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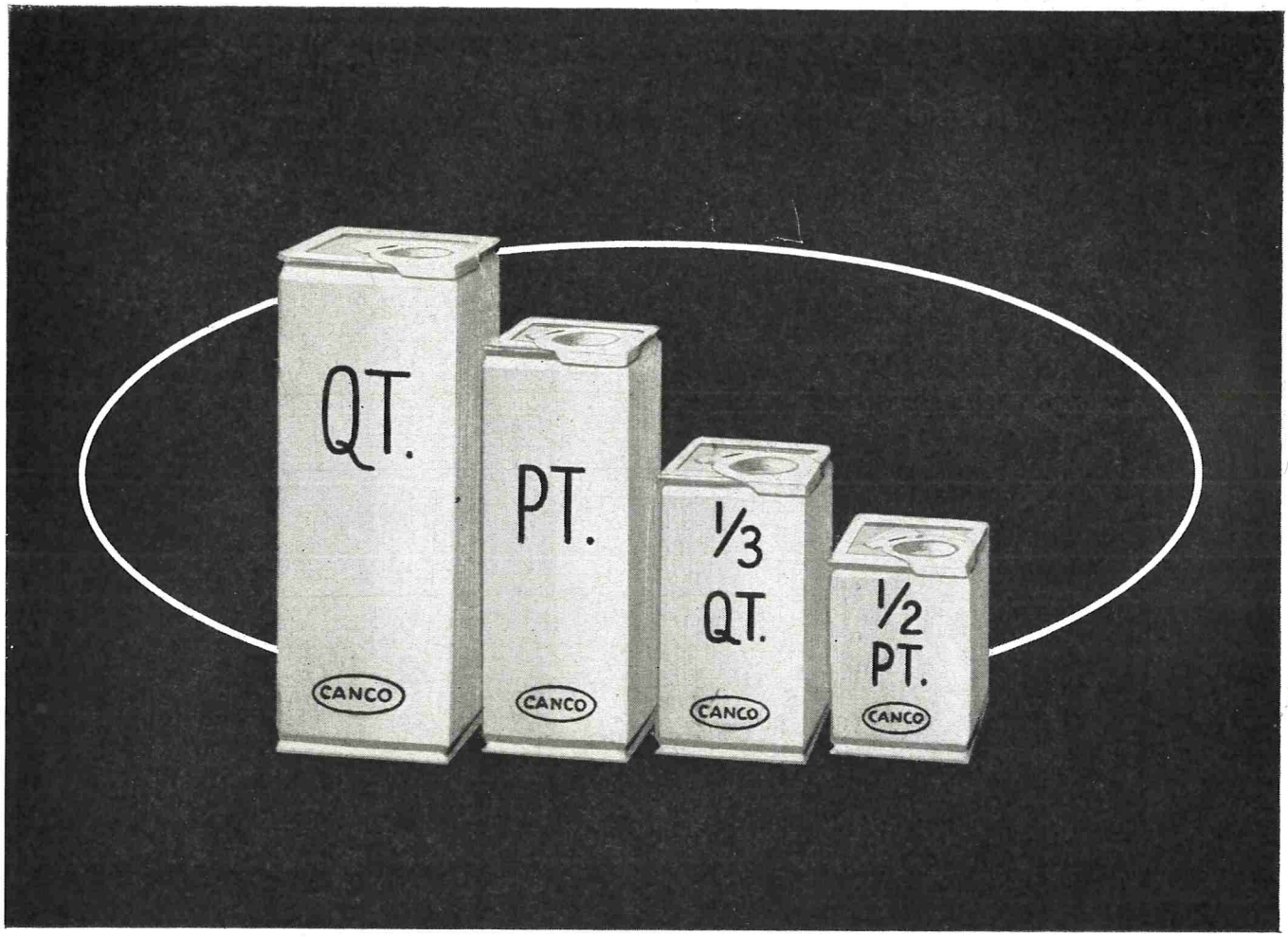

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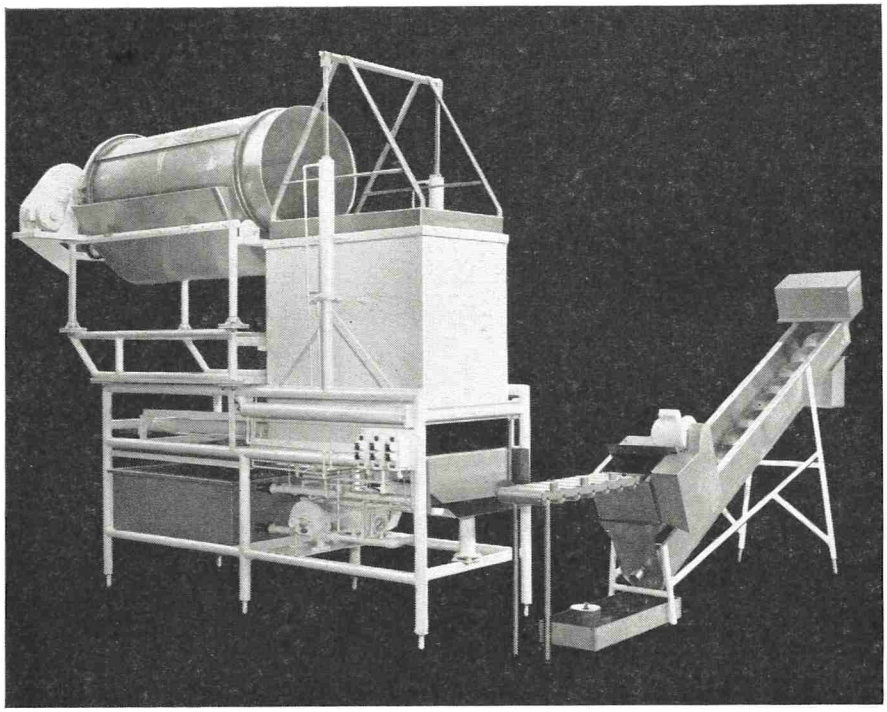

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THE AGREEMENT OF THE NATIONAL CONFERENCE ON INTERSTATE MILK SHIPMENTS; NECESSARY AREAS OF CLARIFICATION AND PROCEDURES FOR IT'S REVIEW[1]

K. G. WECKEL

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The Conference Agreement is a document conceived to enable the convenient interstate flow of milk. It has had almost a decade of use. It is being used, according to survey, by some 30 states, and the volume of milk transhipped by its facilities is presently estimated to be some three-fourths of a billion pounds annually, involving some 20,000 separate shipments (*1*). The object of the conference is to review the Agreement for the purpose of considering how it best can meet the objectives of enabling interstate shipment of milk. There are many who use the agreement to great advantage: in procuring supplies to meet deficit requirements; to decrease costs of import procurement, and in simplifying the mechanics of interchange.

Certain aspects of consideration of the Agreement should be known by all who participate in deliberations about its application. Perhaps the first of these is that anyone who proposes review or change of the document should first read and understand it, and secondly, to recognize that what it contains and embodies did not come lightly, but with a great deal of prior deliberation and reasoning. The second perhaps is that the document is not, and should not be considered a substitute or replacement for the legal instruments presently in use in the respective states. It is, and always was intended to be, a tool or procedure whereby the interstate shipment of milk could be enabled when such was considered desirable for any reason whatever. It is not a regulation. The various states have their own regulation. It is a voluntary Agreement to supplement and implement the transflow of milk.

It is obvious that the Agreement, as a tool, could not possibly conform to the letter, nor the interpretation of all the existing legal documents of the several states. Nor was it ever so intended. It was devised to facilitate desired inter shipment because the legal documents of the several states did and do differ. If the legal documents of the several states did not differ, there would be no need for the Agreement. There certainly is need for the Agreement, because it is being used very extensively by both regulatory and industry people. It was conceived to express what receiving states wanted, and what shipping states could provide, in qualification of a transshipped milk supply. Without question, the existence of the Agreement has had a strong beneficial influence on soul searching and self analysis of industry, community and state standards everywhere. Use of the program *has* resulted in better quality of milk; those who had milk to sell have had to improve it; those who want to buy have wanted it still better. The Agreement is not, and never was intended to abrogate states rights. It is based on faith, and understanding, and confidence. It is a document of voluntary concept.

Thus, participants to consideration of the Agreement, should first know the Agreement, and how it came into being. There is no object in proposing changes, modifications, stipulation of details and like considerations unless, in all true faith, there is intent to use the Agreement. There is no profit in rehashing, either in intent, or in ignorance, problems which have been previously carefully deliberated, unless new information can be provided. The object of consideration of the Agreement is how to best implement its use. If the Agreement is basically sound, and suits a majority on the voluntary basis, there needs to be a bending of understanding by those who may have inherent problems of application.

Any arrangement should be fair and should represent what is feasible on the part of receiving as well as shipping states. It should represent what both can live with. There can be no advantage in incorporation of specific mandatory conditions of specifications which are not, and would not be generally recognized or accepted.

It should be remembered that virtually every state is engaged in interstate shipping and receiving of raw and processed milk. Within the short history of the Agreement, some states which formerly considered themselves solely as receiving states are now strong surplus and shipping states.

In the consideration of the task force work which is to be carried out during the subsequent period of this Conference, it is pertinent to examine certain specific problems and recommendations. In the deliberations during the task force work, it is very im-

[1]Presented at the Seventh National Conference on Interstate Milk Shipments, St. Louis, Missouri, April 20, 1959.

portant that facts be separated from opinion; one of the greatest problems in the deliberations is to establish the facts, and frequently what is considered fact solely from long time application, or assumption, cannot stand the sharp scrutiny of the inquisitive mind. In order that facts can be brought to bear into the forthcoming decisions, a sincere effort was made to survey by questionnaire the problems that warranted consideration in the use of the Agreement. These have been transmitted to panel or task force chairmen so that, in so far as possible, technical or related information could be established for benefit of discussion.

There is a great need for clarification of the procedure of handling task force and committee reports in so far as they relate to the Agreement. In the past much superfluous and irrelevant wordage has crept into the Agreement as the result of having been submitted as task force recommendation. It must be admitted that in spite of the legal language experience of regulatory people, many of the reports or recommendations of the task forces have been without the precision, sharpness and clarity for proper consideration by the Conference at large, or for the Agreement. Frequently the reports of the task force have been created without reference, or regard to the other parts of the Agreement. Every task force should take every advantage of counsel and appraisal in hammering and forging its written considerations; this is fundamental to the soundness of any written document.

The Conference could well consider the use of a document committee to forestall errors of comprehension and expression. The Conference definitely is in need of clarification of what is to be channeled to the Agreement and what is simply a deliberation of a problem, and supplementary information, and prologue for further investigation.

There is a lot of superfluous material in the reports that does not bear directly on the Agreement and in fact, confuses and clouds the issues of the Agreements. The task force reports should be directed primarily to implementing the use of the Agreement. What is superfluous and wordy and what is essential purely to the Agreement? The Agreement needs simplification, and this feature should be retained for the benefit of potential users.

The Agreement has been modified in one way or another at each of the preceding conferences in the effort to implement its use. The Agreement is becoming lengthy, its intent may be at times ambiguous or obscure because of material added, and often because of the manner and place of its structure. Each task force could do no better than to consider ways and means of simplification and codification of the Agreement to eliminate co-mingling of the components, and to establish a glossary of terms, or plan in the use of terms. It is strongly recommended that each task force review the previous conference agreements, and the revisions as incorporated at the last conference (1957) for the purpose of simplification.

There exists in the present Agreement a considerable body of information which is actually not agreement, but is regulatory procedure.

The Agreement provides for use of Standard Methods for the Examination of Dairy Products for methodology by reference. To this there has been incorporated many specifications of procedure which have to do with methods of sampling and frequency, pick up of sample, bulk handling, labelling, sealing of tanks and like procedures. The latter are definitely methodology, and should be extirpated from the Agreement per se and separately established by reference. The methodology is under constant change. The magnitude of this problem is increasing in the light of the many developments in the handling of milk. The Agreement should not be transposed into a Standard Methods for the examination of dairy products, but rather such necessary addenda should be codified by reference.

There is a great deal of interstate shipment of processed dairy products. There appears to be no specific problem with respect to the evaluation of these products per se for shipment, but there is a world of confusion in the area of permissive and required labelling of such products. There are innumerable instances of conflict in the identification of given products which is not in the interests of the consumer. It is hoped the task force on labelling can unravel the problem of procedure wherein a product which conforms to quality standards of the Agreement is not acceptable in interstate trade because of want of a name.

The Conference has from time to time had Committee consideration of special category products such as concentrated milk, nonfat dry milk solids, and supplemental milk fats. There is continuing need for Committee consideration of such products for the purpose of keeping abreast of developments in a fast changing industry and to assist the Conference in appraisal of related problems. As an example; increasingly large quantities of nonfat dry milk are being used in the processing of market milk dairy products such as half and half, cottage cheese, and low fat milk. The Committee on Nonfat Dry Milk of the Conference assisted in the development of Grade A standards for this product. This standard is now available (2). The availability of this standard should result in the development of Grade A programs for nonfat milk solids and for its use in processed dairy products. The standards for nonfat dry milk were under development by the Conference Committee

over a period of four years, and then subsequently under consideration by Public Health Service since 1954. A recent study in Wisconsin indicated that over 50 per cent of the market milk plants use nonfat dry milk in process operations, and that some 10,000 pounds dry milk is used daily in Grade A operations (3). The use of the dry milk standards should be implemented as much as possible. There is need for further study of certain engineering aspects of water utilization in concentrating operations that will warrant further Committee consideration.

SUMMARY

In principal then, the reports of Committees should bring all facts to bear on the problem: (*a*) the work of the task force committees should clarify and improve the agreement for the purpose of implementing its use; the agreement is not a regulation, it is a voluntary program; (*b*) the work of the task forces should be a hammering and forging of clear, concise facts and recommendations for consideration of the Conference; (*c*) the proposals should be submitted with full cognizance of their role and place in the balance of the Agreement.

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FACTORS TO CONSIDER CONCERNING THE OCCURRENCE OF COLIFORMS IN CITRUS PRODUCTS[1]

ROGER PATRICK AND F. W. WENZEL

Florida Citrus Experiment Station, Lake Alfred

Since the introduction of frozen concentrated orange juice to consumers, approximately 12 years ago, the question of the sanitary significance of coliform bacteria in this product has been raised from time to time. Also, with the greater distribution of refrigerated citrus products, such as chilled orange juice, by dairies and retail stores, questions are again being asked about the occurrence of coliforms in these products. When one considers the emphasis that has been placed for a long time on the sanitary significance of coliform bacteria in water, dairy and other food products, it is not difficult to understand why inquiries are made when these organisms are found in citrus products.

This paper discusses briefly, on the basis of available data and other information, factors that should be considered by all persons who are concerned about the presence of coliforms in citrus products, so that they may interpret better results obtained from the microbiological examination of these products. Another purpose is to assemble and include all of the references in the literature covering the many investigations about the occurrence, methods of detection, differentiation, sources, survival and significance of coliform bacteria in citrus juices and concentrates. These studies have been made by the citrus industry, the frozen food industry, governmental control and research agencies, container manufacturers and various universities. A careful and thorough study of the results of these investigations indicates that the occurrence of coliform bacteria in frozen citrus concentrates and other processed citrus products is of no sanitary significance and that the health of the public has not been endangered in the past and is not liable to be in the future from the consumption of these products.

DETECTION OF COLIFORMS

The coliform group of organisms as defined in *Standard Methods for the Examination of Water and Sewage* (3) includes "all aerobic and facultative anaerobic, Gram-negative nonsporeforming bacilli which ferment lactose with gas formation." Since coliform bacteria ferment lactose, various media containing this sugar have been used for their detection and separation from other microorganisms in water, dairy and other food products. The inoculation of a medium with orange juice results in the addition of sucrose, dextrose, levulose and other sugars, which are

[1]Cooperative publication by the Florida Citrus Experiment Station and Florida Citrus Commission. Fla. Agr. Exp. Station Journal Series, No. 884.

natural constituents of the juice. If microorganisms other than coliforms, such as yeasts, in the citrus juice can ferment these added sugars, gas will be produced and false positive presumptive tests will result. Such false tests can be prevented to some extent, but not entirely, either by adding to media substances that inhibit the growth of organisms responsbile for the false tests or by increasing the temperature of incubation, which favors the growth of coliform bacteria but hinders that of yeasts and other organisms. Various investigators (*8, 12, 24, 27, 44, 45*) have used and compared different media including lactose, lauryl tryptose and brilliant-green lactose bile broths incubated at 27°C.; also, Vaughn-Levine boric acid broth at 43°C. and modified Eijkman medium at 46°C. When these media are inoculated with citrus juices, some false positive presumptive tests may still result even though inhibitors and increased temperatures of incubation are used. Therefore, confirmed and completed tests for coliform bacteria must be made, according to standard methods (*3*), if the presence of such bacteria is to be definitely established. Also, any attempt to estimate in orange juice coliform group density or compute the most probable number, as in the examination of water (*3*), may give erroneous and misleading results. This was again pointed out recently by Wolford (*45*), who stated that if orange juice is tested for its coliform index, all positives should be confirmed by microscopic examination. Martinez and Appleman (*24*) reported the futility of using eosin methylene blue plates for a confirmed test, since orange juice sometimes contained lactose fermenting yeasts that can give colonies on this medium identical in appearance to *Escherichia coli.* Violet red bile agar may be used for the detection of coliforms in citrus products, but the isolates must be confirmed by microscopic examination or differential tests.

DIFFERENTIATION OF COLIFORMS

Biochemical reactions of coliform bacteria found in water, dairy and other food products are used for determining their sanitary significance. The coliform group, according to the American Public Health Association (*3*), may be classified into the *Escherichia coli, Aerobacter aerogenes* and *Escherichia freundii* (or intermediate) types on the basis of the IMVIC reactions. The *E. coli* types are considered to be of fecal source and of sanitary significance, whereas the other types are considered to be of non-fecal origin.

Results from investigations reported in the literature (*28, 31, 34, 43, 46, 47, 48, 49*) on the differentiation of coliforms isolated from orange juices and concentrates show that most of these organisms have IMVIC reactions which classify them as *Aerobacter* or intermediate types. Those having IMVIC patterns, + + − −, or − + − −, corresponding to *E. coli* types, are in the minority. For example, Wolford (*43*) reported that from 1185 initial inoculations into lactose broth, a total of 236 coliform cultures were isolated from 79 samples of frozen orange juice. Forty-six of these cultures resembled *E. coli*, 20 resembled the intermediates and 170 resembled *Aerobacter* types. Similar results have been reported by other investigators (*27, 38*).

Patrick (*31*) determined the IMVIC and many other biochemical reactions of 217 coli-like cultures isolated from orange concentrates and damaged oranges. Among these reactions were nitrate reduction and gelatin liquifaction; cellobiose, salicin, sucrose, starch and inositol fermentations; also utilization of urea and uric acid. Only 2 of the 217 coliform cultures studied were confirmed in all tests to be *E. coli.* Thus, if variations in biochemical reactions are taken into consideration, the generic classification of coliforms isolated from citrus products becomes difficult. Coliform bacteria found in orange juices have also been reported (*22, 24, 34, 43*) to have some of the characteristics of the genus *Erwinia.* Kauffmann (*21*) indicated that there are cultures not true to the genus *Escherichia* or to the genus *Klebsiella,* but occupy a position between these two genera. This seems to be the position of many coliform types found in citrus juices, if their biochemical characteristics are taken into consideration.

SOURCES OF COLIFORMS

Many investigations (*15, 19, 26, 27, 28, 29, 30, 34, 36, 46, 47, 48, 49*) have been concerned with sources of the coliform bacteria found in citrus products. The effect of the condition of fruit has been checked by examination of immature, overmature, soft and damaged fruit, as well as that in good condition. Oranges collected from many places have been examined, including those picked in the grove or obtained from field boxes, trucks, fruit bins and packing houses. Both the exterior and the juice were checked for the occurrence of coliforms. Results of these investigations showed that coliform bacteria can be isolated from the exterior surfaces or juice of oranges collected from the different places; even fruit picked aseptically into sterile containers sometimes yielded coliforms. However, there was no appalling evidence that the coliform bacteria found should cause alarm. The incidence of *E. coli* types from such fruit was low. Rakieten *et al* (*32*) examined juices that were freshly extracted from oranges in different homes, as well as samples of reconstituted frozen orange concentrates, and reported the occurrence of coliform bacteria in the freshly extracted orange juices, but

none were found in the reconstituted frozen concentrates.

Wolford and Berry (*47*) and Wolford (*48, 49*) reported that the physical condition of the oranges used had a decided influence on the plate counts and the numbers of coliform bacteria found in frozen citrus juice. Juice prepared experimentally from "soft rot" Valencia oranges (*47*) contained 2,500 times as many microorganisms as juice from sound fruit. The incidence of coliform bacteria was higher also. Patrick (*30*) isolated coliforms from soft and ruptured fruit; he also reported that coliform bacteria were found on fruit infested with scale and that fruit flies could carry coliform contamination. Therefore, fruit exteriors may be a source of coliforms found in juices. However, the methods used today to prepare fruit for extraction are not favorable for such contamination.

The scale infestation and dirt clinging to the peel is removed by a thorough soaking and scrubbing, followed by clear water and chlorine-water rinses. Contamination on the peel due to human contacts, trucks, storage bins and grove-lands is removed also. The thermal stabilization processes used today for the inactivation of enzymes prior to or during concentration of citrus juices, as dicsussed by Wenzel and Moore (*42*), also are destructive to many coliform types that may be in these juices.

Good sanitary practices are used today in commercial concentrate plants, as has been indicated by Brokaw (*10*), *Dack* (*11*), *and others* (*7, 39, 40*). *However*, coliform bacteria sometimes are present in citrus concentrates even with all of these good sanitary and clean-up procedures. Therefore, it is not surprising that various investigators (*26, 28, 29, 36*) have reported, before the use of today's sanitary practices, that equipment in processing plants was a source of coliforms then found in citrus juices.

Significance of Coliforms in Citrus Products

The significance of coliform bacteria in water, milk and other food products, including frozen foods, has been discussed extensively (*3, 4, 9, 16, 20*). Hunter (*20*), Levine (*23*) and others (*1, 2, 5, 14, 41*) have discussed the uses and limitations of the coliform group in sanitary control of food production. They disapprove the use of coliform organisms as indicies of pollution when found on foods without correlative data to establish the route of contamination on that class of food.

Coliform bacteria found in citrus juices and concentrates are far less numerous than that occurring in other food products, such as ice cream, shellfish or nutmeats. Also, since citrus products are acid foods, coliforms die off rapidly when inoculated or introduced into these products at room temperature; however, it has been shown (*6, 13, 17, 18, 25, 34, 35*) that they survive for longer periods of time as the temperature is decreased and have been known to remain viable for 12 months in orange concentrate stored at 0°F.

Finally, the significant fact should be mentioned that consumers are today using approximately 65 million gallons of frozen orange concentrate yearly, as well as very large quantities of other citrus products, without any apparent ill effect upon their health. Thatcher (*37*) did not recommend the setting up and using microbial standards as criteria of healthfulness of frozen citrus juices.

Considering these factors, along with the other information discussed briefly in this paper, we must conclude that the occurrence of coliform bacteria in citrus products is of no sanitary significance, an opinion that has also been reached by other persons who have investigated the available information concerning this question.

Summary

The consideration of available information from many investigations relative to the occurrence of coliform bacteria in frozen citrus concentrates and other processed citrus products indicates that such organisms are of no sanitary significance. Methods of detection and differentiation, sources, survival and significance of coliforms in citrus products are discussed briefly. Also pointed out is the significant fact that millions of gallons of citrus juices are being consumed annually without any apparent ill effect on the health of consumers.

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A REPORT ON SANITARIANS COMPLETING GRADUATE STUDY AT A SCHOOL OF PUBLIC HEALTH, 1946-1956[1]

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Fifty sanitarians who received masters degrees with a major in sanitary science during the period 1946-1956 from the University of North Carolina in responding to a study of their activities revealed that while 41 of them remained in public health work only 29 were engaged exclusively as sanitarians. Changes in work responsibility were accompanied by increases in supervisory duties, increases in their salaries, and changes in their methods of meeting sanitation problems. Forty were certain that graduate education made their advancement easier. Of the fifty studied, 31 felt opportunities in sanitation to be good.

The number of sanitary science graduates at the master's level in the United States during the period 1926-1953 was 407, with 318 of these graduating between the years 1946-1953. The School of Public Health of the University of North Carolina graduated 63 of the 318 during the period noted (*1*). This number is more sanitary science graduates than any other school of public health produced during the same period. In the ensuing three years there were 7 additional graduates in this group from the University of North Carolina.

According to Greve and Campbell (*2*), 3,723 professional sanitarians were employed in the United States in 1951 by official health agencies in local areas. It is apparent that the percentage of sanitarians who have completed a program of graduate study in public health is very small. It is recognized that in the entire group there are other holders of masters degrees in specialized fields such as dairy science, entomology, and food technology. A study has been made of the seventy North Carolina graduates to determine the influence of graduate study on (*a*) their remaining in public health work, (*b*) their functioning exclusively as sanitarians, (*c*) their job responsibilities, (*d*) their salary increases, and (*e*) their attitude toward opportunities and advancement in sanitation.

These objectives were sought by the examination of the students' records at the University and by a questionnaire mailed to all of the seventy graduates. Inclusion in this group was determined by the position held by the man prior to entering school and by the course plan followed while at school. All of them completed a program in sanitary science designed for sanitarians in the Department of Sanitary Engineering and received either the degree Master of Public Health or Master of Science in Public Health during the period 1946-1956. Foreign-born students were not included in the group. No attempt was made to adjust for the differences that appear over a decade spread between men who graduated, for example, in 1947 as compared to those completing work in 1956.

The general composition of the group in terms of age, geographical origin and educational background is of interest. Approximately 22 per cent were under 25 years of age; 36 per cent, 25 to 29; 21 per cent, 30 to 34; and the remaining 21 per cent were over age 35. As would be expected in a school which is located in the Southeast, the states of that region contributed the greatest number of students. Fifteen came from North Carolina; 8 from Florida; 5 each from Georgia and West Virginia; 4 each from Virginia and Arkansas. Other states with a representation of more than one was made by 6 from New York, 3 from each of Missouri, New Jersey, and Ohio. Fourteen additional states were represented by one graduate, with a geographical spread touching all of the regions of the country with the exception of the West Coast.

An initial tabulation of the students' undergraduate majors showed a representation from 13 fields. Six of these may be grouped as biological science majors and include 41 per cent of the students, being the largest by a wide margin. Sixteen per cent had chemistry majors; 13 per cent were agriculture majors; and 10 per cent each from public health and general science majors. The 6 per cent from education and 4 per cent from sociology are the only ones which would not usually be considered to be undergraduates majoring in the sciences. However, at that time these men met the entrance requirement of approximately 30 semester hours of undergraduate work in the natural sciences.

RESPONSES TO THE QUESTIONNAIRE

Fifty men of the 70 who were mailed a three-page set of questions responded with usable returns. No

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follow up letters were planned or made. This is a 71 per cent response. A higher level of response could have been secured by follow up techniques, particularly for those known to be in the immediate area. It is judged that the fifty reporting is sufficient in number and in character to give useful answers to the questions posed to University of North Carolina graduates.

Eighty-two per cent or 41 of the sanitarian group continue in some form of public health activity. Of these, 29 are exclusively carrying out the responsibilities of sanitarians. The remaining 12 are in such positions as industrial hygienist, chief chemist, food and drug inspector, public health dentist, state civil defense administrator, and co-director of state health services. Only one of these is in a voluntary health agency. Of the 9 who are no longer engaged in public health work, only 2 are in completely unrelated occupations. Others are in such activities as service in the armed forces, technical sales work, high school teaching, and advanced study in dentistry and zoology.

The question, "*Do you feel it important for a sanitarian to have a master's degree in public health?*" is a cardinal one. Eighty-four per cent of the respondents answered positively. Three of the 5 men giving a negative answer have left the field of public health. The reasons given by the 42 who answered affirmatively are as follows: 29 thought the advanced education enabled them better to understand public health and sanitation and to do a better job; 6 felt that the degree was important for advancement purposes; and 5 stated its usefulness for purposes of prestige or professional standing.

The negative responses were supported by such reasons as salaries paid are not in accord with time and effort to acquire a master's degree; graduate instruction too theoretical; required technical knowledge can be acquired in good undergraduate program; and the failure of a master's degree to change community attitude in not recognizing the sanitarian as a professional person.

Closely related is the question "*Do you feel the sanitarian with a master's degree in sanitary science has a better chance in public health than a sanitarian without the degree?*" Forty-five of the 50 respondents felt that the degree bettered their chances in public health. Three left the question unanswered and 2 felt that the degree made no difference or was of no benefit.

The reasons for the affirmative fall into three groups. Twenty-one felt that it was because they had a better understanding of public health and were better able to carry out their work; 17 felt that advancement would be much easier; and 5 felt that it gave them a better professional standing.

It should be noticed that the answers to these two questions are not wholly consistent, as in the first instance 6 of the 42 answering positively gave the supporting reason that the degree was needed for advancement. In the second instance, when the question is phrased in terms of having "a better chance," 17 of the 45 supported their affirmative answer with advancement as the reason.

A direct question was asked concerning *the value these graduates placed on graduate work*, with a rating of "none," "a little," or "great," to be checked. The rated questionnaires showed that 43 graduates felt their graduate work to be of "great" value and 6 felt their graduate education to be of "little" value. In comparison, the question was asked whether the graduates felt that their employer placed the same value on a master's degree as they did. Thirty-two of those answering felt that their employers placed about the same value on the degree as they themselves, and 15 felt the employers placed a lesser value on a degree than they did.

Changes in Salary, Responsibility, Work Methods and Professional Interests After Obtaining the Degree

It was found from this study that 72 per cent or 36 of the sanitarians returning the questionnaire received some salary increase within 6 months after receiving their master's degree. This salary increase was reported as follows: 19 per cent or 7 had an increase between $10-21 a month; 36 per cent or 13 had an increase between $21-50 a month; 17 per cent or 6 had an increase between $51-70 a month; and 28 per cent had an increase of over $70 a month. It is emphasized that approximately 60 per cent or 29 of the group felt that pay increases had been due primarily to having a master's degree, and that 80 per cent or 40 of them felt that graduate education had made advancement easier.

Since obtaining a master's degree, the respondents reported, *job responsibility* for 74 per cent or 37 of them has changed. Sixty per cent or 29 of them report acting more in a supervisory capacity than before receiving their advanced degree. Seventy-two per cent or 36 of this group reported that graduate education had changed the ways in which sanitation problems were solved.

To measure increased *professional interests*, the group was asked about membership in professional organizations. It was found that 68 per cent or 34 of them belong to more professional organizations than before graduate study. Of the 34, 14 belong to at least two more organizations, seven of the group be-

long to three more, and two belong to four or more professional organizations.

Discussion

The respondents reported substantial changes in the work responsibilities, in the extent of supervisory duties, and in the methods of solving sanitation problems. No refined analysis can be made of these changes from the data collected as there are differences within the group of lapsed time since graduation, and of the qualitative and quantitative experience of the men prior to entering graduate work. Further inquiry into these matters would be useful.

The data on salary changes within six months after graduation are gratifying as 72 per cent showed increases. These increases are regarded as substantial as for nearly 45 per cent of those receiving these had increments of over $50 a month. No detailed analysis was sought. It is not known whether the graduates had to make extensive job changes and relocations in order to secure such increases or whether these were the result of promotions for new qualifications and new responsibilities. The significant item to this study is that 29 of the 36 men who have reported salary increases did ascribe these as primarily due to having a master's degree.

The interest of sanitarians in achieving professional recognition is marked by such activities as the creation of registration boards and certification plans, the embracement of codes of ethics, and by the emergence of journals devoted exclusively to sanitation. The effect of graduate study on professional interest among this group was noted quantitatively by their joining professional organizations.

A further indication of professional allegiance is the readiness with which men recommend their work to others as a career. A report of the Committee on Educational and Professional Development of the International Association of Milk and Food Sanitarians, Inc., (3) showed that 73 per cent of the respondents recommended public health work as a career. Among the sanitarians here reported, 62 per cent expressed the feeling that opportunities in public health were good. The latter figure is regarded as somewhat low .

Study of graduate education of sanitarians on a wider base is needed. It should include a larger sample. It should permit analysis with adjustments for lapsed time since graduation, and for length of experience prior to graduate study. It should seek information in some detail on changes graduate study produces in the methods of meeting sanitation problems and of planning sanitation activities.

This examination of a small group of graduates from a single school is offered as an example and possible prototype. It may stimulate improved and extensive investigation of much larger and more representative samples of sanitarians throughout the country to determine how graduate education can be made more productive for the people who are served, for the organizations who employ sanitarians, and for the individual professional sanitarian.

Summary

1. In a questionnaire to 70 sanitary science graduates from the University of North Carolina School of Public Health, the school producing the greatest number of sanitary science graduates in the period 1946-1953, 50 responded, revealing 82 per cent as remaining in public health work.

2. Of the 41 respondents remaining in public health work, 29 have responsibilities which are exclusively those of sanitarians.

3. Of the 50 respondents, 37 report changes in work responsibilities with 29 stating increased supervisory duties.

4. Of the 50 respondents, 36 report an increase in salary within 6 months after graduation ranging from $10 to over $70 per month; and 29 ascribe pay increases primarily to having a master's degree.

5. Of 50 respondents, 31 judge opportunities in sanitation to be good; and 40 feel graduate education makes advancement easier.

Conclusion

The answers of 50 sanitarians who during a ten-year period completed a graduate degree program in sanitary science at the University of North Carolina show that they have performed well in public health careers, with 41 remaining in public health work, with reported increases in the scope of their responsibilities and changes in their methods of solving problems, and in securing greater compensation for their work. Graduate education has made their advancement easier and has increased their interests in professional societies. Professional opportunities as sanitarians in public health appear good to 62 per cent of the group.

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THE RELATIONSHIP OF MUNICIPAL ZONING TO PUBLIC HEALTH[1]

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Public Health Defined

It would be well, at the outset, to define some terms that will be used during the course of this discussion. Quoting from Tobey's *Public Health Law* (1) the following definition of Public Health is given: *Public Health is the science and art of preventing disease, prolonging life and promoting physical health and efficiency through community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventative treatment of disease, and the development of the social machinery which will ensure to every individual a standard of living adequate for maintenance of health; organizing these benefits in such fashion as to enable every citizen to realize his birthright of health and longevity.*

You will immediately agree, I am sure, that this is an all inclusive definition and has stood the test of the years, and is a definition that sets forth the views of the average health officer as to the functions of public health.

Zoning Defined

Now the second term that will be used in this discussion should be defined and that is the word *zoning*. The supreme court of Connecticut once gave a very sensible definition when the court said, *zoning consists of the general plan to control and direct the use and development of property in a municipality or a large part of it by dividing it into districts according to present and potential use of the property.* With these two definitions in mind, I will now proceed with a discussion of the relationship between public health and zoning.

When one reads the preamble to any zoning ordinance, usually a general statement will be found to the effect that the ordinance is being adopted for the purpose of promoting health, safety, order, prosperity, historic resources, and the general welfare. Please note that health is first to be mentioned. The theory of zoning, it has been said, is to foster improvements by confining certain classes of buildings and uses to certain localities without imposing undue hardship on property owners.

[1]Presented before the Sanitation Sect. of Virginia Public Health Conference, Roanoke, Virginia, May 6, 1959.

[2]Read by Thomas M. Bay, Administrative Assistant, for the author.

Need for Zoning

Experience has shown that it is impossible for people to live effectively in a community without adequate zoning laws. Without adequate zoning, heavy industry often gets into a residential district, thus creating smoke, noise, dirt, and many other health problems. It is obvious, therefore, that the health of individuals living within this community is effected. Good zoning would attempt to prevent the intrusion of industry into a residential district.

Constitutionality

The question that is often asked by governing bodies and others interested in zoning concerns itself with the extent to which zoning is constitutional. During the course of this presentation, an attempt will be made to give you sufficient background to prove that zoning is legal. The legislature of our state has provided the legal tools with which to work. I refer to an Act of the General Assembly of Virginia as provided in Title 15, Chapter 24, Article 2, Section 15-844.

In view of the fact that many of you represent both rural areas and cities, I feel that this section will be of interest to you. In part it reads as follows: *Boards of supervisors are authorized to divide the area of a county in the unincorporated portions thereof into zones to regulate the use of land and buildings and other structures; to provide the locations of the areas which may be used as places of residence, or in which agriculture, forestry, trade, industry or other specific uses may be conducted; the height, bulk and size of buildings or other structures, the percentage of land area which may be occupied and minimum size of yards, courts, and other open spaces; and to provide for amendments and changes therein; to require county planning commissions to perform certain duties with reference thereto; to permit the appointment and prescribe the powers and duties of county boards of zoning appeals; and to provide methods for enforcement of this ordinance and penalties for the violation thereof.*

Background of Zoning

It may be of interest to review some of the history of zoning. A number of interesting decisions can be found; decisions that have been handed down by State Supreme Courts as well as by the United States Supreme Court. Mentioned earlier was a decision

rendered by the Supreme Court of the State of Connecticut. As one studies the history of zoning in America, it clearly establishes the struggle that has gone on through the years to protect the property rights of people. It has been stated that the late start of zoning in the United States has been attributed to many different causes, but the one most frequently mentioned, and perhaps most accurately, is the tendency of our courts, down through the years, to protect and preserve individual rights in property against the arbitrary control thereof by government. With the increase in size of American cities and urban counties, it is apparent that much harm has been done by our failure to enact regulations relative to the overcrowding of buildings on land and the unregulated use of land.

In fact as one observes the average American city today, he will find almost without exception areas where there is blight, overcrowding, lack of ventilation and light, all of which becomes a breeding place for disease. This indeed is the shame that has been brought to the average American city. The harm was done long before the first zoning ordinance was ever adopted.

Naturally a property owner wishes to know what benefits will be derived from zoning and often it is indeed difficult to convince the property owner of its value. However, we are now convinced and the courts have fairly well upheld this fact that the welfare of society transcends individual profit. In fact there have been fairly recent cases before the courts in which it was held that a land owner has no complaint though deprived of income by a zoning ordinance, unless said ordinance as applied to him was unreasonable and discriminatory and without relationship to public health, safety, morals or welfare.

Again your attention is called to the fact that the court places the same degree of emphasis upon public health as upon safety, morals or welfare. The courts will always hold an ordinance invalid when it clearly appears that the restrictions are unreasonable and have no substantial relation to the health, safety, welfare and convenience of the public. This, of course, is true whether the ordinance in question relates to zoning or any other proper subject for police power regulation.

The first test case in the United States Supreme Court of the right of a city to enact a comprehensive zoning ordinance arose out of consideration of the validity of an ordinance of the city of Euclid, Ohio. The court in this case upheld the validity of the ordinance.

ZONING AND PROPERTY VALUES

Before the advent of zoning in America, there were few regulations to prevent a property owner from using his property as he saw fit. Prior to that time there were only a few scattered fire and health laws. Many fine residential areas were injured by the frequent intrusion of business and factories. Into these vexing situations, came zoning laws and court decisions upholding them. These appeared as a silver lining to harassed property owners.

It has become more and more apparent, therefore, in this land where individuals love freedom that zoning itself has given the greatest amount of freedom and protection to the greatest number of people. Zoning has protected the health of people and property values. Good zoning has contributed to the orderly development of cities; has relieved cities of overcrowding, thus, making the average American city a more desirable place in which to live.

AUTHORITY FOR ZONING LAWS

The question that you may now ask is through what fundamental authority have zoning laws been passed. The answer is by an exercise of the police power of the state. How does such police power operate? The police power has been defined as one inherent in every sovereignty for the preservation of the public health, the public safety and the public morals. We must understand that the police power of a state or a locality is not something that is rigid and definitely fixed but in its very nature, it must be somewhat elastic in order to meet changing and shifting conditions which from time to time, arise through the increase in population and the complex commercial and social relations of the people. In the complexity of our present day life, there are so many factors connected with the health, safety and convenience of the community that the police power and regulations of wide scope are increasingly upheld.

One can hardly discuss this subject without asking very boldly who has the responsibility for zoning. In every county and city of the commonwealth it is the full responsibility of the governing body to see that adequate zoning regulations are passed for the protection of the people in that community. It is not intended to indicate that the governing body should attempt to zone in a dictatorial fashion, on the contrary it should be done in cooperation with the planning or zoning body of that community and with the citizens. There is no better person in a community to give leadership or certainly moral backing to the governing body in the adoption and enforcement of zoning regulations than the local health officer.

I think that zoning has been set apart from public health as such too long and it is now time that we begin to emphasize the importance of zoning in relationship to the promotion of public health.

STEPS IN ZONING

In conclusion, I should like to outline the methods to be used in establishing a zoning ordinance. It is necessary first to appoint a planning commission or zoning commission. This body will be responsible for drafting an appropriate zoning ordinance for the community and will make recommendations to the governing board. Briefly, zoning regulations start with the development of the zoning map which shows the exact boundaries between the different districts decided upon. The map usually shows the streets, highways, all property lines and natural streams, rivers and lakes since all of these things have been surveyed by engineers and have a known location on the ground. The zoning district boundaries are then fixed and so indicated. The map also makes clear each district with appropriate markings or colors. Each zone is given a name, such as agricultural zone, residential zone, retail business zone, etc. If it is decided to keep all future buildings back a certain distance from certain streets, then the set-back line must also be shown on the map.

The other part of zoning is the text which explains what the map means. It states just how the land in the zones or districts can be used or developed in the future. It lists, under the name or number of each zone, the kinds of property use permitted, the maximum height of buildings, the smallest size lot permitted, the rules on how close to a front, side or rear lot line a building can be built, and any other special rules that may be reasonable or desired. One of these special rules might be that every business should have a place on its lot for the customers to park, to keep parked cars off the highway where they may cause danger or interfere with traffic.

The text of the ordinance contains a section on how the regulations are to be enforced and establishes a penalty for breaking the laws. It must also set up a board of appeals, with power to allow some minor variations when the strict enforcement of the letter of the law would work a hardship on one man without doing anyone else very much good. It must always be remembered that good zoning regulations are clear, exact and easily understood. They should be as simple as possible and still do what the people in the community have decided they want to do.

As soon as the ordinance has been adopted, necessary funds must be appropriated for the establishment of machinery capable of enforcing the ordinance. The mistake should not be made of thinking that zoning enforcement can be handled in a haphazard manner. To enforce the ordinance an official must be appointed. He may be called a zoning administrator, zoning official, planning official—it matters not what is his title. He must be acquainted with the zoning ordinance, understand good zoning practices and, above all, be able to be firm yet fair in the enforcement of the law. Of course, the law makes provision for appeals from the decision of the zoning administrator. It is his duty, however, to see that the ordinance is fairly and firmly enforced.

Those of you who are working in communities where zoning laws are inadequate must be willing to recognize the value of such laws as tools in the field of public health. You are qualified by training to understand the importance of zoning. You should give leadership whenever and wherever possible.

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ANTIBIOTIC RESIDUES IN MILK AND MILK PRODUCTS—A REVIEW

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Introduction

Antibiotic therapy has been employed by farmers and veterinarians for over a decade in the treatment of infectious diseases of dairy cattle the most common of which, undoubtedly, has been mastitis. In some instances, the drugs have been incorporated into feed as a dietary supplement. Such uses have led to the presence of antibiotic residues in milk and subsequently to industry-wide problems.

This paper will attempt to summarize available information on: (*a*) the presence of antibiotics in the milk of treated cows, market milk and milk products; (*b*) effects of some manufacturing processes on antibiotic residues in milk and milk products; (*c*) measures suggested for reduction of antibiotic residues in milk; and (*d*) the attitude of the Food and Drug Administration on the presence of antibiotics in milk and milk products. Problems created by the presence of antibiotics in milk and milk products will be discussed in another paper (*46*).

Antibiotics Administered By Intramammary Infusion

Kinds Used

Antibiotics, regardless of kind, are most commonly administered to mastitic animals in a solution or suspension which is infused into the infected quarter or quarters of the udder.

Penicillin, perhaps, was the first of a series of antibiotics employed in mastitis treatment. Its use was suggested in 1946 (*35*) and regularly since then (*33,38, 40, 45*). According to a recent survey (*70*) penicillin was found in market milk more frequently than any other antibiotic.

Other antibiotics suggested for use in the treatment of mastitis are: streptomycin (*39, 51, 66*) chlortetracycline (aureomycin) (*23, 27, 39, 42, 43, 51*), oxytetracycline (*2, 51*), bacitracin (*6, 39*), neomycin (*1*), subtilin (*39*), chloramphenicol (*39*) and polymyxin (*70*).

Combinations of antibiotics have also been suggested for the treatment of mastitis. A test of three different mixtures (*68*) showed that a combination of neomycin and penicillin was most effective of those tested. A mixture of neomycin, bacitracin and penicillin was second in effectiveness while a combination of neomycin and bacitracin was least effective of those tested.

A recent survey (*70*) indicated that antibiotics other than penicillin were found in market milk but in fewer instances. Those found included: streptomycin, bacitracin, one of the tetracyclines or a combination of these antibiotics.

A study on vehicles used to carry antibiotics for mastitis treatment has shown that penicillin diffusion into milk was greatest when the antibiotic was contained in a base composed of liquid and white petroleum (*57*). The addition of beeswax to the base decreased the rate of diffusion.

Levels Used

The quantity of antibiotic used for an individual udder infusion varies according to: (*a*) the kind of antibiotic used; (*b*) the severity of the infection; (*c*) the frequency with which the antibiotic is to be administered during the course of treatment; and (*d*) the judgment of the person administering the antibiotic.

Considerable variation can be noted in the sizes of dosages of antibiotics suggested by various investigators for intramammary infusion in the treatment of mastitis. Suggested levels of penicillin range from less than 10,000 units (*3, 4*) to 300,000 units (*33*) with the most frequently reported dosage as 50,000 units (*10, 36, 51, 56*). Streptomycin dosages reported for use per infected quarter include five to 25 mg. (*66*), 200 mg. (*30, 51*) and 100 to 500 mg. (*62*). Single udder infusions of 200 mg. (*5, 8, 9, 51*) and 400 mg. (*37*) of chlortetracycline per quarter have been reported.

Single doses of 200 mg. of chloramphenicol (*51, 54*) and 200 mg. of oxytetracycline (*51*) per quarter have been used in mastitis therapy.

Best results were obtained with bacitracin when 100,000 units were infused into the infected quarter three times at 24 hour intervals (*6*).

Levels and Persistence in Milk from Treated Cows

After an antibiotic is infused into the udder for the treatment of mastitis some of it may be absorbed by the tissues of the udder and appear in the blood. Concentrations of 0.08 to 0.10 ug. per ml. were found in the blood serum 12 hours after 400 mg. of chlortetracycline was infused into one quarter of the udder of a cow (*37*). Further evidence of absorption by tissues is provided by studies which showed that some of the antibiotic infused into the udder was

mission must find. It is under no burden to establish the restraint of trade that must be proved by the Department of Justice in an equity or criminal proceeding and by a private litigant in a suit for damages.

The particular use of the 3-A symbol that would appear most susceptible of proscription as an unfair method of competition or as an unfair or deceptive act or practice would be its use in advertising. The possibilities here are limited only by the limits of human ingenuity and might range across the entire spectrum of misrepresentation by outright untruth, omission, inuendo or distorted emphasis. Somewhat more specifically, it would include any possible question of the right of the advertiser to use the symbol at all, statements as to the meaning of the symbol, statements as to the quality of equipment on which the symbol is used, statements as to the relative virtues of equipment on which the symbol is and is not used, and finally statements tending to discredit equipment on which the symbol is not used. It will be seen that these possibilities include advertisements by persons who are authorized to use the symbol, persons who are not so authorized, and persons whose authorization, or the extent of whose authorization, may be in question.

The 3-A symbol is a registered trademark. It is owned by the 3-A Symbol Council. The 3-A Symbol Council can control the manner and extent of its use by authorized persons as a condition to authorization. The Council of course does this to a certain degree. Perhaps the control should be extended to include guide lines as to how the symbol may be properly used in advertising and proscribing improper use.

I have said above that this paper will discuss the legal aspects involved in three areas of actual activity relating to the 3-A sanitary standards and the 3-A Symbol. I wish now to go somewhat beyond such considerations and outline some of the legal aspects of standardization programs in general as used in connection with other activities.

In connection with our consideration of the process of adoption of standards, it was said that of the several varieties of illegal restraints of trade, the one most to be guarded against is that of excluding competitors from a market. As contrasted with the adoption of standards, the use of standards after adoption has at times been complained of, especially when the use is in connection with other activities, as having the effect of fixing prices. This will be explained by analyzing an instructive reported case involving the point – *Tag Manufacturers Institute, et al.* v. *Federal Trade Commission*, to which reference has already been made.

In this case, the Commission had issued a cease and desist order under its Act, and the Institute brought this proceeding for review in the Court of Appeals The Institute is a trade association whose members are manufacturers of approximately 95 per cent of all the paper tags produced in the United States. The members of the association had entered into a series of so-called "Tag Industry Agreements", the last in 1940, in which the subscriber agreed to furnish certain industry statistics to an individual and the latter undertook to serve as a sort of clearing house and to administer the terms of the agreement.

Specifically, the manufacturers agreed to file all their published price lists and terms of sale and revisions thereof with the individual and to report to him currently all sales of tag products, including off-list sales. The individual undertook to disseminate this information to the subscribers. The agreements provided that this information should be available to public agencies, distributors, consumers, and any other interested persons. It was provided also that there should be no limitation upon the right of each subscriber to establish such prices and terms of sale as he should "deem expedient".

I mention this case particularly because one of the activities of the Institute was fostering a more refined standardization of tag products and components thereof. It seems that tag products are of enormous variety, and that even after the basic standardization had been effected, there were still more than 50,000 standard items. The program had been initiated under the auspices of the Bureau of Standards some years before the Institute had been organized, but the Institute had, as indicated, performed an active role later on.

The Commission charged that the agreement was one intended to restrain and eliminate price competition; that this purpose had in fact been effectuated; and that the sum of those activities constituted unfair methods of competition within the Federal Trade Commission Act. In connection with its cease and desist order based upon those charges, one of the Commission's findings was that the administration of the reporting agreement "was materially assisted by the standardization of the component parts of tags and tag products developed and adopted under the auspices of the respondent Institute".

The Court of Appeals set the Commission's order aside. It found that the agreement was not an unfair method of competition since such uniformity of list prices as was shown to exist was not in fact a result of the operation of the agreement. After referring to the Commission's findings as to the part that standardization had played, Chief Judge Magruder's perceptive opinion states:

"These standardizations are deemed to be to the advantage of all concerned, including the consumer, who, among other benefits, is thereby better enabled to know what he is buying

to make intelligent price comparisons. Of course, the detailed standardization of tags and components which the Institute has assisted in developing tends to make more serviceable the information reported to the individual under the Tag Industry Agreement and by him collated and disseminated among the Subscribers. But if the reporting agreement is otherwise lawful, such enhanced usefulness of the agreement as results from standardization would hardly infect it with illegality."

It is undeniably true that standardization may, under certain circumstances, have a tendency to produce similarity of product, and that similarity of product may have a tendency to produce similar prices. However, these similar prices are a result of the necessity of meeting or approximating the lowest price for a similar product, and hence are a result of free competitive forces. Since standardization accompanied by price reporting is not unlawful, how much less so is standardization standing alone. The *Tag Institute* case, however, demonstrates that even a perfectly lawful activity can be given a very bad time when a regulatory agency gains the wrong impression. "Legal aspects" can easily be construed as illegal.

STUDIES ON THE BACTERIOLOGICAL QUALITY OF FROZEN MEAT PIES

II. A COMPARISON OF THE METHODS FOR THE ENUMERATION OF COLIFORMS

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The detection of the presence and enumeration of the numbers of coliform bacteria in frozen foods has become an important part of the bacteriological examination of frozen foods. Breed and Norton (*3*) suggested that the term "coliform" be used to designate the gram negative, lactose-fermenting, aerobic bacteria as a measure of pollution of water. Since its introduction, the coliform group bacteria have been extensively studied in milk, food, and water as indicators of sanitation or contamination. Now they have been carried over into the frozen food field as one of the measurements of bacteriological quality.

From a study of 6,500 strains of the coliform group isolated from various sources, Griffen and Stuart (*7*) stated that the *Escherichia* strains were normal inhabitants of fecal material, while *Aerobacter* strains were typical of nonfecal material. However, they admitted that the latter might, at times, be found in fecal materials but they considered this occurrence to be adventitious.

Elrod (*5*) has demonstrated that a genus of plant pathogens, *Erwinia,* is closely related to the coliform bacteria. He stated that, since the *Erwinia* have the ability to ferment lactose and have an IMVIC (indole, methyl red, Voges-Proskauer, and citrate reactions) pattern similar to that of the *Escherichia-Aerobacter* group, results of some previous investigations were misleading and fecal contamination was not necessarily indicated.

In examining 376 samples of commercially frozen vegetables and cantaloupe for fecal contamination, Burton (*4*) used a presumptive coliform and interococcus test. The coliform bacteria were found to be more dependable than the entercocci for indicating contamination in foods prior to freezing.

Berry (*2*) expressed the need for standardization of methods in bacteriological examination of frozen foods. He considered the use of *Escherichia coli* as a test organism of doubtful value because the organism died during low temperature storage.

Zaborowski *et al.* (*10*) evaluated some of the microbiological methods used for the examination of precooked frozen foods; however, they did not evaluate any of the methods used in the enumerating of coliforms.

In bacteriological surveys of commercially frozen precooked frozen foods, (*6, 8, 9*), several methods were used to determine the number of coliform organisms present: a plating method using violet red bile agar (*9*), desoxycholate lactose agar (*10*), and a most probable number method (*8*) using lactose broth for the presumptive and brilliant green bile broth for confirmatory tests.

The present investigation was undertaken to compare a plating method using desoxycholate lactose agar and the most probable number method in the enumeration of coliforms in frozen meat pies.

EXPERIMENTAL METHODS

The frozen meat pies used in this investigation were purchased at retail markets in the city of Omaha. Samples of the frozen meat pies for bacteriological analysis were obtained by using a stainless steel cheese trier which was previously sterilized by dip-

ping into alcohol and flaming in a Bunsen burner. The sample was placed into a sterile Waring blender and sterile 2 per cent peptone water was added to give a 1:10 dilution by weight. The samples were blended for three minutes and serial dilutions were made from this suspension.

The most probable number (MPN) of coliform bacteria was obtained by adding 10, 1, 0.1 and 0.01 ml. portions of the diluted sample to replicate sets of five lactose broth tubes each. Transfers were made into brilliant green bile broth from all tubes in which gas had formed within 48 hours. Streaks were also made on eosin-methylene blue agar plates from the gas positive lactose broth tubes.

Total counts were determined by plating serial dilutions of the blended suspension with desoxycholate lactose agar (Difco). The plates were overlayed with desoxycholate lactose agar. Characteristic red opaque colonies surrounded by a zone of precipitated bile were counted after a 24-hour incubation period at 35° C.

Colonies were selected and transferred to triple sugar iron agar slants (Difco) from eosin-methylene agar plates and from the highest positive dilution of brilliant green bile broth tubes. After incubation at 37° C. for 48 hours the slants were read. The cultures were tested for indol production, methyl red reaction, Voges-Proskauer and citrate utilization (IMVIC patterns) urease production and motility.

RESULTS AND DISCUSSION

A total of 93 commercially produced frozen meat pies from various manufacturers were examined for the presence of coliform bacteria. In this study an evaluation was made of the most probable number method (MPN) and a pour plate method. These two methods were selected because of their extensive use in the enumeration of coliform bacteria in food materials.

The results of this investigation are tabulated in Table 1. The examination of the results in Table 1 indicate that the MPN method may recover a slightly larger number of organisms than the pour plate method. The confirmatory technique of making streaks on eosin-mehtylene blue agar plates or inoculating brilliant green bile tubes from positive lactose broth tubes gave compariable results.

Though the MPN method recovered a slightly larger number of coliform bacteria than the pour plate method, the pour plate method using either desoxycholate lactose agar or violet red bile agar has its economies in equipment as well as time. The results of the pour plates were obtained in a much shorter period of time. In a preliminary study using desoxycholate lactose agar and violet red bile agar in the pour plates, no significant differences were noted in the total bacterial count. As desoxycholate lactose agar was already being used in this laboratory for the routine isolation and enumeration of coliform bacteria, desoxycholate lactose agar was selected for use in this study. However, it is the author's belief that violet red bile agar gives a more easily discernible coliform colony.

Each frozen meat pie giving a positive test for the coliform group was further investigated in order to determine the most predominant species of coliform bacteria present. Typical coliform colonies were isolated from desoxycholate lactose agar plates and colonies from tryptose glucose extract agar plates streaked from samples of positive tubes of brilliant green bile broth were used for identification studies.

TABLE 1—BACTERIOLOGICAL EXAMINATION OF COMMERCIALLY PRODUCED FROZEN MEAT PIES

Processor	Desoxycholate agar plate count [a]	Most probable number: Brilliant green Bile Broth	Most probable number: Eosin methylene blue agar
Chicken Meat Pies			
A	0	1.5	0
B	0	11	46
C	1,000	16,600	7,200
D	10	62	460
E	66	2.8	46
F	800	2,000	1,100
G	26	700	160
H	10	0	0
I	3	3	0
J	0	4	90
Turkey Meat Pies			
A	10	1.5	4.2
B	10	30	90
C	0	6	7
D	10	60	40
E	4	17	7
F	0	26	30
G	10	97	90
H	0	80	280
Beef Meat Pies			
A	30	45	45
B	7	4	4
C	13	300	127
G	0	7	7
I	7	4	4
J	0	92	126
K	0	17	11
L	3	0	0
Tuna Meat Pies			
B	0	90	60
G	0	7	0
D, L, M	0	0	0

[a] Average of three pies having the same manufacturers code or lot number.

TABLE 2—SPECIES OF COLIFORM BACTERIA ISOLATED FROM FROZEN MEAT PIES

Processor and Samples	Species of coliform bacteria isolated [a]
Turkey Meat Pies	
A1, A2	*Aerobacter aerogenes* var I.
B1	*Aerobacter aerogenes* var I.
B2	*Escherichia coli* var I
D1, D3	*Escherichia freundii*
E2	*Escherichia freundii*
	Aerobacter aerogenes var I.
F2	*Aerobacter aerogenes* var I.
G1	*Aerobacter aerogenes* var I.
G2	*Aerobacter aerogenes* var I.
G3	*Aerobacter aerogenes* var I.
	Escherichia coli var I
H1	*Escherichia freundii*
H2	*Escherichia coli* var I
Tuna Meat Pies	
A1	*Escherichia freundii*
B1, B2, B3	*Aerobacter aerogenes* var I
Chicken Meat Pies	
B1, B3	*Aerobacter aerogenes* var I
C1, C2, C3	*Aerobacter aerogenes* var I
	Escherichia freundii
D1, D2, D3	*Escherichia freundii*
F1	*Escherichia coli* var I
G2	*Escherichia coli* var I
H2	*Aerobacter aerogenes* var II
I2	*Aerobacter aerogenes* var II
J3	*Aerobacter aerogenes* var II
Beef Meat Pies	
A1	*Aerobacter aerogenes* var I
C1, C2, C3	*Aerobacter aerogenes* var I
	Escherichia coli var II
J1, J2, J3	*Aerobacter aerogenes* var I

[a]The differentiation of the members of the coliform group was based on the table given on page 391 of Standard Methods for the Examination of Water, Sewage, and Industrial Wastes, 10th edition, 1955.

The identification of the members of the coliform group was based on the table given on Page 391 of *Standard Methods for the Examination of Water, Sewage, and Industrial Wastes* (*1*). The results are recorded in Table 2. The examination of the results in Table 2 indicates that the predominant source of coliform contamination of frozen meat pies was a nonfecal source. Of 37 frozen meat pies demonstrating identifiable coliform bacteria, 30 pies contained a predominance of *Aerobacter* species. Seven of the pies demonstrated the presence of *Escherichia Freundii* varities, which are also of a probable nonfecal origin. Of the 37 pies, seven showed a predominance of *Escherichia coli* varities. These bacteria are usually associated with fecal contamination. About 18 per cent of the frozen meat pies demonstrated a probable fecal contamination while the remaining 82 per cent had a nonfecal or "soil" type of contamination. Whether or not it is necessary to determine if foods are contaminated with a fecal or nonfecal strains of coliform bacteria, the presence of coliform bacteria in frozen foods might indicate whether the foods had been cooked insufficiently or that they were contaminated after cooking or during processing prior to freezing.

SUMMARY

An evaluation of the most probable number method (MPN) and a pour plate method for the isolation and enumeration of the coliform bacteria was conducted on 93 commercially produced frozen meat pies from various producers. The MPN method recovered a slightly larger number of coliform bacteria than did the pour plate method. The MPN method did not demonstrate a sufficiently higher recovery of coliform bacteria to warrant its use in place of a pour plate method.

Predominant species of coliform bacteria recovered from frozen meat pies were demonstrated to be members of the species *Aerobacter*.

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INSECTICIDE RESIDUES IN MILK AND MILK PRODUCTS[1]

III. INSECTICIDE RESIDUES IN DAIRY PRODUCTS AND ASSOCIATED PROBLEMS

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Introduction

Insecticides gain entrance into milk primarily as a result of spraying dairy barns and cattle and ingestion of treated forages by dairy cattle. Information on these subjects has been summarized in two previous papers (*14*, *15*). Milks which contain insecticides may be mixed with insecticide-free milk during processing operations and hence the insecticide level of the final product may be changed. This paper will attempt to summarize information on: (*a*) the presence of insecticides in market milk and milk products; (*b*) problems created by the presence of insecticides in dairy products and (*c*) remedial measures which have been taken.

Market Milk

Surveys conducted by the Food and Drug Administration (*5*) in 1948, 1949 and 1951 indicated that trace amounts of DDT were detected in 25 per cent of the market milk samples tested.

In the fall of 1955, 800 samples of market milk, 50 from each of 16 Food and Drug districts, were analyzed for insecticide residues (*5*). Results of this survey showed the following: (*a*) 62 per cent of the samples contained insecticide residues; and (*b*) most residues were present in trace amounts.

One hundred and sixty samples with highest concentration were checked for the presence of specific insecticides. It was found that BHC was present in 60 per cent of the samples, DDT in 54 per cent, lindane in 26 per cent, DDD in 24 per cent, methoxychlor in three per cent and DDE (a breakdown product or metabolite of DDT) in 36 per cent.

Milk samples were checked for anticholinesterase activity to determine the presence of organic phosphate insecticide residues. These insecticides were not detected in the samples tested.

A later survey (*5*) was conducted during the winter of 1956-1957 by the Atlanta, New Orleans, Los Angeles and San Francisco Food and Drug districts. This survey showed little or no contamination of market milk with either BHC or DDT.

A limited survey for the presence of DDT in milk samples obtained from individual producers was conducted by Berruti (*2*) in January of 1958. Residues of DDT in the range of 0.06 to 10.0 p.p.m. were detected in 14 of 59 samples.

Other Dairy Products

Several authors have reported the presence of DDT in butter made from milk which contained residues of the insecticide. Smith, *et al.* (*24*) reported that 65 p.p.m. of DDT was present in butter made from milk which contained 2.3 to three p.p.m. of the insecticide. Higher levels of DDT were found by Schechter, *et al.* (*22*) who reported the presence of 456 to 534 p.p.m. in butter made from milk which contained three to 26 p.p.m. Telford (*25*) reported the presence of DDT in butter made from the milk of a goat which had been fed the insecticide.

Mann, *et al.* (*13*) found the following concentrations of DDT in dairy products made from milk which contained the insecticide: pasteurized cream, 70.2 p.p.m.; buttermilk, 1.9 p.p.m.; whey, 0.5 p.p.m.; butter, 100 p.p.m. and cheddar cheese 47.0 p.p.m.

Benzene hexachloride was found in butter made from milk produced by cows grazing on pastures that were previously sprayed with the insecticide (*16*).

Information about residues of other insecticides in dairy products or about insecticide residues in other dairy products appears to be lacking in the literature. Results of studies on the effect of manufacturing processes on insecticide residues are also scarce. Mann, *et al.* (*13*) reported that pasteurization had very little effect on the amount of DDT in milk.

Problems Created By The Presence Of Insecticides In Milk And Milk Products

The literature fails to cite instances in which insecticide residues in milk have interfered with any of the processes employed in the manufacture of various dairy products. It must be noted, however, that the presence of a wettable DDT powder in milk has been found to interfere with the methylene blue test (*11*).

The presence of insecticides in milk, however, does create public health problems. No entirely "safe" insecticide has been developed. The misuse of any one of them in the production of milk (or the manufacture of milk products) may endanger the health of the consumer.

Chlorinated Hydrocarbon Insecticides

Most reported toxicological studies of this group of insecticides have involved DDT. This insecticide can gain entrance into the bodies of man and animals through absorption from the gastrointestinal tract, the lungs after inhalation and through the skin (*7, 17*). Neal and Von Oettingen (*17*) found no toxic symptoms in humans that were exposed to DDT as an aerosol spray or dust at a rate ten times greater than that which would be normally used. Various types of dermatitis may be associated with exposure of the skin to DDT and its solvents according to Hayes (*7*).

Cases of DDT poisoning are most generally associated with the oral ingestion of the insecticide. Animal experiments have indicated that solvents such as digestible animal or vegetable oils enhance the toxicity of DDT (*7*). When ingested in high concentrations, DDT can cause death in man (*3, 8*) and animals (*26*). If ingested in lower concentrations by man, DDT may produce nausea, apprehension, stiffness in the jaws and throat (*23*), slow pulse, giddiness and dilated pupils (*4*). MacCormack (*12*) reported that his own blood was lethal for lice six and 12 hours after he ingested 1.5 g. of DDT in butter. He only suffered from a few subcutaneous hemmorrhages and this only after exercise.

In animals large doses of orally ingested DDT caused tremors, convulsions, incoordination and death (*17*).

Adult cats who were injected with DDT showed neurologic disorders which involved stiffness, tremor, clonic movements and death (*19*). An autopsy of the cats showed damage to ganglion cells (vacuolar degeneration or pyknosis) and capillary dilation in the liver.

When rats were chronically poisoned with DDT, increases in liver lipids and the size of the liver were noted (*21*). The increase in liver lipids was accompanied by an increase in phospholipids and cholesterol.

Oral dosages of DDT required for the production of illness in man have been reported (*7*). A single dose of 10 mg. per kg. of body weight produced illness in some but not all subjects even when no vomiting occurred. Smaller dosages generally failed to produce illness although perspiration, headache and nausea were noted in an already sickly man who ingested 6 mg. per kg. of body weight. Convulsions have been noted when 16 or more mg. per kg. of body weight were ingested. Dosages as high as 285 mg. per kg. of body weight have been taken without fatal result. Vomiting, however, occurred and hence the dosage was reduced. The least daily dosage, which will lead to illness in man is unknown. Experimental work with animals shows, however, that some individuals might show mild illness if they received 2.5 to 5.0 mg. of DDT per kg. of body weight daily.

DDT was stored in the fatty tissues of all mammals and birds that have been studied (*7*). When a given quantity of DDT was ingested for a period of time, the amount stored in fat gradually increased to a point at which it remained stationary as long as the ingestion rate was constant. If the ingestion rate increased, the quantity stored also increased gradually until a new point was reached at which it again remained stationary as long as the new ingestion rate remained constant.

DDT introduced into the bodies of humans was regularly broken down into DDA (the acetic acid derivative of DDT) and DDE (the dehydrochlorinated derivative) (*7*). The DDA was subsequently excreted in the urine (*18, 23*) while the DDE was stored in the fat. (*7*). Hayes (*7*) noted that a small group of people may become hypersensitive to DDT.

Little information appears in the literature on the toxicity to man of other chlorinated hydrocarbons. Furman (*6*) reported that no toxic signs were seen in cattle which were dipped in benzene hexachloride solutions up to 0.5 per cent concentrations. Ingestion of BHC also failed to produce symptoms of toxicity.

Princi (*20*) reported that there is no essential difference in physiological responses produced by chlorinated hydrocarbon insecticides, hence, information given about DDT is perhaps somewhat applicable to other insecticides of the same general type. Table 1 indicates the toxicity of chlorinated hydrocarbon insecticides to both man and rats. It can be seen that toxaphene and endrin are most toxic and that methoxychlor and perthane are least toxic. The other insecticides of this type rank somewhere in between.

Organic Phosphate Insecticides

This group of insecticides may be absorbed by ingestion, inhalation or through the intact skin (*20*).

Table 1 indicates that parathion and TEPP are high and thiodan is moderately high in toxicity to human beings. Chlorthion, diazinon and malathion are moderate or moderately low in their toxicity to humans.

Early symptoms of organic phosphate poisoning may be any combination of the following: headache, dizziness, blurring of vision, nausea, vomiting, diarrhea, and breathing difficulty (*20*). Later symptoms include profuse sweating, salivation, pulmonary edema with cyanosis, meiosis and convulsions.

Since these insecticides generally are not secreted by cows in their milk even if they are ingested (*14*), it is doubtful whether milk or milk products would be responsible for human intoxications. Gross misuse of the organic phosphate insecticides during the pro-

TABLE 1—TOXICITY RATINGS OF COMMON INSECTICIDES[a]

Insecticide	LD/50-Oral[b]	Toxicity to humans
Chlorinated hydrocarbon		
Aldrin	0.107	Moderately high
Benzene hexachloride	0.960	Moderate
Chlordane	0.732	Moderate
DDT	0.400	Moderate
Dieldrin	0.130	Moderately high
Endrin	0.040	High
Heptachlor	0.144	Moderately high
Lindane	0.200	Moderate
Methoxychlor	9.600	Low
Perthane	9.600	Low
TDE	5.450	Moderate
Toxaphene	0.110	High
Organic Phosphate		
Chlorthion	2.410	Moderately Low
Diazinon	0.200	Moderate
Malathion	1.600	Moderately Low
Parathion	0.005	Very high
TEPP	0.002	Very high
Thiodan	0.144	Moderately high

[a] Information in this table based on data by Lehker (10).

[b] Figures given are the number of ounces of chemical orally administered per 100 pounds of body weight needed to kill 50 per cent of the test rats.

duction of milk or manufacture of milk products could, however, result in the presence of toxic levels in these products.

PRESENT STATUS OF REMEDIAL MEASURES

The Food and Drug Administration has attempted to eliminate certain insecticides from milk by setting tolerance levels for these chemicals at zero p.p.m. Affected by the zero tolerance level are: DDT (*2*) methoxychlor (*1, 9*) and malathion (*1*).

The U.S.D.A. has also attempted to help the situation through its recommendations on insecticide usage (*9*). The chlorinated hydrocarbon insecticides have virtually been eliminated from the list of products suggested for use in the control of insects on dairy cattle. Furthermore, the farmer is cautioned not to feed dairy cattle with plants which have been treated with aldrin, dieldrin, DDT, chlordane or toxaphene.

SUMMARY

Surveys of market milk supplies have shown that 25 to 62 per cent of the samples contained traces or larger amounts of chlorinated hydrocarbon insecticides. Benzene hexachloride and DDT were found most frequently. Organic phosphate insecticides were not found in samples tested.

Highest concentrations of chlorinated hydrocarbon insecticides were found in high-fat dairy products such at butter, cream and cheddar cheese.

DDT and other chlorinated hydrocarbon insecticides were found toxic when ingested in high concentrations and some may bring about chronic intoxication if ingested at low levels over long periods of time. DDT was stored in the fatty tissues of man, other mammals and birds after ingestion. Some people were hypersensitive to DDT.

Organic phosphate insecticides were found to vary from high to moderately low in their toxicity to humans. Milk generally did not contain these insecticides and hence only gross misuse would result in the presence of toxic levels in dairy products.

The Food and Drug Administration has set tolerance levels for DDT, methoxychlor and malathion in milk at zero p.p.m.

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Special Service Article

TUBERCULOSIS AND BRUCELLOSIS AS MILK BORNE DISEASES

Editor's Note: Presented herewith is a Special Service Article on Tuberculosis and Brucellosis. Sometimes complacency may exist with regard to these two diseases, transmissible to man. While real progress has been and is being made, this Article indicates the need for constant vigilance. Also presented is a review of the situation as it now stands.

It is a tragic paradox that milk as one of the most important foods in the diet of the American people, is also an important vehicle for the transmission of disease of both human and animal origin. Bovine tuberculosis and brucellosis are probably the two most commonly know animal diseases which are transmitted to humans through the consumption of milk. Both can be completely eliminated in humans only be total eradication of the disease in animals.

TUBERCULOSIS

Tuberculosis is pathogenic to many animals, including mammals, birds, fish and reptiles, yet the only animals from which the disease is transmitted to humans are cattle and goats. (*1*) During the past 40 years, tremendous progress has been made in this country in reduction of tuberculosis in cattle through Federal and State test and slaughter programs. The nationwide incidence has been reduced from a high in 1918 of nearly 5 per cent of the animals and 25 to 50 per cent of the herds tested, to a low in 1952 of 0.11 per cent of the cattle tested. In 1940, the entire nation attained modified accredited status (infection rate of less than 0.5 per cent.) (*2*)

Unfortunately, after reaching modified accredited status, it became more difficult to obtain support for tuberculosis eradication programs, and, of course, during World War II, our fiscal and manpower attention and resources were diverted to the war effort. As a result of cutbacks in tuberculosis testing programs, the incidence of reactors in some States has increased since the war and this trend is expected to continue in certain areas until more intensified testing programs are instituted. In one of the States, the infection rate in cattle tested, rose from a low of 0.18 per cent during the war years to a high of 0.87 per cent in 1956. The average rate of infection in cattle tested in one county in this State rose as high as 5.14 per cent. To correct this condition the State, in cooperation with the U. S. Department of Agriculture, is now testing all cattle in each county as it comes due for accreditation. The State officials are also obtaining information on pretest movement of animals in and out of infected herds as a means of locating and eliminating other possible foci of infection, and tracing back to the herd of origin untested cattle that are slaughtered and show evidence of tuberculosis. Other states are similarly adopting more stringent programs in an effort to reduce infection where the infection rates have indicated that a problem was developing and to eliminate the disease entirely where the infection rate is low. The problem of eliminating the residual foci of infection will be particularly difficult, because of the lack of a rapid and practical method of screening herds for infection, short of periodic testing of all animals in all herds.

MILK BORNE BOVINE TUBERCULOSIS

At this point we might ask the question, is milkborne bovine tuberculosis in this country a serious public health problem? Only isolated cases of this disease

Presented at the Course on Epidemiology of Milkborne Disease, held at the Communicable Disease Center, Atlanta, Georgia, February, 1958.

in humans have been reported during the past few years. Two examples come to mind. In 1954, a farm boy in Michigan was found to have bovine tuberculosis. Upon testing the cattle on the farm, all 17 were found to be reactors and 15 showed gross lesions when slaughtered. In 1948, there was a fairly large outbreak in Ohio which involved 119 school children who consumed raw milk. Dr. Robert Anderson, Chief, Communicable Disease Center,[1] pointed out that although current medical literature contains statements that the role of bovine type tuberculosis is an insignificant one in this country, data is not available to support such statements. He went on to say that, *"The public health importance of animal tuberculosis, it seems to me, cannot be measured with the information we now have. We think bovine tuberculosis in humans is rare. The cases that have come to the attention of the Communicable Disease Center since 1950 — cases confirmed by laboratory study — can be counted on the fingers of one hand. But this communicable disease, that exists in animal hosts closely associated with man, does not announce itself in sudden, dramatic onset, but often develops slowly and can go unrecognized for long periods. Its public health importance must be evaluated by some means more definite than opinion."*

PUBLIC HEALTH CONTROL

In view of the increasing incidence of tuberculosis infection in dairy cattle and in view of the potential hazard of the transmission of the infection to humans through milk consumption, what public health controls are necessary? How can the chain of infection be broken? First and foremost in the prevention of any milkborne disease, is the mandatory pasteurization of all milk. Those states, cities and counties who do not, as yet, have laws or regulations requiring the pasteurization of all market milk and milk products, should certainly pass such regulations without delay. In addition, broad educational campaigns should be conducted by the state or county health departments, directed to the rural population who may consume raw milk from their own cow or dairy herd, or from that of a rural distributor. These public education programs should underscore and reiterate the necessity to either boil or pasteurize such milk before consumption, or use only commercially pasteurized milk. Secondly, it is important that health officials cooperate with livestock disease control officials in the establishment and conduct of effective programs for the eradication of bovine tuberculosis.

MILK ORDINANCE AND CODE PROVISIONS

The Milk Ordinance and Code—1953 Recommendations of the Public Health Service, which provides the basis for milk sanitation regulations in 34 States, 2 Territories, 477 counties and 1,398 municipalities, contains safeguards to prevent transmission of tuberculosis through milk and milk products. Section 7, Item 1r, *Cows* - Health, requires that all milk for pasteurization shall be from herds which are tuberculosis free, or from herds which are located in modified accredited free areas and which have been tested for tuberculosis not more than 6 years prior to the adoption of the Ordinance and at least once every 6 years after such test. All additions to the herds are required to be free from tuberculosis. Tests, retests and disposal of reactors are required to be made in accordance with current USDA requirements. A certificate identifying each animal in a herd is required to be on file as evidence of the tests or retests.

There is currently some question as to whether the tuberculosis provisions of the Ordinance should be revised. Three changes have been proposed by various groups, namely: (1) permit animals from herds located in modified areas to be added to the dairy herd without another test, (2) eliminate the provision which requires test of herds at least once every 6 years and (3) eliminate the requirement that all animals tested be identified. The experience of some states would indicate that testing more frequently than once every 6 years (as required by some states and municipalities) is indicated.

Section 8 of the Ordinance, *Grades of Milk and Milk Products Which may be Sold*, specifies that all milk and milk products for human consumption must be pasteurized. Although pasteurization is a very important and effective safeguard against the transmission of tuberculosis in milk, it is subject to mechanical failure and human errors, consequently, the most effective measure is to completely eradicate the disease from our animal population. Seven states now require pasteurization of all market milk. And in the U. S., currently, ninety-five per cent of market milk is pasteurized.

BRUCELLOSIS

Although brucellosis is primarily an occupational disease, it is transmitted to man through the consumption of raw milk and dairy products from infected animals. Fortunately, since World War II, there has been a gradual decline in the number of cases of human brucellosis reported throughout the country. During the 10-year period 1947-1956, the States reported to the National Office of Vital Statistics, a total of 31,132 cases of brucellosis. A high of 6,321 cases in 1947 decreased gradually to 1,100 cases in 1956. Results of studies in Iowa, Minnesota and Wisconsin and other states have shown a correlation between the incidence of brucellosis in humans and in

different species of animals. A number of state health department officials and medical investigators were invited recently by the Communicable Disease Center to submit their evaluation of brucellosis as a public health problem. A consensus of their views as to the source of human infection was as follows:

Farm Occupational	40%
Raw Milk or Cream	20%
Industry Occupational	20%
Unknown	20%

Reporting on specific epidemiological case-histories by the various state health departments showed that 61 out of a total of 381 cases of brucellosis in humans were attributed to the consumption of infected raw milk.

THREE SPECIES INFECT

Brucellosis in humans and animals is due to infection with any of three species of Brucella, namely *abortus, suis* and *melitensis*. Even though *abortus* is the species most commonly found in cattle, all three may be transmitted through milk. Borts, and others, reported on a milkborne epidemic in Iowa in which 77 cases of human brucellosis was caused by *Brucella suis*. The milk involved in this outbreak came from a herd of 24 cows in which 11 reacted to the blood agglutination test. The organism was isolated from the milk.

There is no known cure for brucellosis in animals, therefore, the only effective means of eliminating the disease in dairy cattle is by vaccination of all calves, and test of all adult animals followed by slaughter of the reactors. Reinfection is prevented by bringing only brucellosis-free animals into the herd. Eradication of brucellosis from beef cattle and swine on the premises and adjoining premises must be done also.

PROGRESS MADE

A great deal of progress has been made in eliminating brucellosis in cattle through the cooperative State-Federal brucellosis eradication program. In recent years this progress has been particularly rapid due to a combination of factors, the most significant of which are (1) the passage of State and local milk regulations requiring brucellosis-free herds for the production of market milk, (2) the introduction of the rapid and economical milk ring and whey tests for screening herds for infection and (3) extensive calf vaccination which is resulting in higher herd immunities.

According to USDA reports the rate of infection for the nation as a whole is declining very rapidly. In spite of an increased concentration of blood testing on BRT suspicious herds, there is still disclosed a significant reduction in percentages for blood reactor cattle and herds. The infection rate for herds tested is now down to about 10 per cent, and for cattle tested is down to 0.16 per cent. The number of States which are attaining certified status is also increasing. Currently, there are 9 states (Conn., Del., Mo., Minn., N. H., N. C., Vt., Wash., and Wisc.) and one territory (Puerto Rico)* which are modified certified brucellosis free. This means that they have less than one per cent infection in the cattle and 5 per cent of the herds. In addition, 441 counties in 27 other states have attained this status. The USDA predicts that at the present rate of eradication, over one-half of the states will be Modified Certified Brucellosis free by 1960.

UNIVERSAL PASTEURIZATION NEEDED

The same public health controls as mentioned above for tuberculosis are equally applicable for preventing the transmission of brucellosis to humans through the consumption of infected milk. Pasteurization or boiling of milk before consumption is a vitally important safeguard and, of course, eradication of the infection in milk producing animals will result in elimination of the disease in humans.

PLAN A AND B

Section 7, Item 1r, of the Milk Ordinance and Code requires that within (from 1 to 5) years after adoption of the Ordinance, all milk and milk products for pasteurization shall be from herds certified by the State livestock disease control authority as following either plan A or plan B approved by the USDA for the eradication of brucellosis. All additions to the herds must be brucellosis-free. A certificate identifying each animal shall be evidence of the above test, and it shall be filed as directed by the health officer. Plan A requires test and prompt slaughter of all reactor animals, and permits vaccination of calves. Plan B permits retention of reactor animals in the herd. Plan B, of course, is not consistent with the definition for milk which specifies that milk is the, *lacteal secretion . . . . obtained by the complete milking on one or more healthy cows* . . . However, at the time this Ordinance was written the incidence of brucellosis in dairy herds was much higher than it is now largely because health departments had not given sufficient attention to the eradication of this disease from dairy herds. To have required dairy herds to be brucellosis-free would have created a severe milk shortage and an economic crisis in some areas. Therefore, is was agreed that for milk which is to be pasteurized it should be permissible to retain the reactor animals in the herd. In this connection, the Code states that, *Ultimately, this ordinance will be revised to require*

* As of May 1959, the following additions should be made: Maryland, Michigan, Nevada, New Mexico, Pennsylvania, Rhode Island, Utah.

all milk-producing herds to be under Plan A; therefore, a dairyman who has brucellosis reactors in his herd is urged to eliminate a sufficient number of such reactors each year so that all reactors will have been removed from the herd within a period of 3 years after his entry into Plan B. A longer period of time may be needed in isolated instances where the incidence of brucellosis in the herd is higher than 50 per cent." The stimulus resulting from more stringent requirements in state and local milk laws and regulations with respect to brucellosis has been much more pronounced than was anticipated. Many states and municipalities already require herds to be free from brucellosis, or have established dates when all of the herds must be brucellosis-free. Livestock disease control officials and the industry are very much pleased with the progress being made and realize that everyone is profiting by the elimination of brucellosis.

PROPOSED REVISIONS

Proposals are currently under consideration for revision of the brucellosis provisions of the Ordinance. These proposals are as follows:

1. Require all dairy herds to be brucellosis-free or be located in a certified area.
2. Require all additions to the herd to be brucellosis-free or from herds located in certified areas.
3. Not require identification of each animal.
4. Discuss the utilization of the milk ring test as an effective screening test for the location of foci of infection.

In conclusion it should be reemphasized that bovine tuberculosis and brucellosis, the two most commonly known animal diseases transmitted to humans through the consumption of milk, CAN be completely eliminated in humans only by total eradication of the disease in animals. Although pasteurization is a very effective safeguard in preventing the transmission of disease through milk, our goal should be the total elimination of the source of infection.

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NEWS AND EVENTS

SOME TIPS ON REPORT WRITING*

There are essentially two kinds of reports, a factual report, one in which facts and related details are given and nothing more. The other is a narrative report which is a detailed presentation of facts or findings, a discussion of those findings and conclusions draw.

Common errors in report writing:

1. Rambling – lacking continuity of thought.
2. Use of impressive words – simple language more readily conveys the ideas and thoughts of the writer.
3. Spelling – one of the most serious of all errors.
4. Reflective or muddled thinking; an implied understanding versus clear thinking.

How to eliminate or correct these errors:

1. List your ideas.
2. Group them into related groups. There generally should not be over three related groups – If more than three groups it may be best to make more than one report.
3. Non-readers are poor spellers. One good informative book should be read each month. This will not only improve spelling but will also be conducive to constructive thinking.
4. Do not exaggerate.

A few rules to be considered for successful writing:

1. Make an outline. Join together sentences of one idea each, and with not more that 10-15 words. (Note: The Reader's Digest is written for 9th and 10th grade level of readers, no sentence contains over 15 words.) Each paragraph should contain only one idea. The first sentence should state the idea, while the remainder enlarges upon or reinforces that idea.
2. Use simple words and phrases. Avoid unneeded words or phrases as: "for purpose of", rather say, "for".
3. Read report aloud – read to another. It should be easy to read and should read smoothly.
4. Incubate – Lay it aside for a day or so then reread and criticize.
5. Write for interest – Simplify. Keep in mind that the report may be read by someone unacquainted with the subject matter.
6. Avoid Jargon, trade terms, professional idioms, etc.
7. Use comfortable words, familiar words, if in doubt as to meaning of a word do not use it.
8. Check Grammer – Most common errors are the use of a singular verb with a plural subject (or the opposite) and the use of wrong verb tense.
9. Edit and rewrite. Five sentences that fully express an idea are better than a whole page of unimportant matter.
10. Keep a file of reports. Reread occassionally and watch for faulty trends.

HELPS

A handbook of information is a useful article. One that is free:

"TECHNICAL WRITING TIPS"
BY PUBLIC RELATIONS DIRECTOR
CONSOLIDATED ELECTRIC DYNAMICS CORP.
300 NORTH SIERRA MADRE VILLA
PASADENA

ANOTHER GOOD AID

"TECHNICAL REPORT WRITING"
BY JAMES SOUTHER
PUBLISHED BY JOHN WILEY

AN INDISPENSABLE TOOL: A GOOD DICTIONARY

*Presented by E. Charles Alvarez, Pierce Junior College, at the 40th Annual meeting of the California Association of Dairy and Milk Sanitarian's Refresher Course, Long Beach, Calif., October, 1958.

ENGINEERS REPORT ON SCHOLASTIC GRANTS

Federal Support

The United States Public Health Service administers four major programs, authorized by various Congressional action in recent years, for the purpose of stimulating both research and training in the fields of sanitary engineering and occupational health. These programs are (1) research grants, (2) research fellowships, (3) traineeships, and (4) training grants-in-aid.

Research grants are awarded to individual investigators for the support of research projects in sanitary engineering and related sciences principally to (1) expand research activities and (2) provide research training for personnel. During Fiscal Year 1957, more than 400 individuals shared almost $2,000,000, about 95 percent going to universities and another 4 percent to independent research laboratories.

The program of *research fellowships* is new and is supported initially on a modest scale in 1957. The fellowships are of three types in the broad field of sanitary engineering – predoctoral, postdoctoral, and special. Applicants may have basic training background in engineering or related biological, chemical, and physical sciences. The primary purpose of this program is to increase the number of engineers and scientists qualified to conduct independent research in problems of environmental sanitation. Five such fellowships were awarded during 1957, each worth $1,800 plus tuition plus a family allowance and total-

ing an average of over $4,000. It is planned to double this number of fellowships in the coming year.

The *traineeships,* under Title I of Public Law 911, are available to sanitary engineers, sanitarians, sanitary chemists, and allied personnel wishing to study in a graduate program having definite public health implications. They are intended to bring new people into the field of public health and thus give preference to those with no more than two years' experience in public health, who have had less than one year of graduate or specialized public health training after obtaining their professional degree, and who are under 35 years of age. Approximately 130 traineeships were awarded in the past several years to sanitary engineers, sanitarians, chemists, physicists, industrial hygienists, biologists, and geologists. The average stipend is $4,000.

Training grants-in-aid are awarded under the Air Pollution Research and Technical Assistance Act of 1955. So far, some 14 individuals have been awarded stipends of $4,500 for the purpose of increasing their competence in the prevention and abatement of community air pollution. Eleven grants were made directly to certain educational and training institutions to assist in developing graduate level study in air pollution, and three grants were awarded to air pollution control agencies to pay for the specialized training of certain employees.

All the programs described here, with the exception of research grant activity, are quite new, show great promise, disclose mounting interest, and are slowly expanding. Indication of potential growth may be noted from the actual development of the research grants program. In 1947, six grants totaling $66,284 were awarded in the field of sanitary engineering and occupational health. Ten years later, 73 such grants were awarded, in 1956, totaling $880,853.

Other Federal Agencies

Other Federal agencies provide stipends of various categories for study in a great range of fields, though only a few are peripheral to public health interests as such. The Veterans Administration, National Science Foundation, Atomic Energy Commission, and Department of Defense are the major providers. Other than the famous GI Bill of the Veterans Administration, the financial aid programs of the other Federal agencies are heavily weighted toward postdoctoral research. Even the Public Health Service lends its greatest support in the health field to medical research through grants administered by the National Institutes of Health.

Of particular interest is the program of special fellowships under the aegis of the Oak Ridge Institute of Nuclear Studies. Study leading to the Master's degree in industrial hygiene is supported by $2,500 grants for 10 months plus tuition, other fees and family allowances. Graduate predoctoral fellowships of the National Science Foundation are available to individuals desiring to pursue graduate work in the physical, biological, engineering, and related sciences. Stipends range from $1,400 to $1,800.

In the past few years the Federal Government expended altogether about $50 million in aid to some 43,000 graduate students in 1954-55. Almost half of these were studying in science fields. The largest group of graduate students were employed as research assistants and were working on research contracts or grants awarded to senior investigators at colleges and universities.

Since the emphasis is on research and teaching, Federal funds available for graduate students planning to practice their profession on the job in various communities are, indeed, limited. More, much more, needs to be done in this particular Federal area of assistance.

To this end, it is pertinent to note that a Conference on the Education, Training, and Utilization of Sanitary Engineers was held this past spring in Washington, D. C. The two-day meeting was conducted under the auspices of the Subcommittee on Personnel and Training of the Committee on Sanitary Engineering and Environment, which is a unit of the National Academy of Sciences, National Research Council.

Outstanding educators, engineers, and administrators focused their attention upon a number of problems, including that of financial aid, relating to sanitary engineering personnel and training. Recommendation was made in strongly affirmative tone that graduate-level fellowships and traineeships should be expanded and should carry no restrictions on the duration of training awards to any qualified individual up to and including the Doctoral program. The conference was equally forthright and insistent in its recommendation that Title I of Public Law 911 should be expanded to include financial assistance for the undergraduate education of engineers and should provide a monthly stipend of not less than $100 plus an allowance for tuition and books.

Non-Federal Support

Financial assistance to sanitary engineering graduate students is quite meager in institutions of higher learning. In a survey made recently, by the authors, of all institutions of higher education known to offer training in sanitary engineering, very few provided assistance in this field. Though the data are not exhaustive, they are representative of the nature and extent of aid currently available to graduate students in this field.

A total of 17 schools, three foundations, and four professional organizations offer graduate students scholarships and/or fellowships in which the study

of sanitary engineering is permissable. These schools include the Massachusetts Institute of Technology, California Institute of Technology, Virginia Polytechnic Institute, Rensselaer Polytechnic Institute; the Universities of California (Berkely), Oklahoma, Utah, Washington, Florida, and Michigan; Northwestern, Rutgers, Harvard, Johns Hopkins, and Oklahoma State Universities. This group provides an average of 47 separate stipends, ranging in value from $400 to $4,500 per year. It must be noted that the awards in a few of the above-named universities are closely linked with graduate research requirements.

The American Water Works Association, the American Public Works Association, the National Lime Association, and the National Council for Stream Improvement, each offer a graduate stipend, with value up to $1,500, $1,000, $2,400, and $2,574 per year, respectively. These are specifically for sanitary engineering. The Dorrco Foundation (Rutgers U.) offers a stipend of $2,400 leading to the Ph.D. The Kemper Foundation (Harvard U.) is limited to study in industrial hygiene and carries a sum varying with need and project. The Clow Foundation in the midwest offers a sum up to $1,800 per academic year to a graduate of a college or university in the states of Ohio, Michigan, Illinois, Indiana, Iowa, or Wisconsin. This award is for graduate study in sanitary engineering leading to the Master's degree.

Another sixteen colleges and universities reported the availability of financial assistance. In general, such money is offered in part payment for services rendered in the form of membership on a research team or part-time teaching, and are labelled "research assistantships" or "teaching fellowships." Actually, *most* colleges and universities with graduate programs provide such remuneration, if only of a token nature, in exchange for the "junior faculty" services rendered to overburdened professional teaching or research faculty.

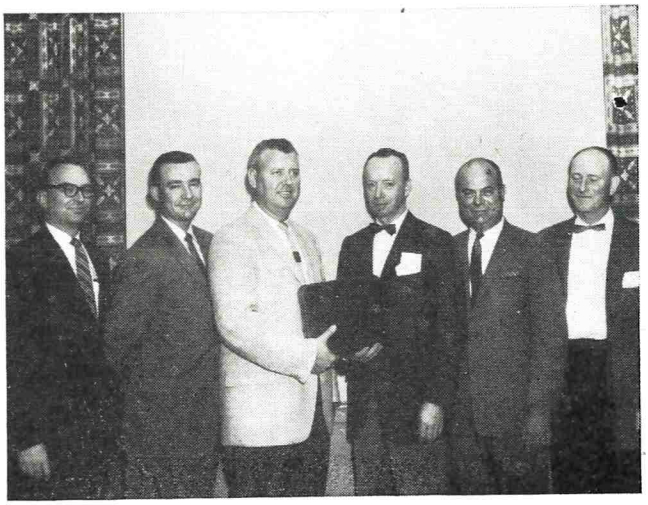
Despite the importance of such assistance, the focus is on the professional teaching or research engineer and not on the young engineer who is to be trained for a career in the community or in industry. Much more attention must be given to this latter group.

Excerpts from: Journal of Sanitary Engineering Division — Proceedings of the American Society of Civil Engineers. Paper 1708

FOLEY ELECTED PRESIDENT OF MISSOURI ASSOCIATION

Vincent Foley, Secretary-Treasurer of International, was elected President of the Missouri Association of Milk and Food Sanitarians during the 27th annual meeting of that Association held April 6-8, at Columbia, Missouri.

The annual meeting consisted of a three day short course in milk and food sanitation. It was co-sponsored by the Department of Dairy Husbandry, College of Agriculture, University of Missouri; The Missouri Division of Health; and the Missouri Association of Milk and Food Sanitarians.



Missouri Association Officers, 1959, left to right; Sec.-Treas., Charles Orr; 1st Vice-Pres., L. R. Miller; retiring Pres., Jerry Cook; Pres., V. T. Foley; 2nd Vice-Pres., Robert Wehmer; Auditor, Floyd Copenhaver.

Twenty-five year awards and diamond studded lapel pins were presented to Milton R. Fisher, D.V.M., Chief of Milk Control, St. Louis Department of Health, and to R. H. Baird, D.V.M., Director of Milk Control, St. Joseph City Health Department. Ten year awards were presented to Ben Meinershagen, D.V.M., Higginsville: Glenn Lotspiech, Senior Sanitarian, Division of Health, and to Floyd Copenhaver, Senior Sanitarian, Kansas City Health Department.

In addition to President Foley, other officers elected were: First Vice President — Lesley Miller, State Division of Health; Second Vice President — Robert Wehmer, St. Louis Health Department; Secretary-Treasurer — Charles Orr, State Division of Health; Auditors — Floyd Copenhaver, and Jerry Cook, the latter being the Association's retiring President.

STANDARDS FOR FROZEN FRUIT CONCENTRATES ANNOUNCED

Food and Drug Administration standards for frozen concentrates to make lemonade have been published recently in the Federal Register. The concentrates are sweetened lemon juice products to which the consumer adds water to make plain or colored

lemonade. A six-ounce can makes a quart. The standards will go into effect in 60 days unless FDA receives objections which require a public hearing.

Comments following publication of proposed standards on June 29, 1957, raised the issue of whether the standards should require some proportion of unconcentrated lemon juice in frozen concentrates for lemonade to produce the kind of taste consumers expect. The California citrus industry favored the requirement and the Florida industry opposed it.

Blindfold tests showed no distinguishable difference in the taste of lemonade made with concentrate alone or concentrate with an added 20 percent of unconcentrated lemon juice. Accordingly, the standards published do not require the use of unconcentrated lemon juice in the frozen concentrates.

The standards do not allow the use of chemical preservatives and reject the industry's proposal for a separate standard for "Industrial Frozen Concentrate for Lemonade" to contain an added chemical preservative. They also limit the use of water and require the product to contain sufficient sugar and lemon juice to make, in accordance with label directions, a beverage with at least 10½ percent of soluble solids and 0.7 percent of acid.

NATIONAL MILK SANITATION ACT HITS AT TRADE BARRIERS

Editor's Note: The bill in question has not been reproduced in toto, but significant sections have been given so milk control personnel can be informed of its main administrative and operational procedures. Readers wishing a copy of H. R. 3840, should direct a request for same to their Congressional Representative.

In February, Representative Lester Johnson of Wisconsin, introduced in the 86th Congress, H. R. 3840 which is a bill: *To amend Public Health Service Act to protect the public health from unsanitary milk and milk products shipped in interstate commerce, without unduly burdening such commerce.* The proposed amendment to the Public Health Service Act now becomes known as TITLE VIII – MILK SANITATION.

Some of the stated provisions and stipulations contained in H. R. 3840 are excerpted and reproduced herewith, to give the reader a better knowledge of the bill's content. These are as follows:

1. The Congress hereby finds that the sanitary control of fluid milk and certain milk products is necessary to protect the public health and recognizes that the exercise of such sanitary control is primarily the responsibility of State and local governments, but that no state or local government has the right to obstruct the free movement in interstate commerce of milk and milk products of high sanitary quality by use of unnecessary sanitary requirements or other health regulations.

2. For the purposes of rating, certification, and listing of interstate milk plants as provided by this title, the Surgeon General (of the Public Health Service) shall by regulation promulgate, and may from time to time amend, a Federal Milk Sanitation Code which shall set forth milk and milk product sanitation standards and sanitary practices (including standards as to inspections, laboratory examinations, and other routine official supervision by local or State milk sanitation authorities, or by both) which, if effectively followed, would in his judgment result in a supply of milk and milk products of a sanitary quality at least equivalent to that of:

(a) Grade A raw milk for pasteurization and Grade A pasteurized milk, respectively, and

(b) Milk products containing only Grade A raw milk as their milk component and intended for pasteurization, and milk products containing only Grade A pasteurized milk as their milk component, respectively, produced or processed, or both, in conformity with the provisions of the edition of the Public Health Service's recommended Milk Ordinance and Code (unabridged form) which is current on the date of enactment of this title.

3. (a) The Surgeon General shall by regulation promulgate, and may from time to time amend, standard rating methods and criteria for determining through compliance ratings, with respect to milk and milk products, the degree to which interstate milk plants and their milk supply comply with the Federal Milk Sanitation Code. Such ratings shall be expressed in terms of percentage of full compliance.

(b) The Surgeon General shall announce, by regulations, the minimum compliance ratings, (pursuant to such rating standards) which, in his judgment, are necessary to give satisfactory assurance that milk and milk products shipped from interstate milk plants receiving such ratings will have been produced, handled, transported, and processed in substantial conformity with the Federal Milk Sanitation Code, except that the minimum so prescribed shall not be less than 90 per centum.

4. Any state milk sanitation agency of any state which wishes to obtain for its interstate milk shippers the benefits of this title shall submit to the Surgeon General for approval a state plan for periodically (but not less often than annually) rating interstate milk plants located in such State, and their milk supply, on the basis of the standard rating methods and criteria in effect under item 3 above, and certifying to the Surgeon General those interstate milk plants receiv-

ing a compliance rating at least equal to the minimum ratings established under this item. Such plan shall be accompanied or supplemented by such information concerning milk sanitation control activities of the state agency and of local official milk sanitation control agencies, and such other revelant information, as the Surgeon General may request.

5. (a) The Surgeon General shall approve a State plan submitted if it meets such requirements as he determines to be necessary to obtain reliable ratings for the purpose of maintaining the list provided for, including a requirement that such ratings will be made only by State rating officials who are full-time employees of the State milk sanitation agency, (or, under interstate arrangements, by full-time employees employed by a sister State having an approved plan or by both States jointly) and hold a currently valid certificate of qualification issued or renewed by the Surgeon General. Approval of a State plan shall be for such period (but not exceeding three years) as may be fixed by regulation.

(b) Whenever the Surgeon General, after reasonable notice and opportunity for hearing to the State milk sanitation agency, finds that:

The State plan has been so changed that it complies with neither the requirements for State plan approval in effect at the time such plan was last approved, nor with the requirements for state plan approval as last amended, or, in the administration of the State plan there is a failure to comply substantially with any provision contained in such plan, the Surgeon General shall revoke his approval of such State plan. The Surgeon General may suspend his approval of a State plan at any time after giving the notice of hearing referred to above and pending such hearing and decision thereon if in his judgment the protection of the public health so requires.

6. (a) The Surgeon General shall establish and maintain a list of certified interstate milk plants, and shall publish such list, or revisions or amendments thereof, not less often than quarterly. Except as provided in subsection (b) all interstate milk plants shall be included on such list, which, by a certificate currently in effect at the time of such listing, have been certified to the Surgeon General by a State milk sanitation agency under an approved State plan as having compliance ratings at least equal to the minimum ratings established by the Surgeon General under item 3 (b). Such list shall identify each interstate shipper, the interstate milk plant or plants involved, and the milk and milk products covered by the certification.

(b) The Surgeon General shall not include or permit to remain on the list provided for under subsection (a) any interstate milk if —

1. the persons having legal ownership or control thereof does not consent to the listing of the interstate milk plant, or

2. the last rating upon which the certification of the plant was based is more than one year old, or

3. the State milk sanitation agency gives written notice to the Surgeon General that the plant is no longer entitled to the minimum rating required for listing, or

4. the Surgeon General, after investigation made on his own initiative or upon complaint of a receiving State or locality, finds that the plant, though duly certified, is not entitled to the minimum rating required for such certification. (Here legal regress is provided for any aggrieved person through usual hearing procedures.)

7. (a) Except as provided in subsection (b) - (1) no milk or milk product which emanates from an interstate milk plant in another State, while such plant is listed by the Surgeon General under item 6 with respect to the milk or milk product, as the case may be, shall be subject to seizure or condemnation in, or to exclusion from, a receiving State or locality, or from transportation, distribution, storage, processing, sale or serving in such State or locality, and (2) no processor, producer, carrier, distributor, dealer, or other person handling such milk or milk product shall be subject to punishment, or to denial of a required license or permit, by reason of the failure of such milk or milk product, or of the sealed container or vehicle (complying with the Federal Milk Sanitation Code) in which such milk or milk product was brought into the State, or of an interstate milk plant in another State or its milk supply, or of any transportation or handling facility, in which such milk or milk product was produced, processed, carried, or handled, to comply with any prohibition, requirement, limitation, or condition (including official inspection requirements) relating to health or sanitation and imposed by or pursuant to any State or local law, regulation, or order of the receiving State or locality, or by any officer or employee thereof. In the event any milk or milk product emanating from a listed interstate milk plant in another State and complying with the Federal Milk Sanitation Code is commingled with milk or milk products from within the receiving State provisions of the preceding sentence shall apply to the resulting mixture, except that nothing in this section shall be construed to prevent the application of such State or local laws, regulations, or orders to such mixture by reason of the failure of such milk or milk product of intrastate origin not emanating from an interstate milk plant in another State, to comply therewith immediately prior to such commingling.

(b) Subsection (a) shall not be deemed to prohibit any receiving State or locality from:

1. subjecting any milk or milk product upon its arrival from another State, to laboratory, or screening tests in accordance with standard methods for the examination of dairy products provided for in the Federal Milk Sanitation Code, and rejecting the shipment if upon such examination it fails to comply with the bacterial and coliform count standards, temperature standards, composition standards, and other criteria of such Code relating to the then physical condition of such milk or milk products, and

2. enforcing sanitary laws and regulations, equally applicable to milk or milk products not coming from outside the State —

a. to require pasteurization of raw milk brought into the State before delivery to retail sale or consumer-serving establishments or before use in making products with milk or milk products,

b. to otherwise protect milk or milk products from contamination or deterioration after arrival through requirements as to temperature and sanitary handling, transportation, and storage: Provided, that the State or locality may not, except as provided in subparagraph (c) reject the sealed container or vehicle, as such, in which the milk or milk product arrived in the State, if it complies with the Federal Milk Sanitation Code, or as to type of container in or from which milk or milk products may be sold at retail or served to consumers.

8. (a) The Surgeon General may make such inspections of interstate milk plants and plants proposing to become interstate and of their milk supply, and such laboratory examinations, studies, investigations, and ratings, as he may deem necessary in order to carry out his functions under this title and to promote uniformity in the application of the Federal Milk Sanitation Code and the Surgeon General's standard rating methods and criteria.

(b) The Surgeon General shall remove any interstate milk plant from the list provided for under item 6 if the State or any local milk sanitation authority or laboratory refuses to permit representatives of the Service to inspect and copy relevant records pertaining to State or local health and sanitary supervision of such milk plants or any part thereof or facility connected therewith and their milk supply, or if the person in charge of such plant or if any part of the milk supply of such plant, or any person under his control, refuses to permit representatives of the Service, at all reasonable times—

1. enter such interstate milk plant or any establishment, premises, facility, or vehicle where milk or milk products intended for such interstate milk plant are produced, processed, packed, held or transported,

2. inspect such plant, establishment, premises, facility, or vehicle, and all pertinent personnel, dairy animals, equipment and utensils, containers and labeling, and milk and milk products, and

3. inspect and copy pertinent records.

9. The Surgeon General shall conduct research, studies, and investigations concerned with the sanitary quality of milk and milk products, and he is authorized to (1) support through grants, and otherwise aid in, the conduct of such investigations, studies, and research by State agencies and other public or private agencies, organizations, institutions, and individuals, and (2) make the results of such research, studies, and investigations available to State and local agencies, public or private organizations, and institutions, the milk industry, and the general public.

10. The Surgeon General is authorized to

1. train State and local personnel in milk sanitation methods and procedures and in the application of the rating methods and procedures and criteria established,

2. provide technical assistance to State and local milk sanitation authorities on specific problems,

3. encourage, through publications and otherwise, the adoption and use, by State and local authorities throughout the United States, of the sanitation standards and sanitation practices specified in the Federal Milk Sanitation Code, and

4. otherwise cooperate with State milk sanitation authorities, other public and private organizations and institutions, and industry in the development of improved programs for the control of the sanitary quality of milk and milk products.

The bill proposes an appropriation, not to exceed $1,500,000 annually to enable the Surgeon General to carry out his functions under the Act.

Excerpts from a statement by Representative Johnson when he introduced H. R. 3840.

The bill which I am introducing today has been drafted so as to conform to the recommended principles adopted by the Association of State and Territorial Health Officers. This Association, as its name indicates, is composed of State and other sanitation officials and health officers. It has studied this matter carefully and has developed and adopted a set of recommended principles for Federal milk sanitation legislation. These recommended principles were formally adopted at the Annual Convention of the Association in Washington, D. C., October 24-28, 1958. I am asking unanimous consent to have the report included in the Record after my remarks.

The current bill does not require any State or municipality to adopt the U. S. Public Health Serv-

ice Milk Ordinance and Code, nor does it require that all fluid milk and fluid milk products shipped in interstate commerce meet the requirements of the Code.

The bill does provide, however, that any milk which does meet the requirements of a Federal milk sanitation code, the promulgation of which is provided for in the bill, cannot be excluded from any State or fluid milk market in the United States. State and local health authorities under this bill will still inspect out-of-state supplies of milk which are not qualified under the U. S. Code, if they so desire. But no State or local health authority can prevent the entry of milk which does qualify under the Code.

The bill also provides for many safeguards in areas receiving milk from plants qualified under the Code. They have the right of inspection of milk upon arrival to see that it has not deteriorated in transit, and after arrival, the handling, processing, and sale of such milk must meet the requirements applied to milk entering such markets from intrastate sources.

I feel that this bill will go far towards eliminating the use of sanitation regulations as economic trade barriers which have been and are widely prevailent in this country, while at the same time protecting and maintaining the rights and prerogatives of State and local health authorities in respect to milk originating within respective jurisdictions.

STUDY REVISION OF PHS DRINKING WATER STANDARDS

On March 24-25 a group of physicians, scientists, engineers, and administrators met in Washington, D. C., to consider revision of the U. S. Public Health Service Drinking Water Standards. In view of changes in the nature and extent of impurities which are being added to the nation's supplies as a result of greater population growths and even greater technological and industrial development, the Public Health Service has appointed this Advisory Committee to re-evaluate these Standards, which were first formulated 45 years ago and last revised in 1946.

The Public Health Service Drinking Water Standards were originally written t oapply only to water used on interstate carriers and this remains their only legal basis. However, State health departments, the American Water Works Association, and the Armed Forces have accepted them as standards for public water supplies. This general acceptance makes it mandatory that they be kept current andt hat the basic knowledge required to deal with new problems be developed before problems become acute. In considering standards for limiting impurities in drinking water at this time, special attention was given at this meeting to the problem involved in setting limits for nonliving contaminants such as radionuclides and synthetic organics and other chemicals. This was the first of a series of meetings scheduled for coming months by the Advisory Committee.

PIPE LINE MILKING SYSTEMS DISCUSSED AT RECENT MEETINGS

Milk sanitarians from several sections of the country have attended six meetings at St. Charles, Illinois. These consisted of a short course on planning, installing, cleaning and sanitizing of pipe line milking equipment on the dairy farm.

These one-day meetings, sponsored by Babson Bros. Co. and held at the Surge Training Center, look into dairy sanitation requirements of the future.

One of the high points is a question and answer period where milk sanitation problems of mutual interest are discussed.

The meetings started March 24 with milk sanitarians from Wisconsin attending. They were concluded May 7 with sanitarians from the Southeastern states in attendance. Future meetings may be held to give broader geographical coverage.

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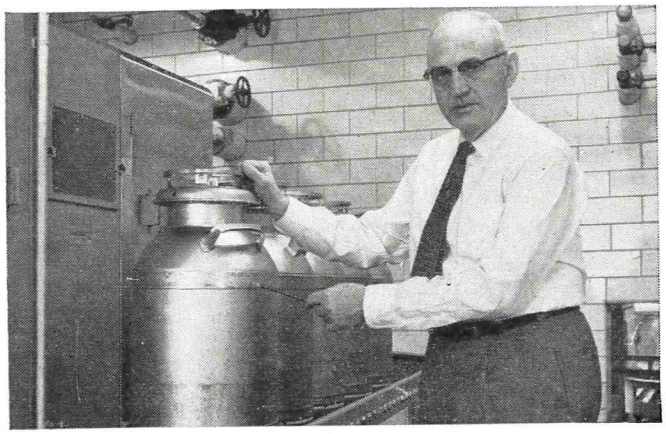

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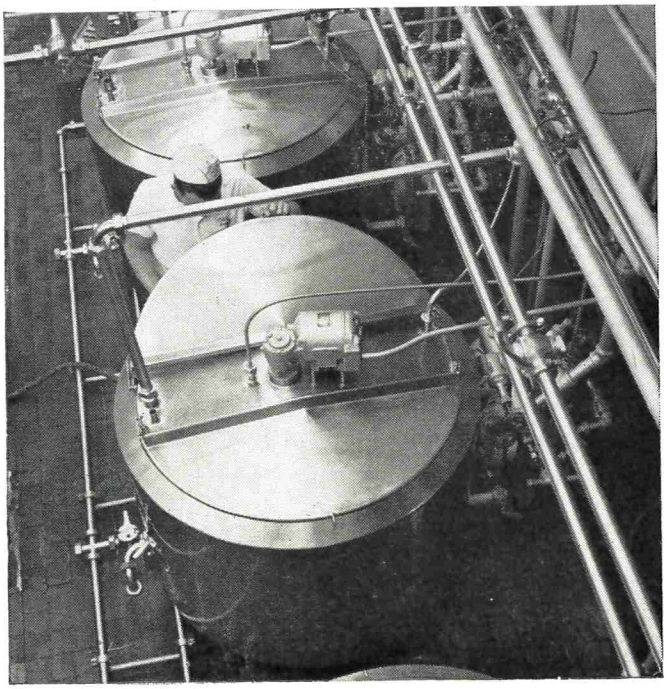

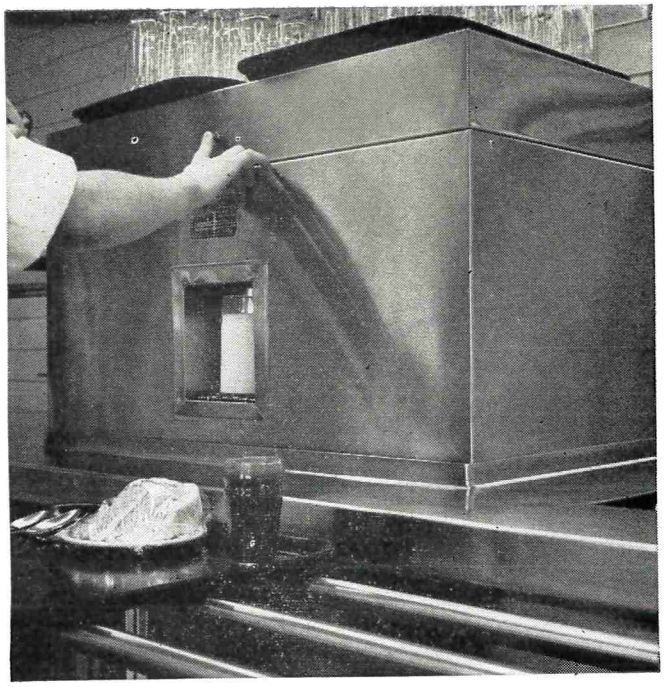

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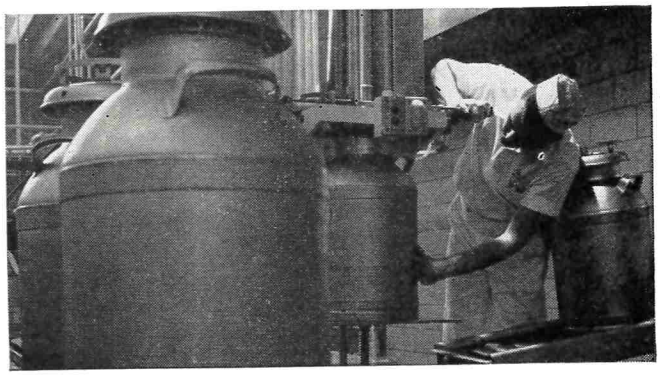

If you would like to have more information about dispenser cans or bulk dispensers, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

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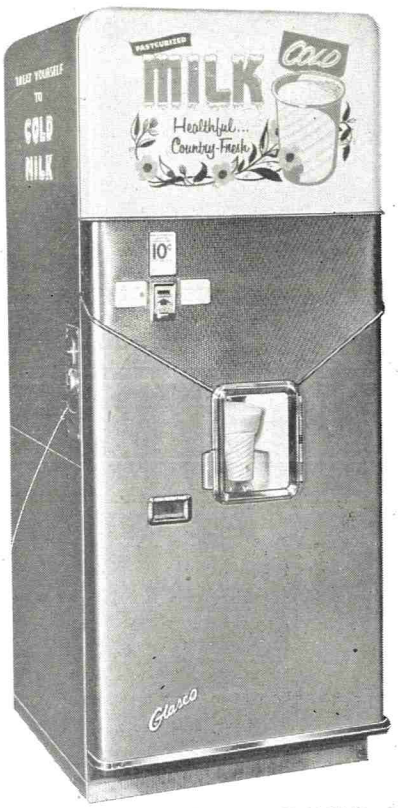

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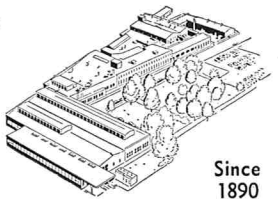

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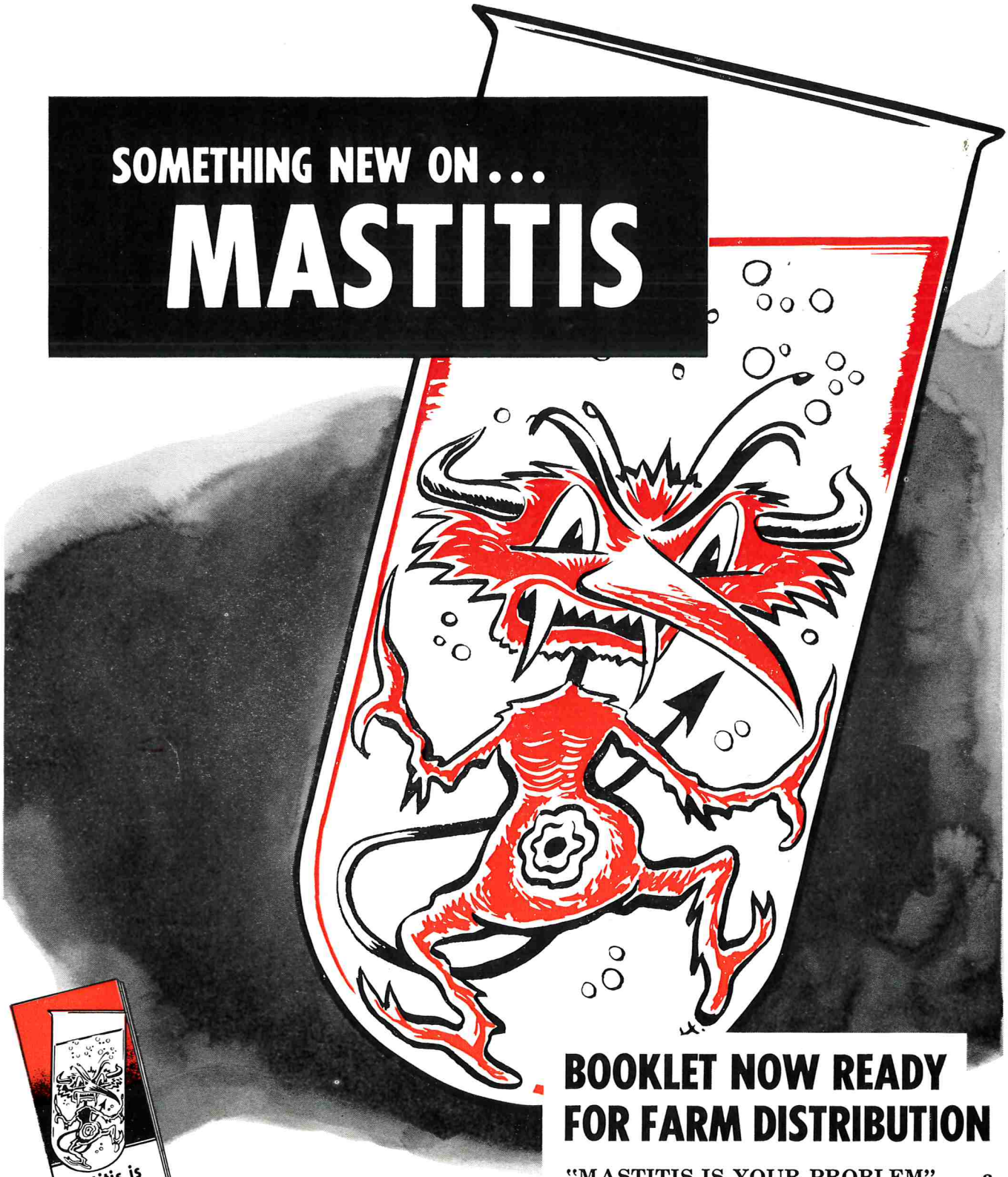

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