the recent establishment of a number of small plants for the sole purpose of preforming single-service containers. For a number of years, it was increasingly difficult for small and medium-sized dairy plants to compete with large dairy plants in the packaging and sales of single-service containers. This was undoubtedly one of the reasons for the general exodus from the dairy industry of many small plants. Others, in order to continue in business, resorted to having milk packaged by their competitors with their own names imprinted on the carton.

Although preforming of certain types of milk cartons has been done for many years, it was not until 1947 that the first of the independent milk carton preforming plants was established for preforming the gabled top carton. The cartons were shipped to small and medium size dairies, and the dairy plant in turn was able to fill and seal the cartons in relatively inexpensive equipment by eliminating the costly portion of the equipment, including the former, waxer, and refrigerator sections.

There are two basic types of preformed cartons. One is completely preformed, requiring reopening of the carton prior to filling, the other is preformed, nested and wrapped and the top closed after filling at the milk plant.

Today, 17 independent preforming plants of this type, devoted solely to the forming, waxing, and packaging of single-service containers under strict sanitation controls, have been established, as noted in Table 1.

The need for sanitation and quality control was evident at an early stage. This accelerated a group of preformers of gable top cartons, together with manufacturers of filling and forming equipment and paper board fabricators to establish the Milk Carton Quality Preforming Council in February, 1955.

Harold Wainess is engaged as a milk, food, and industrial sanitation consultant. For ten years, he served with the U. S. Public Health Service. He acted as Chief Sanitary Officer of the Chicago Health Department, and was employed in various capacities in the dairy and food industry. Mr. Wainess was a member of the 3A Sanitary Standards Committee, and is a consultant to the Automatic Merchandising Health Industry Committee, and a special consultant to the U. S. Public Health Service. He received his B. S. degree in Bacteriology from Brooklyn College and his M. S. degree in Agriculture from Purdue University. He is author of numerous papers on milk and food sanitation.

The fundamental aim of the Milk Carton Quality Preforming Council is the establishment of sanitation and quality programs for the preforming industry. It was decided that the fulfillment of these programs could not be successful without the concurrent development and establishment of proper standards.

In the development of operational standards relating to public health, certain specific problems had to be dealt with as follows:

1. The amount of moisture in the atmosphere had to be maintained at a specific predetermined maximum.

[1]Presented at the Annual Meeting of the INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC., September 5-7, 1956, at Seattle, Washington.

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TABLE 1 — LOCATION OF GABLED TOP MILK CARTON PREFORMING IN PLANTS IN U. S.

California	1	Massachusetts	1
Colorado	1	Minnesota	2
Georgia	2	Mississippi	1
Illinois	1	Missouri	1
Indiana	1	Oregon	1
Iowa	1	Pennsylvania	2
Kentucky	1	Tennessee	1
Louisiana	1	Texas	1

2. The moisture content of the carton had to be exactly controlled.
3. The handling and distribution of adhesives and waxes required special consideration.
4. Since the cartons were not to be filled immediately with milk and thus gain some of the refrigeration from the product, additional refrigeration had to be incorporated after waxing.
5. Sufficient space had to be allocated to store single-service cartons, paper for wrapping, and large corrugated shipping cartons.
6. The building in which the plant was located had to be sanitary in construction to eliminate atmospheric contamination and infestation from insects and rodents.
7. A standard method for determining wax penetration had to be prepared.
8. Equipment normally used for fabricating milk cartons, which were to be filled with milk immediately, had to have a number of substantial changes in order to produce a satisfactory preformed carton.

PLANT OPERATIONAL STANDARDS

Moisture

The probem of excess moisture in the preforming of single-service containers is one that has been given considerable attention and was a determining factor in the use of single-service containers a number of years ago.

Moss, Thomas, and Havens (2) have commented on the effect of moisture as follows:

> "As paraffin is an anhydrous substance, any factors which affect the moisture content of the paperboard and especially the surface moisture at the time of paraffining would influence the bacterial reductions due to the paraffin treatment."

Excessive moisture content in the blanks can also cause a lack of stiffness in the container, opening difficulties, and excessive bulging.

Excessive moisture in the blanks prevents proper drying of the adhesive film during the sealing cycle. This results in a weak bottom, and is a potential source of bottom leakers. When a damp container is submerged in hot wax, the moisture in the board penetrates through the film of the wax on the inside and outside of the container, forming pinholes in the wax coating.

The lack of stiffness in the board can cause a concave condition in the side panels, and results in panel cave-ins.

A moisture content of four to six per cent gives the best operating conditions. Since the moisture content of the paperboard is related to the humidity of the surrounding air, it is of extreme importance to control this by maintaining the relative humidity in the storage rooms at specific levels. Table 2 is indicative of the relationship between the moisture content of the blank and room humidity. (3)

In order to maintain the paper blanks at five per cent moisture, it is necessary to store them at thirty per cent relative humidity. It is also essential that the storage room be warm.

While controlling the humidity, the moisture content of the blanks will also be controlled. However, it is important that the temperature of the room be at least 70°F. Where blanks are stored at lower temperatures and then removed to a warm, humid atmosphere, it is always possible that moisture from the air will condense on the carton and nullify substantially the effects of proper storage.

Controlling the humidity in a blank storage room is accomplished by condensing the excessive moisture from the air by passing it over refrigeration coils.

To provide good storage, the first essential is a dry room constructed of materials which will resist the passage of moisture-laden air. Effective vapor barriers, such as aluminum, are most efficient for this purpose.

To effectively and economically use a refrigeration method to control humidity, it is necessary to provide good air circulation throughout the storage area. The refrigeration coils can only condense moisture from air which passes over it. Therefore, it is essential that the air circulate freely in order to perform its function of releasing moisture from the container blanks and carrying it to the cooler coil where it is discharged as water after condensing.

Storage methods are also importance. Blanks should never be stored on a concrete floor. Cement is porous, readily transmitting moisture from the ground to its surface. Container blanks should be stored on wooden pallets or racks, so that they are at least four inches from the floor, with a six-inch space between stacks and twelve inches between the

TABLE 2 — RELATIONSHIP BETWEEN RELATIVE HUMIDITY AND MOISTURE CONTENT OF BLANKS[a]

Relative humidity (%)	Moisture in the blanks (%)
10	2.3
20	4.0
30	5.0
40	6.0
50	7.0
60	7.5
70	8.5
80	9.0
90	9.5
100	10.0

[a]Courtesy of Ex-Cello-O Corporation (*3*).

stack and the surrounding walls. This accomplishes three things — first, it keeps the blanks from direct contact with the concrete; second, it permits free air circulation so that the stored containers can come to a state of equillibrium with the temperature and humidity existing in the storage room, and third, it allows sufficient space for proper cleaning of the floor area.

In order to maintain and control the humidity of the room and moisture in the blanks, it is recommended that the plant use a cooler, a heater, a humidistat, a thermostat and a hygrometer or humidigraph. In addition, a device for actually determining the moisture on a single or a group of blanks is essential.

Under normal conditions, blanks, as they are received from the converter, should never be immediately preformed. The variation in moisture content could be considerable. As an example, it is possible that blanks could leave the converting plant with a four to six per cent moisture content. However, during transportation in rainy weather, the moisture level may rise to as high as ten per cent upon arrival at the preforming plant, and it will take a number of days in proper storage, thirty per cent relative humidity, to return the blanks to their orginal condition. Therefore it is recommended that blanks be stored under a controlled atmosphere for at least two weeks prior to being used.

Adhesives

Adhesives should be compounded of non-toxic ingredients and should be handled and shipped to the preforming plant in clean, tightly-covered containers, or bulk transportation tanks.

At the preforming plant, the adhesives should be stored at a temperature ranging from 50° to 100°F and kept not more than three months. Material stored longer than this will show some evidence of separation and will require thorough agitation before use.

Where adhesives are manually applied to the rollers, the covers on the large shipping containers should be removed only for short periods of time and the adhesives kept covered when not in use. Transfer containers should be kept clean and adhesive appliers should be of sanitary construction and washed at frequent intervals.

Where adhesives are pumped from storage containers to the preforming equipment, the storage containers must be completely covered at all times. This is to prevent contamination of adhesives by insects and dust.

Waxes and Other Surface Protectants

Wax should be stored in a clean, cool room in the orginal shipping cartons and it is recommended that the temperature of the room never exceed 90°F. The wax storage room should be well ventilated in order to remove the possibility of odor absorption, particularly of petroleum products.

Where wax is not completely used after the day's operation, it should be returned to the orginal carton and placed in the storage room. Open cakes of wax should not be exposed to atmospheric contamination for more than very short periods of time.

Wax should be stored on skids at least four inches from the floor, both in the storage room and the area adjacent to the preforming equipment. The use of skids simplifies transportation of wax throughout the plant and facilitates cleaning.

The most sanitary and economical method of handling wax is by purchasing it from the refinery in the liquid state. The wax is kept at predetermined temperatures and automatically fed to the wax tank in a completely sanitary manner. It eliminates the unnecessary handling and the many chances of contamination that can occur with block paraffins. In addition, it assures a more even temperature in the wax tank.

Refrigeration

The orginal design of carton manufacturing equipment provided sufficient refrigeration to cool cartons to a limited extent, since the addition of milk at a temperature of 40°F would serve to complete the necessary cooling. The lack of these factors results in an improper setting of the wax, permits the formation of loose wax, provides a carton with an uneven distribution of the wax throughout the paperboard surface, and may cause improper sealing after the preformed carton is filled with milk. The importance of these factors must be given further consideration. The even distribution of wax over the surface is undoubtedly one of the greatest factors in preventing so-called "leakers." The public health significance of leakers

of course is obvious. Not only do they create an insanitary condition at the milk plant, in the milk delivery truck, and at the retail store, they also create problems of sanitation in the household refrigerator. Therefore, in the preforming of single-service containers, the refrigeration capacity must be accordingly increased.

Storage

There should be appropriate storage rooms for single-service containers, paper for wrapping and large corrugated shipping cartons, waxes and adhesives.

Building and Maintenance Sanitation

Many items of the Milk Ordinance and Code Recommended by the U. S. Public Health Service (*1*) and similar requirements of state and local codes must be complied with. These include floors, walls and ceilings, doors and windows, lighting, ventilation, miscellaneous protection including insect and rat control, toilet facilities, water supply, handwashing facilities, construction of containers, waste disposal, bacteriological examination, storage of multi-use containers, handling of containers, storage of single-service containers, personnel health, and personnel cleanliness. In addition, a statement should be added indicating that preformed cartons from points beyond the limits of routine inspection are acceptable if manufactured, fabricated, preformed, stored, and handled under provisions substantially equivalent to the requirements in these standards.

Labeling

There is need for a further clarification of the labeling requirments of most ordinances and codes relating to the identity of the plant at which the cartons are preformed. It has been tentatively suggested that the standards include a requirement for such identity in order to enable milk control officials to readily establish the source of cartons in the case of emergency. This need is evident when it is pointed out that users of preformed cartons may obtain these cartons from more than one source.

Laboratory Analysis

Bacteriological analysis, both disintergration tests of each source of supply and rinse tests, should be conducted monthly in accordance with the latest Standard Methods for the Examination of Dairy Products. This includes both standard plate and coliform counts.

Most preforming plants and milk control agencies have conducted penetration tests on preformed cartons to determine whether the carton is completely and sufficiently waxed. Both methylene blue and iodine solutions have been used for this purpose.

However, there is no available standard method either for determining the length of time the solution is to stay in the carton or a standard of interpretation. Although most cartons will show some slight staining at the flaps and on other surfaces, it has been felt that a good carton is one that shows staining of not more than one-quarter inch on each side of each score line, and no staining at any other surface. As yet, the Milk Carton Quality Preforming Council has not developed a standard for determining wax covering on preformed cartons, but feels that this will be an important part of the final standards.

Plant Inspection Form

A "Preformed Milk Carton Plant Inspection Form" has been prepared[3]. At present, it is intended to use this form merely as a guide. However, when the standards are completed, they will be available to all milk control agencies.

CARTON STANDARDS

The Milk Carton Quality Preforming Council is at present preparing a detailed standard for the dimensions of the carton, both in the blank state and completely preformed. This is extremely important in order to insure the sanitary filling of the container, regardless of the source of the container or the type of filling equipment.

Deviations from a standard may result in breakage of cartons, unnecessary handling of contact surfaces in order to have proper fill, and improper sealing. It is contemplated that most of the dimensions should be maintained within 1/32", and experience indicates that preformers can adhere to this standard.

The top must be sufficiently strong to be opened by the filler plow without damage to perforations, glue joints, or flaps, and where pitcher pour perforations are used, they should not be broken in forming.

CONCLUSION

It is the intention of the Milk Carton Quality Pre-

[3]Copies may be obtained from the author.

forming Council to prepare a complete tentative standard for review by the industry. Following that, it is to be submitted to various milk control agencies for their comments and suggestions. When all of this has been completed, the standard will then be adopted as an official industry code.

REFERENCES

1. Milk Ordianace and Code Recommended by the Public Health Service, 1953.

2. Moss, F. J., Thomas, R. C., and Havens, M. K. Bactericidal Effect of the Paraffining of Paperboard Used for Paper Milk Containers. Public Health Reports, 56. 944-956. 1941.

3. Pure-Pak Manual, 1954. Ex-Cell-O Corporation, Detroit, Michigan.

NEWS AND EVENTS

3-A SYMBOL ON DAIRY EQUIPMENT A 'SYMBOL OF SAFETY' INDICATING COMPLIANCE WITH SANITARY STANDARDS

"More than 20 letters from milk producers asking me just what is this business about '3-A symbols' on farm tanks have come across my desk in recent weeks," a staff member of a major milk producer group recently stated.

To explain "what this business about '3-A symbols' " is, the following short announcement was recently issued by a spokesman for the 3-A Sanitary Standards Symbol Administrative Council:

When an item of dairy equipment carries on it the 3-A Symbol, this indicates that the equipment complies with 3-A Sanitary Standards for Dairy Equipment, and thus is acceptable to most sanitarians and health inspectors in all parts of the United States.

The 3-A Sanitary Standards are evolved, voluntarily, by the 3-A Sanitary Standards Committees, on which are represented sanitarians, makers of equipment, and the dairy processors and milk producers who use the equipment. The 3-A Committees meet twice a year, and to date have approved 3-A Sanitary Standards for 15 types of dairy supplies and equipment, and have recommended sanitary methods to follow in certain processing teachniques.

If a manufacturer of equipment believes that his product complies with an existing 3-A Sanitary Standard, he may apply to the 3-A Symbol Council for authorization to place the 3-A insignia on his finished equipment, so that a potential buyer can tell at once that the equipment he is purchasing meets the exacting sanitary engineering standards deemed most desirable by a consensus of regulatory officials, manufacturers and users, and so that the regulatory officers can readily identify 3-A complying equipment. The symbol, which resembles a large letter "A" on which is super-imposed a smaller number "3", may also be used in advertisements for conforming equipment, thus further informing prospective purchasers of the sanitary engineering aspects of equipment.

The 3-A Symbol Council, which authorizes use of the symbol on complying equipment, is composed of eight persons, four of whom represent the International Association of Milk and Food Sanitarians; two of whom represent Dairy Industries Supply Association; and two of whom represent all major processing associations through the Dairy Industry Committee.

The 3-A Symbol is a potential "symbol of safety" for prospective purchasers of any of the types of dairy equipment now covered by 3-A Sanitary Standards. For further information, interest persons may write the headquarters of their national dairy industry trade associations, or directly to the 3-A Symbol Council which has its staff headquarters at 2617 Hartzell Avenue, Evanston, Ill.

MASTITIS TEST KIT AVAILABLE

A new Mastitis Test Kit is now available, free of charge, from Lazarus Laboratories, Inc. 42-16 West Street, Long Island City 1, New York.

This Kit, consisting of "indicator blotters" is suitable for testing 20 cows. It is simple to use and easily carried in the pocket.

Lazarus Laboratories, pioneers in the development and marketing of "Tamed Iodine" detergent-germicids, manufactures Iosan, Iobac and Iopipe (for C. I. P.) and maintains a dairy sanitation sales force in principal cities throughout the United States and Canada.

The new text kits may be had simply by writing the company at the above address or by contacting any of Lazarus' local representatives.

FIFTH ANNUAL DAIRY CONFERENCE UNIVERSITY OF KENTUCKY

Dairy Leaders of North and South will meet on the neutral ground of Kentucky to discuss dairy problems at the Fifth Annual Dairy Manufacturing Short Course at the University of Kentucky, December 3, 4, and 5, 1957. The short course is sponsored jointly by the Dairy Section of the University of Kentucky and the Dairy Products Association of Kentucky.

Ice cream, market milk, and cheese will each be given a day at the course with the problems unique to each being discussed at that time. The ice cream program will be a "what is" program — what is the necessary requirement for good ice cream, what is a good stabilizer and many other questions will be discussed.

Present problems and the future of the market milk industry will be the subject on the second day while Thursday, December 5th will be devoted to those problems peculiar to the cheese making industry. Outstanding experts in all phases of the dairy field have been engaged for the course.

Clinics in ice cream, cottage cheese, buttermilk, and cheddar cheese will continue to be a feature of the short course. In addition an added feature this year will be a milk scoring contest open to those attending the short course.

The annual short course banquet will be held Wednesday, December 4th with J. G. Hayes of Michigan State College as the banquet entertainer. Fee for the three day course will be $10.00 which includes the banquet ticket. Further information concerning the fifth anual Kentucky Dairy Manufacturing Short Course may be obtained by contacting Dr. A. W. Rudnik, Jr., Chairman of the Short Course, Dairy Section, University of Kentucky, Lexington, Kentucky.

KLENZADE BREAKS GROUND FOR NEW PLANT

Coincident with its 25th Anniversary, Klenzade Products, Inc., Beloit, Wisconsin, is building a new plant which will be occupied in December of 1957. Ground was broken by Mr. A. L. Shogren, Chairman of the Board, and Mr. C. B. Shogren, President, on September 3 at a beautiful location just outside of Beloit, Wisconsin. A 45 acre plot at this site will provide for expansion, parking facilities, and attractive landscaping.

The rapid growth of the company since its founding by the two Shogren brothers 25 years ago has made this expansion necessary to enlarge manufacturing facilities and still further improve service to customers.

At the present time, a clear-span structure 100 feet by 260 feet is being built to house powdered detergent manufacturing facilities. Late in 1958 an addition, 200 feet by 260 feet, will be made to the original building to house the remaining operations. Klenzade will then have its manufacturing, local warehousing, accounting, shipping, laboratory control and research, sales and administrative facilities under one roof in a modern building specifically designed to meet the growing needs of the company.

To better serve sanitary chemical needs in the dairy, food processing, and institutional fields, much of the plant will be set up on automation production lines with incoming raw materials routed on a straight line basis to the various processing operations with a minimum of handling. The broad experience of Klenzade in automation engineering will be excellently typified in the application of automation techniques to the manufacturing of detergents and bactericides, thus assuring not only closely controlled uniformity but also top quality products at lowest possible manufacturing costs.

BRITISH DAIRY QUEEN PLANS TOUR OF U. S.

The "royalty" of Great Britain's dairy industry, a pretty, bright-eyed Welsh dairy farmer's daughter, will begin a two-week tour of the United States October 1.

Twenty-year-old Mona Griffiths, Britain's newly-selected National Dairy Queen, will arrive in New York October 1 to begin a United States tour which will take her to Jamestown, Virginia, where British colonists originated the American dairy industry 350 years ago, and to farming and dairying centers across the nation.

High point of the trip will come in Chicago October 12 and 13 when she participates in the American Dairy Association-sponsored ceremonies naming the American Dairy Princess at the International Dairy Show.

The British Dairy Queen has left her native Wales only twice before - - and one of these trips was to compete for the Dairy Queen title.

She lives near the village of Sarnau (population: 40), where she and her father and two younger brothers operate a 200-acre dairy farm. Besides helping look after the herd of 10 milking Shorthorns, she bottles milk for the entire village and delivers it herself. Because her mother died when she was three, she also does most of the cooking and housekeeping for her family.

The hustle and bustle of busy American cities will mark quite a change from tranquil Sarnau, which can boast of three telephones, three TV sets and a business district made up of a combination post office and general store. But the Dairy Queen isn't worried about the change; she is an accomplished public speaker and is becoming accustomed to the busy life of a Dairy Queen through her experiences in England.

While in the United States, she will be making numerous radio and television appearances - - and may even have an opportunity to show her skill at singing and dancing to Welsh folk music.

DAIRY FIELDMEN AND PLANT OPERATION CONFERENCES TO BE HELD AT PURDUE

Professor H. W. Gregory, Head, of the Dairy Department at Purdue University has announced two one-day meetings to be held in November, 1957. The meetings are as follows: Dairy Fiedmen's Confer-

ence, November 20 and Plant Operator's Conference, November 21.

The conferences are an annual affair sponsored in cooperation with the Indiana Dairy Products Association. Dairy industry and university specialists will discuss topic's selected because of their current interest.

For further information write to: Mr. H. F. Ford, Smith Hall, Purdue University, Lafayette, Indiana.

PROFESSOR LEONARD R. DOWD PRESENTED CERTIFICATE OF APPRECIATION

At the annual outing of the Connecticut Assocation of Dairy and Food Sanitarians, Inc., held September 11, 1957 a "Certificate of Appreciation" was presented to Leonard R. Dowd, Professor of Dairy Manufacturing at the University of Connecticut. This was signed by more than 400 members and friends of the Association.

Professor Dowd was born in Hartford, Michigan in 1908, and was graduated from Michigan State College in 1931. He received his Masters Degree in 1932 from Purdue University on a fellowship award by the Dairy Industry Supply Association for exellence in products judging. Since 1934, with the exception of the years 1942-1943, Professor Dowd has been with the University of Connecticut. He is signally recognized for his work in the short-time high-temperature pasteurization of ice cream mix.

He has been very active in the Connecticut Association through committee work, and contributions to our educational program. He was the first pitcher on their state group soft ball team; President of the Assication in 1951; and Chairman of the Milk Industry Equipment Committee for Civil Defense. He has also served for several years as Co-Chairman of the Connecticut Milk Industry Committee for Civil Defense, currently holding this responibility.

At large, Professor Dowd has graciously extended a helping hand in a most friendly manner to those who were struggling with dairy industry problems.

DAIRY INDUSTRY COMMITTEE REORGANIZED

The Dairy Industry Committee beginning on November 1 will operate on a new basis, as a result of action taken at a meeting held on September 19 in Chicago, Illinois. The composition of the Committee will continue to consist of three industry representatives and the chief paid staff officer of each of the constituent assications - American Butter Institute, American Dry Milk Institute, Dairy Industries Supply Association, Evaporated Milk Association, International Association of Ice Cream Manufacturers, Milk Industry Foundation, National Cheese Institute and National Creameries Association.

The action of the Committee, while providing for the maintainance of the machinery for continuing inter-association consultation on common problems, calls for a discontinuance of the reporting services heretofore rendered by the Washington staff.

The standing subcommittees of the D. I. C., such as those on 3A Sanitary Standards, Transportation, Education, Dairy Waste Disposal, Imports and others, will continue to serve the dairy industry.

A resolution adopted unanimusly commends the Executive Secretary, M. H. Brightman, and Assistant, Miss A. Olivia Nicoll, both of whom will leave the employ of the D. I. C., for their capable and loyal service rendered the industry over a long period of time.

PUBLIC HEALTH SERVICE ANNOUNCES VENDING OF FOODS AND BEVERAGE ORDINANCE & CODE

The Public Health Service has announced the publication of "The Vending of Foods and Beverages", a suggested sanitation ordinance and code recommended for the guidance of municipalities and other local governmental units concerned with the sanitary control of vending machine operation.

The publication is the result of cooperative efforts between the Milk and Food Program of the Division of Sanitary Engineering Services of the Public Health Service and the National Automatic Merchandising Association, the trade association of manufacturers and operators of food and drink vending machines.

The 18 page booklet deals with the sanitary construction and operation of vending machines and with sanitation programs in this area of milk and food protection. It was developed at the request of state and local health authorities and the industry in the interest of uniformity in the sanitary control of vending machines, particularly those dispensing ready perishable foods and beverages.

In addition to recognizing the many contributions by state and local health authorities in the development of these recommended standards, the Public Health Service also acknowledged the work of the 71 member Public Health Committee of the National Automatic Merchandising Association, Aruthur J. Nolan, Dixie Cup Co., Chairman.

Vice Chairmen of the cooperating divisions of NAMA were: William M. Barnes, Coca Cola Com-

pany, Cold Drink Division; William H. Seldy, Lilly Tulip Cup Corp., Hot Drink Division; George Hanson, Vendo Company, Hot Food Division; Everett Newcomer, City Milk Vending Corp., Milk and Ice Cream Division; Maurice Gottleib, National Automatic Service, Inc., Operators Division; Charles Rolleston, Gordon Foods, Inc., Packaged Confections and Candy Division; and H. M. Beitel, Secretary, N. A. M. A.

NATIONAL COMMISSION ON HEALTH CAREERS FORMED

Formation of a national Commission on Health Careers to plan ways to meet the acute need for qualified health personnel in the United States was announced by Basil O'Connor, President of the National Health Council.

The Commission will be headed by Dr. Leonard A. Scheele, former Surgeon-General of the United States Public Health Service and now President of Warner-Chilcott Laboratories in New Jersey. Its membership has been drawn from leaders in American life.

Mr. O'Connor said the Commission had been created in a setting which finds health manpower shortages already at a "crisis stage."

"Lack of manpower poses the biggest threat not only to our present health services, but to the future progress of medical science," he declared.

"Many people, when they think of the health professions, naturally picture the physician, the dentist, and the nurse," he said. "Actually the range is infinitely broader. Workers in more than 150 health occupations guard the well-being of American citizens. Many of these professions are inter-linked and mutually dependent. The great majority are dangerously understaffed."

Mr. O'Connor said the Commission would undertake a "total approach" in meeting health manpower needs.

He outlined the general task of the Commision as:

1. Sparking and giving added impetus to all kinds of health career programs at local, regional, and national levels.
2. Investigating the possibilities of careers in the health field, not only for young people, but for other potential health workers.
3. Assembling information vital to the full staffing of the health services by conducting fact-finding studies on health manpower problems and by encouraging and offering guidance in the conduct of such studies by other groups.
4. Focusing on such specific issue as eductional facilities and programs for potential health workers, the availability of scholarships and loan funds, aptitude testing, salary ranges in the health field, etc.
5. Encouraging further studies of the work done by highly trained people and ways of utilizing their skills most effectively.
6. Stimulating public recognition of the need for adequate staffing of health services.

Mr. O'Connor said that a poineering step toward the adequate staffing of the health services of the country was taken three years ago when the National Health Council initiated its Health Career Horizons Project

"This project is designed to inform the nation's young people of the wide range of career opportunities in the health field. With the cooperation of national, state and local organizations, and with materials supplied by The Equitable Life Assurance Society, the Project has achieved a remarkable degree of success," he said.

He said that the Commission would carry on the full operations of the Health Careers Horizons Project, while at the same time engaging in its greatly broadened task.

In accepting the Chairmanship of the Commission, Dr. Scheele said that virtually every element in American society had a stake in the Commission's efforts and pointed out that labor, industry, and education are all involved.

Among those named to the Commission are:

Eugene Beesley, President of Eli Lily and Company, Indianapolis, Ind.

Jacob Blaustein, Director of the American Oil Company, Baltimore, Md.

Howard Coughlin, President of the Office Employes International Union, New York City.

A. W. Dent, President of Dillard University, New Orleans, La.

Melville P. Dickenson, Senior Vice-President, the Equitable Life Assurance Society, New York City.

Alvin C. Eurich, Vice-President, The Fund for the Advancement of Education, New York City.

Miss Margaret Hickory, Public Affairs Editor, Ladies Home Journal, Philadelphia, Pa.

Dr. Herman E. Hilleboe, Commissioner of Health, New York State, Albany.

Mrs. Albert D. Lasker, President of the Albert and Mary Lasker Foundation, New York City.

Herbert H. Lehman, former U.S. Senator.

Thomas A. Spragens, President, National Merit Scholship Corporation, Evanston, Illinois.

Sylvester Weaver, former President of the National Broadcasting Company, New York City.

The National Health Council, 1790 Broadway, New York City, is an assoication of 61 national organizations concerned with health. Its membership consists of voluntary and governmental health agencies, civic and professional associations, and business firms having a major interest in health.

PUBLIC HEALTH SERVICE ANNOUNCES REVISED EDITION "SANITARY CONTROL OF THE SHELLFISH INDUSTRY"

The Public Health Service announced today the publication of a revised guide to the Sanitary Control of the Shellfish Industry, 1957 Edition, PHS Publication No. 33. The initial publication of standards of recommended practice in this area was developed in 1925 by The Public Health Service at the request of state health departments and the shellfish industry. The current guide is the third revision.

This guide outlines the basic sanitary standards for the cooperative State-Industry-Public Health Service program for the certification of inter-state shellfish shippers.

The guide includes recommended sanitation practices for harvesting boats and establishments which process oysters, clams or mussels.

The revised Manual is a product of the Shellfish Sanitation Section of The Milk and Food Program, Division of Sanitary Engineering Services, Public Health Service.

Agencies cooperating in the revision of the guide included shellfish control authorities in all coastal states, food control authorities in inland states, various Federal agencies, The Canadian Department of National Health and Welfare, The Pacific Coast Oyster Growers Association and the Oyster Growers and Dealers Association of North America.

UNDERGRADUATE LOANS NOW AVAILABLE THROUGH DAIRY REMEMBRANCE FUND

A rotating fund is being set up by the DAIRY REMEMBRANCE FUND in order to grant undergraduate loans to students in the dairy field. These will be long term loans to be repaid out of earnings and upon a basis tailored to the needs of each individual applicant. If you wish to submit nominations for such loans, further information may be obtained from: Robert Rosenbaum, Secretary, 3743 "D" Street, Philadelphia 24, Pa.

HELPFUL INFORMATION

Editorial Note: Listed below are sources of information on a variety of subjects. Requests for any of the material listed should be sent by letter or postcard to the source indicated.

Bank Barns Compared with Aboveground Barns for Housing Dairy Cattle. Bulletin Cat. No. A 1.84:2. 38 pages, illustrated. 1956. Available from Supt. of Documents, Washington, D. C. Price 15 cents.

Bread Baking, Department of the Army Technical Manual 10-410. Cat. No. D 101. 11:10-410. 163 pages, illustrated. 1956. Available from Supt. of Documents, Washington, D. C Price 75 cents.

Automatic Merchandising of Fluid Milk Products. Bulletin by E. E. Brown, C. D. Evans and B. J. Todd. S. C. Agric. Expe. Sta. AE 111, 20p. June 1955. 281.9 C59. Available from South Caroline Agricultural Experiment Station, Clemson, S. C. No charge.

Automatic Milk Vending. Bulletin by E. E. Brown and B. J. Todd. S. C. Agric. Expt. Sta. AE 115. 13 pages Nov. 1955. 281.9 C59. Available from South Carolina Agricultural Experiment Statioon, Clemson, S. C.

Unloading and Receiving Produce in Retail Food Stores. Bulletin presenting the results of research on methods of increasing the efficiency of operating the produce department of supermarkets. Cat. No. A 1.82:129. 13 pages, illuustrated. 1956. Available from Supt. of Documents, Washington, D. C. Price 10 cents.

A Longtime Study on the Feeding of Chlorotetracyline (aureomycin) to Gestatinglacting Sows. Bulletin by H. D. Wallace and C. E. Haines. Fla. Agric. Expt. Sta. Amin. Husb. Mimeo. Ser. 55-12, 4 pages, Feb. 1956. 49.9 F66. Available from Florida Agricultural Experiment Station, Gainesville, Fla. No charge.

Annual Diseases-1956 *Yearbook of Agiculture.* 575 pages. 134 chapters. Available from Supt. of Documents, Washington, D. C. Price $2.00

Dictionary of Poisons. Book by Ibert and Eleanor Mellan. Available from Philosophical Library, 15 E. 40th St., New York 16, N. Y. 1956. Price $4.75.

Changing Patterns in Fluid Milk Distributions Types of Milk, Channels of Sale, Types and Sizes of Containers. Bulletin. Publication MRR 135. Available from Supt. of Documents, Washington, D. C. Price 25 cents.

Frozen Food Lockers-Highlights of a Survey. Circular FCS 17. Available from Supt. of Documents, Washington, D. C. No charge.

The Use of Frozen Foods by Restaurants. Bulletin. Cat. No. A 1.82:144. 32 pages, illustrated. 1956. Available from Supt. of Documents, Washington, D.C. Price 25 cents.

Milk Ordinance and Code. Bulletin. Cat. No. FS 2.6:M 59 953-3. 233 pages, illustrated. 1956. Available from Supt. of Documents, Washington, D. C. Price $1.00.

Undulant Fever, Health Information Series No. 42. Cat. No. FS 2.50:42 2. Rev. 1956. Available from Supt. of Douments, Washington, D. C. Price 5 cents.

Utilization and Disposal of Poultry By products and Wastes. Bulletin. Cat. No. A 1.82:143. 54 pages, illustrated. 1956. Available from Supt. of Documents, Washington, D. C. Price 35 cents.

Houses and Equipment for Laying Hens For Loose Housing on Litter. Bulletin. Cat. No. A 1.38:728. 28 pages, illustrated. 1956. Available from Supt. of Documents, Washington, D. C. Price 20 cents.

Production Research Reports (This is a new series presented in popular or semi-technical style for professional and technical workers in agriculture and related fields).

Bank Barns Compared with Aboveground Barns for Housing Dairy Cattle. Bulletin by M. J. LaRock and R. G. Yeck. Argic. Res. Ser. and the Wisc. Agric. Expt. Sta., Madison, Wisc. No charge.

Bovine Contagious Pleuropneumonia. 16 mm color, sound film. 28 minutes. Available from film libraries at Land-Grant Colleges having Veterinary Medical Schools. No charge.

The Use of Frozen Foods by Restaurants. Marketing Research Report No. 144. Mktg. Res. Div. A. M. S., U. S. D. A., Washington, D. C. Available from Supt. of Documents, Washington, D. C. Price 25 cents.

Improved Handling of Frozen Foods in Retail Stores. Report. Available from Supt. of Documents, Washington, D. C. Price 20 cents.

Facts About Pasteurization of Milk. Leaflet No. 408, U. S. Dept. of Agric. Dec. 1956. Available from Supt. of Douments, Washington, D C. Price 5 cents.

Anthrax in Man. Symposium presented under joint sponsorship of Dept. of Health, Pennsylvania and University of Pennsylvania. 178 pages. Available from Dept. of Health, Commonwealth of Pennsylvania, Harrisburg, Pa. No charge.

Cleaned in Place. 16 mm movie about washing of bucket and pipe line milking machines. Available from Babson Bros. Co., 2843 W. 19th St., Chicago, Ill. No charge.

SEIBERLING ASSOCIATES WITH KLENZADE

Dale Seiberling, formerly Engineering Specialist in the Department of Dairy Technology of Ohio State University, has been retained as a Consultant by Klenzade Products, Inc., Beloit, Wisconsin, to head Klenzade Automation Engineering Services. Mr. Seiberling is well known throughout the dairy industry for his extensive development work in automation engineering and automated cleaning techniques. He was recently sent to India by the United States Government as a member of the Technical Cooperation Mission to design and prepare specifications for a number of milk processing plants as part of the Dairy Development Project of the Indian Government second five-year plan. The association of Mr. Seiberling with Klenzade further implements and expands the company's diversified engineering services in automation cleaning of storage tanks, bulk pick-up tanks, and various phases of semi-automated cleaning such as evaporators, vacuum pans, and other cleaned-in-place operations. Complete details about Klenzade Automation Engineering Services may be obtaained by writing to Engineering Department, Klenzade Products, Inc., Beloit, Wisconsin.

PUBLIC HEALTH SERVICE ANNOUNCES AWARD OF SEVENTY-SEVEN TRAINEESHIPS

The Public Health Service has awarded 77 graduate traineeships in environmental sanitation for the 1957-58 school year, it was announced recently.

The awards were made to 32 sanitary engineers, 37 sanitarians, 3 chemists, 2 industrial hygienists, a geologist, a physicist, and a biologist. The awards went to persons from 28 States and Alaska.

The environmental health traineeships are available to engineers, sanitarians, chemists, and allied professional personnel who wish to enroll for graduate study in public health. Traineeships in other public health fields are also available under Title 1, Section 306 of the Act, which was primarily intended to bring new people into the field of public health.

Applications may be obtained from any of the Department of Health, Education, and Welfare Regional Offices or from the Chief, Division of General Health Services, Bureau of State Services, Public Health Service, U.S. Department of Health, Education, and Welfare, Washington 25, D. C.

ANNUAL OKLAHOMA DAIRY CONFERENCE

The Annual Oklahoma Dairy Industry Conference will be held at Oklahoma State University, November, 11, 12 and 13, 1957. A well rounded program that will appeal to all plant personnel is planned. Details may be obtained by writing the Dairy Department, Oklahoma State University, Stillwater, Oklahoma.

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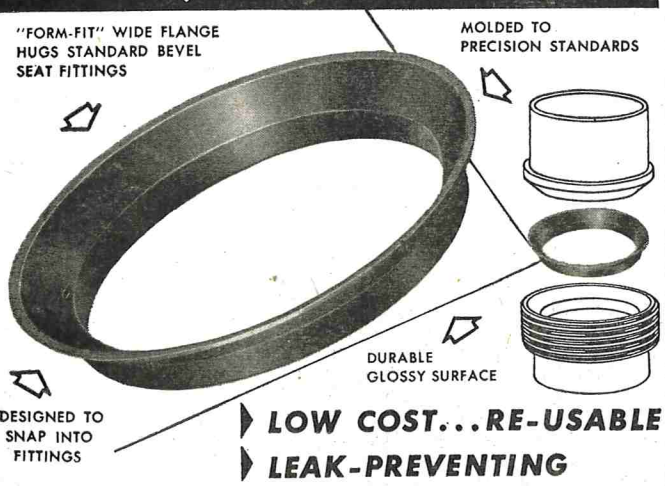

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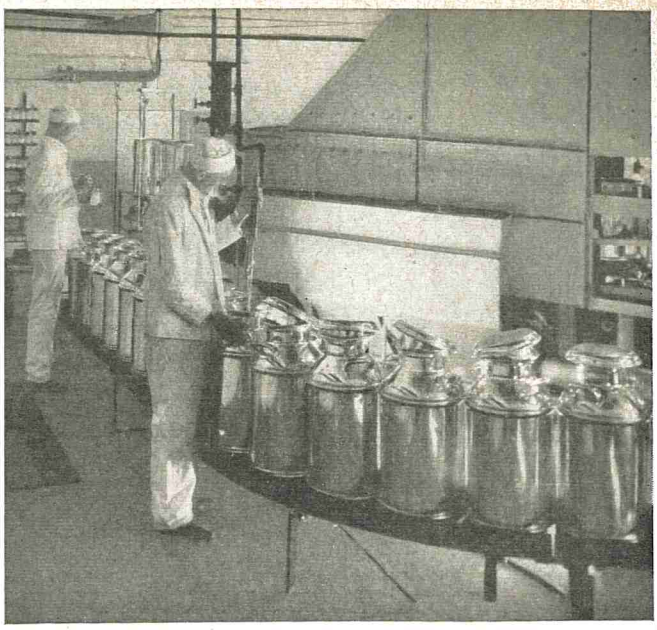

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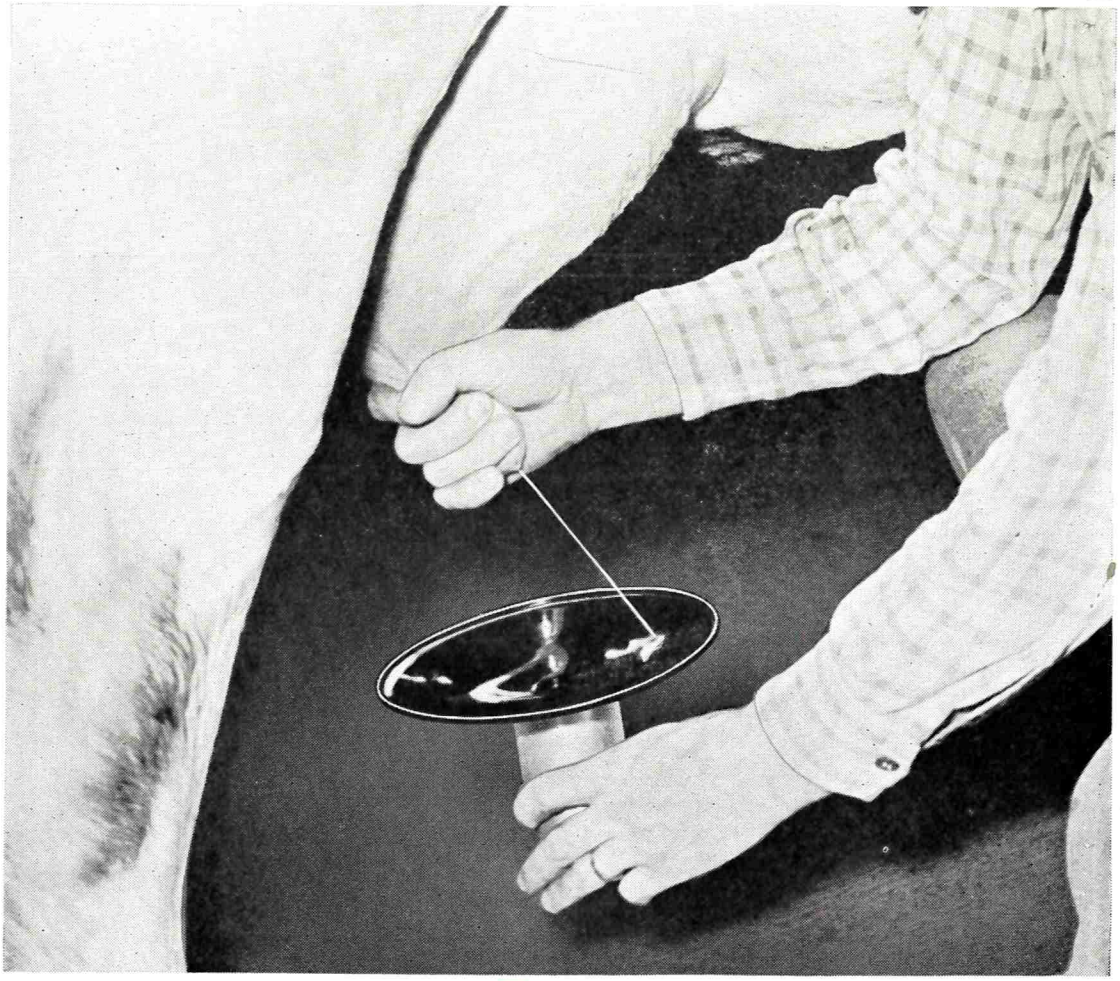

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