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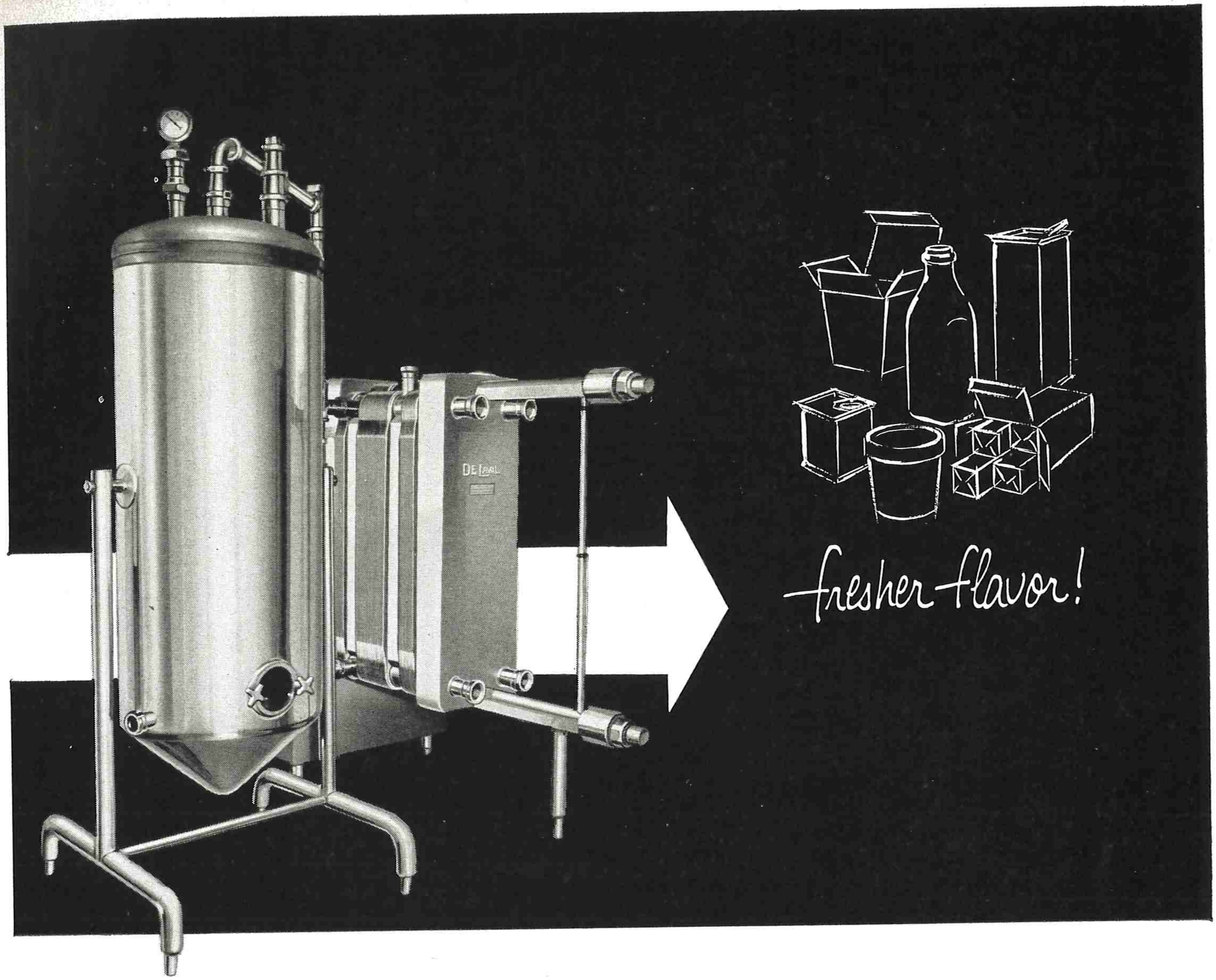

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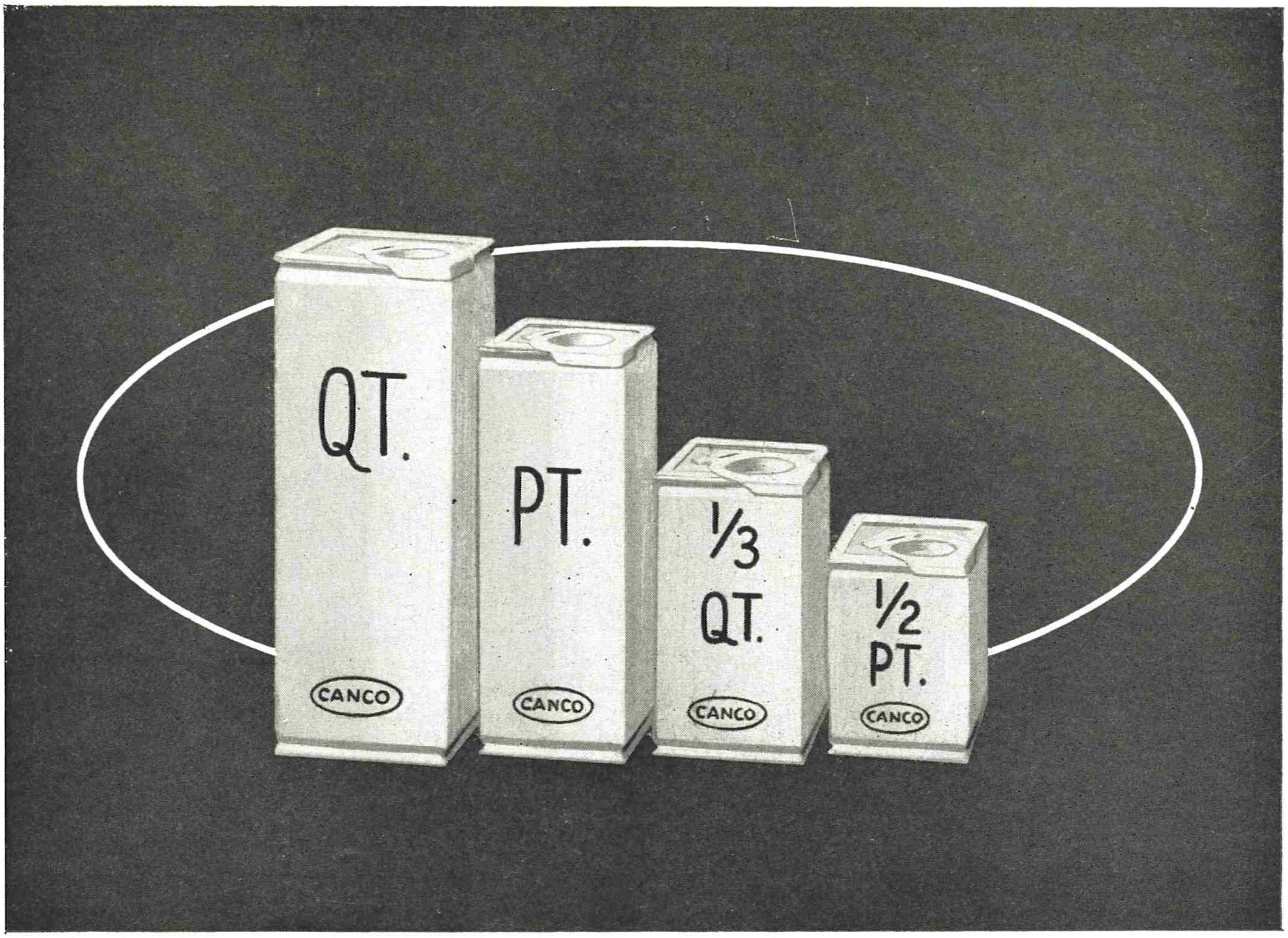
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THE DEVELOPMENT OF NATIONAL MINIMUM QUALITY STANDARDS FOR MILK TO BE USED IN MANUFACTURING[1]

H. L. Forest
Dairy Division, Agricultural Marketing Service,
United States Department of Agriculture,
Washington, D. C.

Recently there has been renewed interest in improving the quality of milk used in manufacturing. A number of organizations whose members are producing milk for the manufacture of dairy products, as well as industry leaders and college and regulatory officials, have recognized the need for quality improvement in manufacturing milk. During the past year, the U. S. Department of Agriculture has done considerable work on the development of a set of quality standards for milk for manufacturing. These standards would be available for voluntary adoption by the several States and the industry, to provide a focal point for the development of a more uniform approach to the total problem of improving the quality of manufacturing milk.

The quality improvement program which we have been constructing during the past several months reestablishes some well recognized and accepted guides and does not reflect any particular bold steps or novel ideas. Many in the industry have stated that the standards we are recommending for voluntary adoption by the States have long been overdue and will offer valuable assistance to the States and to the industry groups in improving the quality of milk for manufacturing purposes.

Need for Standards

While significant progress in improving milk quality is being accomplished in some quarters, the situation leaves much to be desired in others. Progress has not by any means been uniform nor is any final solution of the problem in sight.

Many persons believe that platform inspection of incoming raw milk is all that is needed to enhance milk quality and that any quality deficiencies can be rectified through processing or manufacturing methods. Others contend that the measure of dairy product quality can be confined to the finished product. These views are not consistent with experience nor with logic and approach the problem precisely backward.

The Dairy Division's plant survey work, which has been conducted over a period of many years, further reveals the needs for quality standards for milk for manufacturing. These surveys have shown an extremely wide range in milk quality received at manufacturing plants and somewhat comparable gradations of plant operations in many sections of the country. For example, in the last half of 1956 and early 1957, we made 56 special plant surveys at milk drying plants, in 7 States, primarily in the Midwest area. The raw skim milk represented the product from 371 creameries due to the fact that some plants received supply from numerous sources. Bacteriological examinations of the raw whole milk or raw skim milk showed counts ranging from approximately 500,000 per ml. to well over 200 million per ml. The raw milk supply for all manufactured products in any given area is essentially the same. Cheese plants, evaporating plants and butter plants all buy from the same general source of supply.

In too many instances producers are allowed to deliver poor quality milk which is blended with good quality milk from other producers. This method of operating is not sound and not in the best interest of producers who day after day are delivering top-quality milk. In many cases the producer of poor quality milk is not informed of this situation and nothing is done in the way of field service to ferret out and correct the contributing causes at the farm level. The producer under these conditions is naturally of the opinion that the quality of the milk he is delivering is what plant management wants or needs.

It seems obvious that industry is not sufficiently self-disciplined to handle this problem, and that there is need for a blueprint of production and quality requirements.

A study of the provisions in present state requirements for milk for manufacturing shows that generally little attention has been given to the development of a set of well-balanced quality standards. Many States attempt to control the quality of milk for manufacturing through sediment content requirements only. In general the State requirements are fragmentary and diverse. Undoubtedly the absence of adequate quality standards has impeded progress in quality improvement. The manufacturing branches of the dairy industry are fully aware of the problem and the attendant deficiencies.

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[1]Presented at Thirteenth Annual Meeting, Dairy Products Improvement Institute, Inc., Hotel Governor Clinton, New York City February 18, 1960.

REQUEST FOR STANDARD

In order to place this discussion of quality requirements for milk for manufacturing in its proper setting let us review some happenings of the last few years. In February 1957 the Dairy Division conducted a series of eight industry conferences in various parts of the country to present a suggested revision of the U. S. Standards for Grades of Nonfat Dry Milk. This revision featured the inclusion of the direct microscopic clump count test as a means of evaluating product quality. At that time some members of industry suggested the desirability of a national regulation requiring that all milk for manufacturing purposes be inspected and classified. They contended that such an approach would be more equitable since there was no other comparable objective test that would reflect both the case history of the raw milk and the hygiene of manufacture for butter, cheddar cheese, evaporated milk and other manufactured dairy products.

Since that time various industry groups have urged the Department to draft quality standards for milk for manufacturing and specifications for dairy plant operations. In the fall of 1958 we received approval from the Assistant Secretary of Agriculture to activate a working group of industry technicians to assist us in the formulation of these standards. We recognized that industry had a mutual interest in this program, and with the assistance of eight major national trade associations we designated a number of industry technicians, representing various manufactured dairy products, to consult with us in developing applicable standards and plant specifications. The members of the working group were selected on the basis of their broad experience with respect to milk production methods and practices and plant operations, on a national rather than a local basis.

The Animal Husbandry Division, Agricultural Research Service, U. S. Department of Agriculture, as well as a small group of technicians designated by the American Dairy Science Association also furnished advice and guidance in the formulation of the initial drafts of the quality standards.

While there was substantial agreement on the primary objectives of the program, there was divergence of opinion on a number of items, particularly the bacterial standards for raw milk, the requirements relating to farm certification, and transfer of producer records. We were well aware at the very outset that it would be impossible to have a meeting of minds on all issues. This couldn't be accomplished even if we were dealing with only one segment of the industry, let alone all segments. Differences were inevitable and in a sense salutary. Nevertheless, practically every item in the quality standards for milk received the support and approval of a number of the members of that working group. The industry, through the working group and others, furnished valuable ideas and suggestions which were incorporated in the initial working drafts.

The third working draft, dated July 2, 1959, was prepared after the work session in May and was distributed to the working group technicians, state regulatory agencies, trade associations, and other interested parties for comments and suggestions.

I wish to emphasize at this point that the proposed quality standards are still in the working draft stage. Perhaps the use of the term "recommended" in the title has caused some misunderstanding. The drafts which we have distributed do not represent at the present time anyone's final recommendations. The term "recommended" was used in the title because the standards, in their final form will be presented as recommended quality standards.

We distributed the documents in the working draft form so that we might have the benefit of the thinking of state regulatory authorities and other interested groups in the early developmental stage of the program. Normally in developing a program such as this one, working drafts are not distributed so widely for public review before preliminary recommendations are firmed up.

We have been receiving many comments and suggestions, and we welcome such additional ones as members of industry and other interested parties care to submit. All will be given careful study and consideration before the standards are published in the Federal Register. Following such publication, all interested parties again will have an opportunity to express their views, comments and suggestions.

BASIC REQUIREMENTS

In seeking to develop a blueprint for recommended quality standards, intended for voluntary adoption by states, we have endeavored to shape a well-rounded program, and have incorporated basic requirements fundamental to the production of good quality milk. We have tried to draft the standards in such a way that they can be met by the small as well as the large dairy farmer, with a minimum financial outlay. The standards provide for farm inspections as well as platform inspection of the raw milk supply and quality testing of the finished products. We feel that without adequate routine farm inspections the value of platform inspection and laboratory control of finished product is greatly lessened.

Specifically the basic requirements are related to (a) farm certification, and (b) quality specifications of the raw milk.

Farm certification requires compliance with only two fundamental factors in the production of good quality milk, namely, health of the herd, and design, construction, condition and sanitation of the utensils and equipment. Farm certification would not have to be completed before a producer could begin shipping manufacturing milk. However, it is intended that certification would be completed within 12 months from the adoption date of the standards.

In addition to farm certification, the producer would be required to meet the quality specifications of the raw milk as to flavor and odor, physical appearance, bacterial limits, and sediment content.

With respect to the bacterial standards, the proposed basic class requires a methylene blue reduction time, or its equivalent, of not less than 2½ hours. At the present time there are at least seven States that have bacterial limits for milk for manufacturing that are basically comparable to, or more rigid than, the 2½ hour standard. These States are California, Iowa, Minnesota, Oregon, Virginia, Wisconsin and Wyoming. The Evaporated Milk Industry Sanitary Standards Code likewise specifies a methylene blue reduction time of not less than 2½ hours for its basic class. Three States, namely, Colorado, Idaho and South Dakota require a methylene blue reduction time of not less than 2 hours.

We recognize that some States may not be ready to adopt the recommended standards as soon as others. Some may wish to defer application of the bacterial standards for a period of time so that they could inaugurate or accelerate a producer education program for milk quality improvement. These are decisions which would have to be made in each individual state in the light of local conditions.

In addition to the *requirements* referred to above, we have developed an appendix to the quality standards which contains some guide-lines for the production of good quality milk. This material suggests to producers how they may achieve the prescribed standards, but it is not intended to be an integral part of the quality standards. For example, sections relating to milking area, milking systems and milking procedures, feeding practices, milkhouse, milkroom, milk cooling facilities, 50 degree cooling temperature, and the like, are all included as *suggestions only,* and compliance would not be required.

MIXED REACTION AND MISUNDERSTANDING

Reactions to the third working draft of the recommended standards have been mixed, with considerable variation among regions and among states, as well as among individual and groups within a given State. It appears that a considerable amount of the unfavorable reaction stems from a misunderstanding of what is intended under the program. I should like to briefly summarize some of the reactions we have received, and to comment briefly on them.

As I said before, the material in the appendix was included only on a suggested or guideline basis, and never was intended to be a required part of the recommended quality requirements. However, the appendix has been the cause of so much misunderstanding and apprehension, that it has been suggested that this material be deleted entirely from the document and perhaps be used as a basis for developing a separate manual for use by fieldmen, extension workers or others engaged in educational programs for milk quality improvement. This suggestion is being seriously considered.

Some regulatory officials and industry representatives have expressed the fear that USDA intends, through the proposed standards, to impose its will on the States, and, to administer and enforce the program at the State level. This never has been contemplated, and, in fact, is not legally possible. Congress, through Public Law 733, — the Agricultural Marketing Act of 1946 — authorized and directed the Secretary of Agriculture "to develop and improve standards of quality . . . and *recommend and demonstrate* such standards in order to encourage uniformity and consistency in commercial practices." With respect to the applications of standards through the inspection and grading service, the Act further provided that "no person shall be required to use the service authorized."

To repeat what I said before, these standards are for voluntary adoption by the States. Whether or not an individual State adopts the proposed standards, and when, are left entirely to the State's own discretion. The administration and enforcement of the program, once adopted, also would be entirely up to the State. The role of the Federal Government in the program is strictly that of a service agency and no Federal regulatory activity is or can be contemplated. We are aware of the fact that the statutes of a few States (Wyoming and Idaho) provide for automatic adoption of Federal standards, but this is a matter which remains within the control of the respective States.

Some persons have pointed to similarities between the recommended standards and the U. S. Public Health Service Milk Ordinance and Code for Grade A milk. Except that both programs are recommended for voluntary adoption by the States, there is no similarity between the two. The requirements of the two are quite different and our proposed program includes no provision for a Federally administered rating system such as exists under the U.S.P.H.S. Milk Ordinance and Code program.

Some in the industry have objected to the proposed standards on the grounds that they would lead to trade barriers. They claim that if one State (A) adopts the standards, and another (B) does not, then A can prohibit products from B from moving into A. Certainly at the *present* time there is nothing to prevent individual States from adopting different standards, and in the absence of any uniform guide, wide differences do exist. It seems to us that the availability of some uniform standard, even though there was no compulsion for any State to adopt such a standard, could only result in *greater* uniformity among States and a consequent *reduction* of trade barriers.

Another fear that has been expressed is that as soon as the Department publishes these standards, the Food and Drug Administration will adopt them and the program will automatically become mandatory. The objective of the Food and Drug program relates to standards of identity, purity, wholesomeness, and questions of fitness for human consumption, whereas the USDA objective is related to gradations of quality. The two programs are so different that any adoption of the proposed quality standards by the Food and Drug Administration is hardly feasible.

There has been some apprehension that the adoption of the standards by any State would require USDA resident inspection service in order to assure compliance. This fear is unfounded. The State of Wisconsin, for example, has had regulations governing the production and quality of milk for manufacturing purposes since 1949, yet only a few plants in Wisconsin utilize USDA resident inspection service and in no case did the need or the desire for the service relate to or stem from the State regulations. The same is true in the case of Iowa and Minnesota.

A suggestion has been made that we experiment with the proposed standards on a *trial* basis, selecting one state as a starter. This suggestion again appears to be based on an assumption that the Federal standards will be compulsory. Since we are acting only as a service agency in the development of the proposed standards, we are not in a position to direct any state to adopt this program. Moreover, it is our feeling that the adoption of the recommended standards by the States will take place slowly, and in the normal course of events the first States to adopt the program would serve as a proving ground for the others.

Some trade association representatives feel that the suggested standards would place in jeopardy existing industry-administered quality programs. It seems to us that any existing milk quality improvement program and the suggested standards would be compatible. This situation exists today in many states. There is no valid reason why industry codes cannot function effectively within the framework of the suggested standards.

Another common assertion is that the program will damage the dairy industry by increasing production costs and forcing more small farmers out of the dairy business. I think that a good answer to this is found in a quote from a talk at the Central Minnesota Dairymen's and Creamery Operator's Convention in February, 1959, given by Professor James A. Gholson, then Extension Specialist at the University of Minnesota. Professor Gholson stated: "I suspect that many producers will be of the same opinion as one I heard expressed the other day. The question of higher standards came up and the producer's comment was 'Well, looks like I'll have to spend 3 or 4 thousand dollars for equipment if standards are raised.' *Good* equipment helps but *clean* equipment is what's really important and the cost is negligible. I am sure you can see the true problem that is present. It's a difficult one. It calls for an informed patron who is willing to put out some elbow grease."

We are aware of the economic implications of the program we are suggesting, and as I stated earlier, we have attempted to develop the proposed standards in such a way that both large and small producers could meet them with a minimum financial outlay. On the other hand, I think we must also consider the economic benefits which might accrue from such a program, in the form of better quality products, greater consumer confidence and acceptance, and expanded markets for dairy products.

CONCLUSION

In conclusion, I wish to emphasize again that a program of milk quality improvement such as we have been discussing, needs to be inaugurated at the state level, and effectively coordinated, so that industry efforts can be concerted and directed to a definite end.

The standards which we are proposing are reasonably comparable in structure, including bacterial levels, to systems or programs already provided by progressive privately-owned or cooperative organizations. Therefore, the idea does *not* embody a totally different approach to the quality problem, nor does it flow in an opposite direction. The principles contained in the recommended standards merely serve to re-establish some accepted guides to quality improvement and product stability.

It is highly important that before the States or industry act in this matter, the issues be explored carefully and thoroughly. Any State interested in this program should arrange to have industry representatives, regulatory officials, and dairy extension workers hold district meetings with producers to acquaint them with the quality requirements. The overall relationship must be explained to enable the producer to acquire a better understanding, proper attitude and convictions in terms of fundamental principles governing raw milk quality and end product quality. In those States where legal machinery authorizing the establishment of a comprehensive milk quality code does not already exist, appropriate legislative action would be required.

The interest of the entire industry demands the support and encouragment of the adoption of these standards. It is heartening to note that several trade associations passed resolutions at their annual meetings last fall favoring the development and implementation of a quality improvement program such as we have been recommending. No door should be left unopened in our search for improved quality of dairy products. If there is something wrong with the emerging pattern, now is the time to find it out and work for changes. It seems to us that the implementation of a set of quality standards susceptible of voluntary adoption would provide the basis for greater uniformity and promises to be the most inviting and profitable door to open in our quest for higher quality dairy products.

PRODUCING CULINARY STEAM FOR PROCESSING MILK AND MILK PRODUCTS[1]

To clarify current methods suitable for the production and transmission of steam satisfactory for use in steam-vacuum treatment or pasteurization by direct steam introduction into milk and milk products, the following procedures for providing steam of culinary quality are recommended.

Source of Boiler Feed Water

Potable water or water supplies acceptable to the regulatory agency in jurisdiction shall be used. Water containing organic materials such as leaves, algae, etc. should not be used for feed water without adequate pretreatment. (This is necessary to prevent such organic materials from causing foaming and priming in the boiler with resultant carry-over into the steam distribution system which could cause off flavors in milk).

Feed Water Treatment

Feed waters may be treated if necessary for proper boiler care and operation. Boiler feed water treatment and control should be under the supervision of specially trained personnel or a firm specializing in industrial water conditioning. Such personnel should be informed that the steam is to be used for culinary purposes. Pre-treatment of feed waters for boilers or steam generating systems to reduce water hardness before entering the boiler or steam generator by ion exchange or other acceptable procedures is preferable to addition of conditioning compounds to boiler waters.

There are a number of different chemicals that are commonly employed in boiler water treatment. These include sodium triphosphate, sodium hexametaphosphate, sodium hydroxide, sodium sulfite, sodium silicate, sodium aluminate, and sodium alginate, all of which are nonvolatile. Accordingly, there would be no objection to these compounds when they are properly used and the boiler is properly operated. Tannin is also frequently added to boiler water to facilitate sludge removal during boiler blowdown. This product, while essentially nonvolatile, has been reported to give rise to odor problems, and for this reason should be used with caution. Compounds containing chromium shall not be used.

The compounds named above do not include all the compounds to which there is no objection. Compounds in addition to those cited above may be permissible but should be cleared with regulatory authorities having jurisdiction.

The above compounds are used to prevent corrosion and scale in boilers or to facilitate removal of sludge. There are other compounds—namely, cyclohexylamine, morpholine, and octadecylamine, which are volatile and are used to prevent corrosion in condensate return lines. Cyclohexylamine and morpholine are not regarded as hazardous in concentrations of less than 10 p.p.m. in steam used in direct contact with foods other than milk.

However, because of the importance of milk in the diets of infants and children, these compounds *should not be added* to boiler feed waters when the steam is introduced into milk. The use of octadecylamine in steam contacting food has not been sanctioned by the Food & Drug Administration and any approval in the future depends upon the presentation of proper application and information under the new food additives amendment of the Federal Food, Drug and Cosmetic Act.

[1]Prepared by the National Association of Dairy Equipment Manufacturers, 1012 Fourteenth St., N. W., Washington, D. C. Copies available on request.

BOILER OPERATION

A supply of clean steam, dry and saturated is necessary for proper equipment operation. Therefore, boilers and steam generation equipment should be operated in such a manner as to prevent foaming, priming, carry-over and excessive entrainment of boiler water into the steam. Manufacturers' instructions regarding recommended water level and blow-down should be consulted and rigorously followed.

The blow-down of the boiler should be carefully watched, so that over-concentration of the boiler water solids and foaming are avoided. It is recommended that periodic analyses be made of condensate samples. Such samples should be taken from the line between the final steam separating equipment and the point of the introduction of the steam into the product.

CULINARY STEAM SUPPLY LINE

The steam pipe line between the steam main and the point of introduction of steam into the milk should be equipped with units of adequate size for control and safety purposes. Suggested units and a flow diagram are presented in Figure 1.

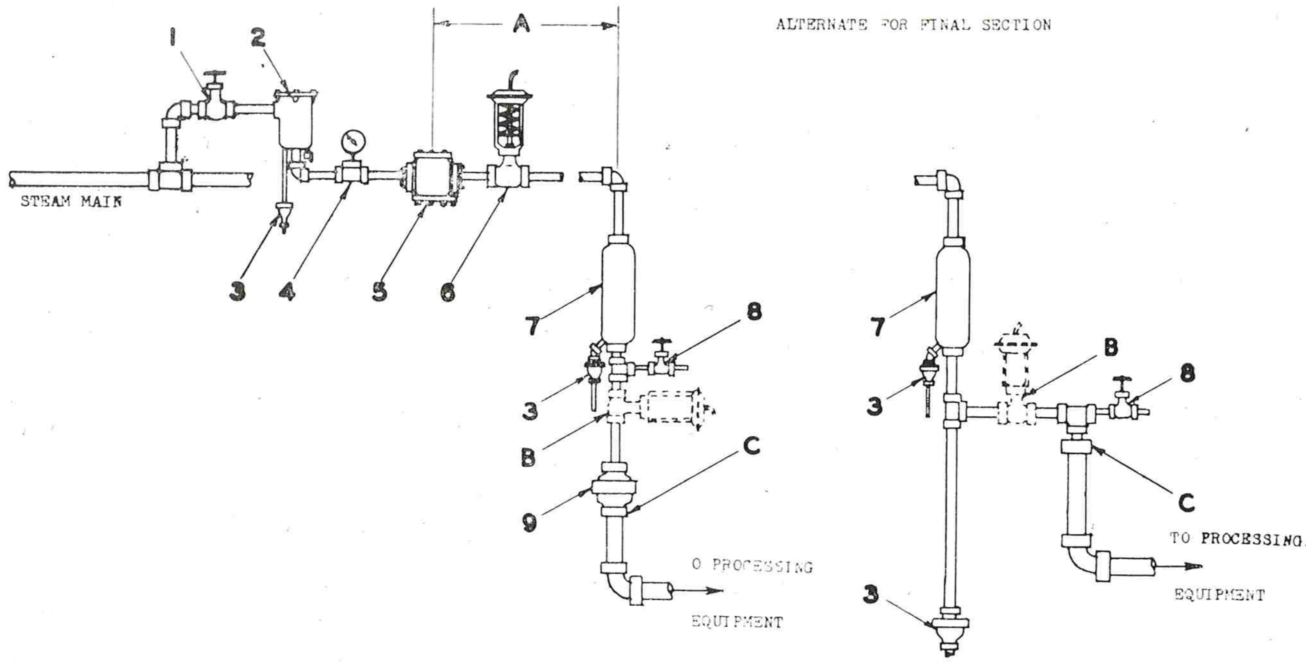

Figure 1. Units and flow chart for production of culinary steam.

Legend

A. Desuperheater or sufficient length of piping to desuperheat steam shall be incorporated between the pressure regulating (reducing) valve and steam purifier.
B. Acceptable alternate location for steam throttling valve.
C. Sanitary tubing and fittings shall be used between the point indicated and the processing equipment.
D. Additional valves, strainers, traps, gauges and piping may be used for control and convenience in operation. The location of the steam throttling valve is not restricted to the positions located in the figure.
1. Stop valve off steam main; 2. Separator, Adams carbon or equivalent; 3. Condensate trap; 4. Pressure Gauge; 5. Steam pressure regulating (reducing) valve; 6. Steam throttling valve (automatic or manual). An alternate location is shown at B; 7. Steam purifier, Anderson Hi-eF or equivalent; 8. Steam sampling valve and connection; 9. Spring loaded sanitary check valve.

CONTROLS USED IN THE OPERATION OF VACUUM FLAVOR EQUIPMENT AND IN HIGH HEAT PASTEURIZERS USED FOR PROCESSING FLUID MILK AND MILK PRODUCTS IN TENNESSEE

W. R. McLean, G. C. Fulkerson, and R. E. Maxwell

Region IV Office, U. S. Public Health Service, and Tennessee Department of Public Health, Nashville

Introduction

The sudden influx of new equipment in the milk industry for processing fluid grade A milk and milk products has created a pressing problem for regulatory officials and the dairy industry in safeguarding the product from a public health standpoint. This study was conducted to determine the public health problems involved, if any, and the controls and other safeguards required to conform with the provisions of the *Milk Ordinance and Code—1953 Recommendations of the Public Health Service.*

Legal control of milk in Tennessee is vested in the Department of Agriculture. The State Department of Public Health provides consultation service to local departments of health in the enforcement of locally adopted U. S. Public Health Service Milk Ordinances. Beginning in 1954 and increasing rapidly to the present time, numerous installations of vacuum flavor control equipment have been made in Tennessee. The geographical location of this state, as well as the assortment of weeds and grasses and variations in water conditions that are responsible for off-flavors in milk, made Tennessee suitable for conducting such a field study. The magnitude of the problem of regulating this equipment was seriously considered before a pilot installation by each of the interested equipment companies was provisionally approved by the Tennessee Department of Public Health for operation in a commercial milk plant.

Those making this study decided that this type of equipment had a place in the fluid milk industry in that benefits could be realized by the producer, processor, and consumer in those areas where feed, weeds, and water presented flavor problems. Sales charts of plants employing vacuum flavor control equipment did not show the usual decline during the spring months when onion, garlic, and weed flavors had previously caused customer complaints or rejection of the milk.

It was immediately recognized that certain controls would be necessary to safeguard the product and to assure that provisions of the Recommended U. S. Public Health Service Milk Ordinance were not violated. This was particularly true when the vacuum equipment was used in conjunction with a high temperature, short time pasteurizer with milk-to-milk regenerator.

A policy was established requiring each company to submit plans, specifications, and a description of the operation for each proposed installation. This requirement was necessary since each installation was different even with the same type equipment. In addition, data were not available to substantiate compliance of this type equipment with the provisions of the Recommended U. S. Public Health Service Milk Ordinance. Furthermore, there was a continuous change of instruments and other devices which affected the H.T.S.T. pasteurization process, particularly the holding time, pressure differentials within the regenerator, and the proper operation of the flow diversion valve.

Flow Characteristics of Vacuum Flavor Equipment

Group I—Flavor control equipment employing vacuum and steam treatment used in conjunction with high-temperature, short-time pasteurization.

A. *Two chambers*—Flow through this equipment is as shown in Fig. 1. Cold raw milk is drawn by vacuum from the balance tank through the raw regenerator section of the H.T.S.T. pasteurizer by the timing pump. Milk is heated by regeneration from approximately 40°F. to about 130°F. depending upon the regeneration efficiency of each installation. The preheated milk is pumped by the timing pump to the heater section of the H.T.S.T. pasteurizer where the temperature of the milk is raised high enough to assure that the milk, after passing through the holding tube will be at least 161°F. upon reaching the temperature controls of the flow diversion valve. Pasteurized milk leaves the forward flow port of the flow diversion valve and enters chamber No. 1. In this chamber the milk is treated with steam and the temperature of the pasteurized milk is raised to the temperature desired for the amount of treatment required, normally about 185°F. This chamber is under approximately 8″ vacuum which is below that required to flash or boil milk at this temperature. (See Table 1). The milk is drawn by vacuum from chamber No. 1 to chamber No. 2, through a common

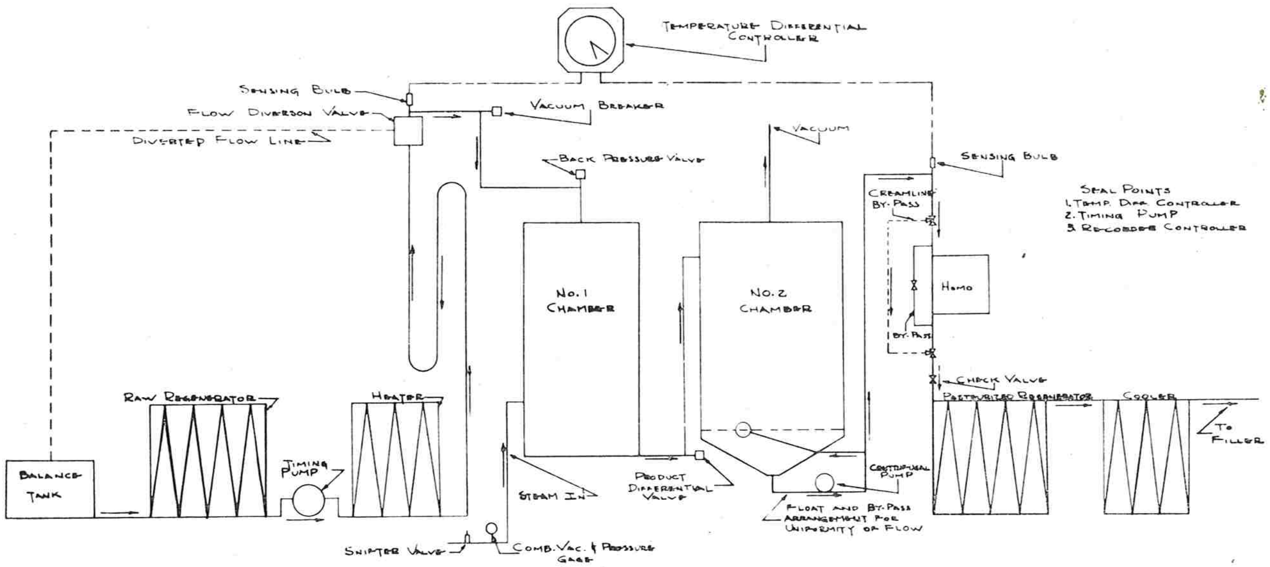

Fig. 1

2 Chamber - Steam Treatment with H.T.S.T.

line. Milk entering chamber No. 2 flows down the sides in a thin film to the bottom. In this chamber the temperature is lowered immediately by the corresponding vacuum (20″) from 185° to 161.5°F. The liberation of heat causes volatile flavors and odors, and the water introduced as steam in chamber No. 1 to be removed. The vapors are drawn from this chamber by a vacuum pump or other vacuum producing devices (Fig. 11). The balance between temperature and vacuum is maintained by automatic controls to prevent excessive concentration or dilution of the milk.

TABLE 1—SATURATION (BOILING) TEMPERATURES FOR VARIOUS VACUUMS

Vacuum	Saturation
(Inches mercury)	*(Temperature °F.)*
14	182
15	179
16	176
17	173
18	169
19	165.5
20	161.5
21	157
22	152
23	147
24	141
25	134
26	125

B. *Single chamber*—The flow of milk through this equipment is the same as that described in Group I-A except that steam is injected directly into a sanitary milk line upstream from the vacuum chamber by means of special sanitary devices (booster heaters or venturia injectors) which facilitate turbulence and the mixing of milk and steam, thereby preventing burn-on. The temperature of pasteurized milk is raised between 10° and 40°F. by the injection of steam, the degree rise depending upon the product being processed and the amount of treatment necessary to remove off-flavors and to improve the keeping quality (Fig. 2).

C. *Three chambers*—Again the flow in this equipment is the same as that described in Group I-A, except that preheated raw milk (130°F.) from the raw regenerator side of the H.T.S.T. pasteurizer is introduced into the vacuum equipment. In the first chamber steam is mixed with milk, increasing the temperature from approximately 130° to 200°F. In the second and third chambers the heat is removed and the milk temperature leaving the vacuum equipment is the same or lower than the entering temperature (130°F.) The vacuum-steam treated milk is pumped to an elevated surge tank, open to atmosphere, and from this point it flows by gravity to the homogenizer which acts as the timing pump. The elevated surge tank has been eliminated in most recent installations by using two centrifugal pumps in the line between the vacuum chamber and the homogenizer. The pump used immediately downstream from the vacuum chamber is a double vane pump that will pump against vacuum. For processing creamline milk a

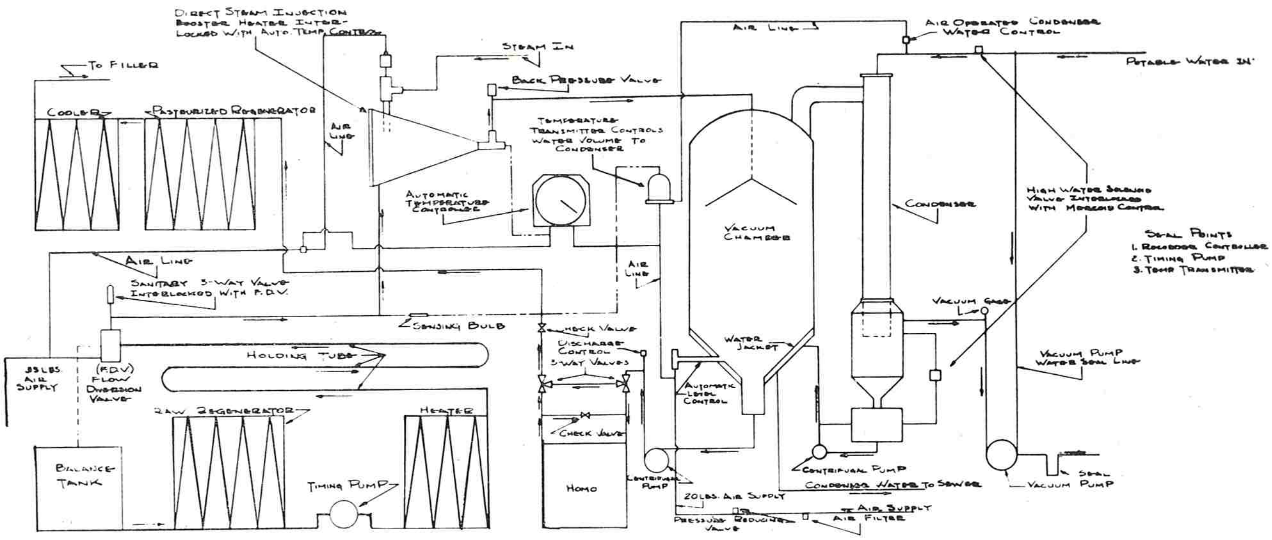

Fig. 2

One Chamber Steam Injected Into Milk Line

three-way sanitary valve may be located on the discharge side of the conventional H.T.S.T. timing pump to by-pass the vacuum chambers and homogenizer (Fig. 3).

Group II—High-heat pasteurization employing vacuum and steam treatment.

A. *Three chambers—Vacuum pasteurizer (milk pump stop installation)*—Milk is preheated to about 130°F. by plate or tubular heat exchangers before entering the vacuum pasteurizer. The flow of milk through the vacuum pasteurizer is the same as that described in Group I-C except that milk must be heat treated, by a regulated steam supply, to at least 194°F. in the first chamber. This chamber must be equipped with proper controls to satisfy the requirements for pasteurization as defined by the U. S. Public Health Service. Milk leaving the vacuum pasteurizer should be of the same or less temperature as when it entered and is homogenized and cooled by plate or tubular heat exchangers that must satisfy the requirements for milk-to-milk and milk-to-water regenerators closed to the atmosphere (Fig. 4).

Group III—Flavor control equipment employing vacuum treatment used in conjunction with high-heat pasteurization (Fig. 5).

A. *One chamber*—High-heat pasteurization of milk consists of heating milk to a temperature of 194°F. or higher with a calculated holding time of three seconds or more. Higher heating is accomplished by means of the pasteurizer which in some cases raises

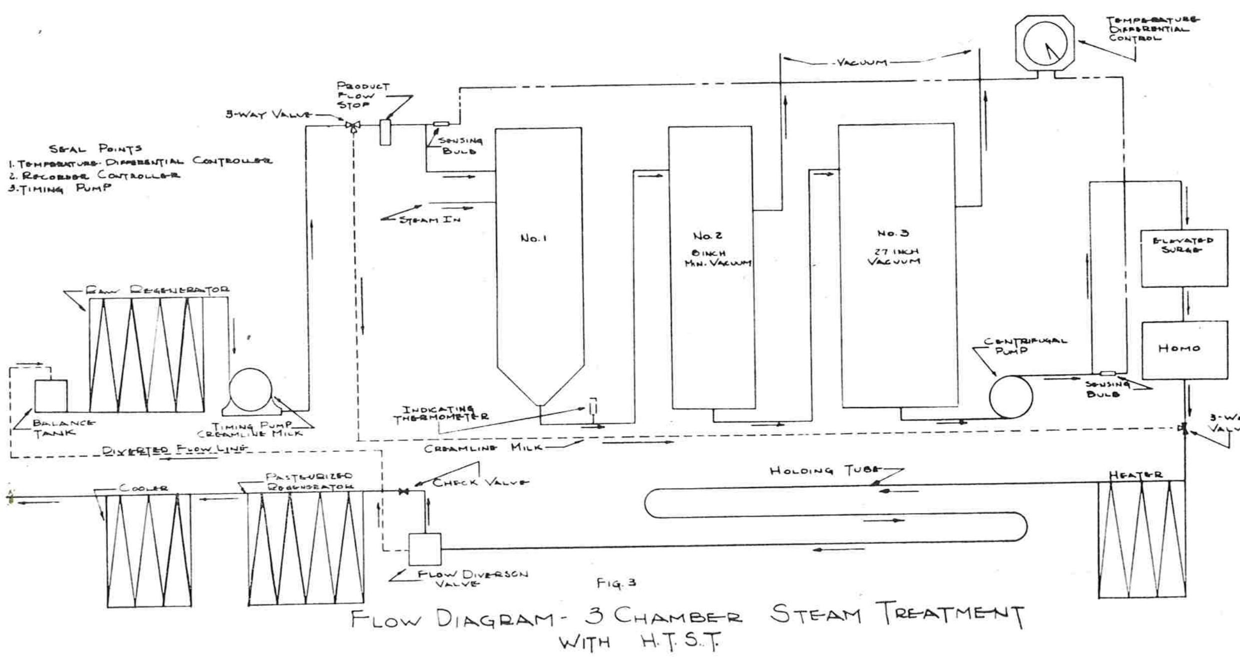

Fig. 3

Flow Diagram - 3 Chamber Steam Treatment With H.T.S.T.

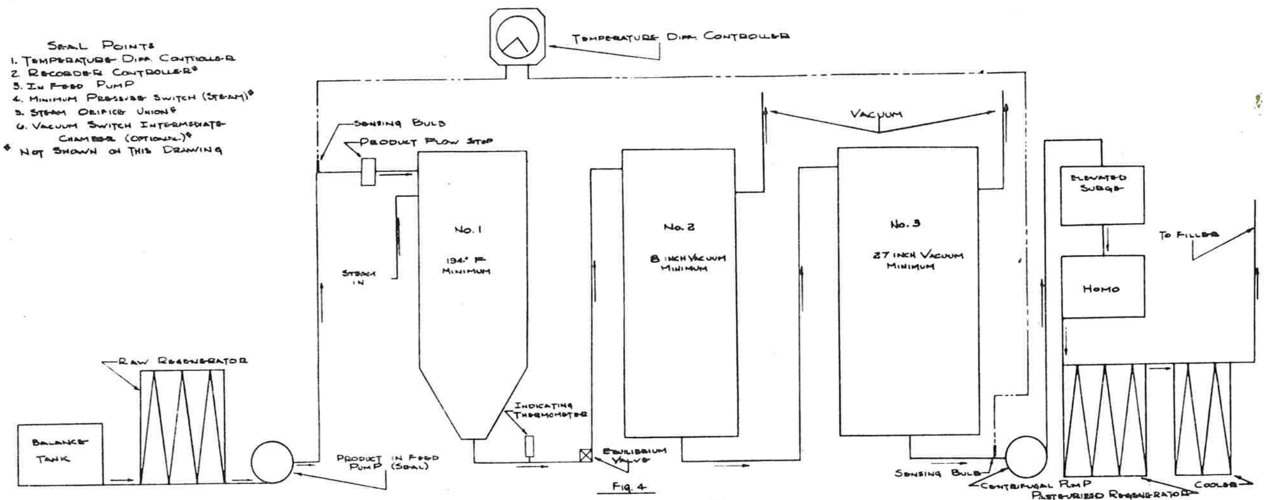

Fig. 4

FLOW DIAGRAM – VACUUM PASTEURIZER

the milk to 260°F. or higher. An electrical high temperature stop is usually employed to prevent burn-on in the pasteurizer. The high temperature stop is wired to the micro-switch of the flow diversion valve so as to divert the milk if the pre-set temperature is exceeded.

From the pasteurizer heater the pasteurized milk is discharged through the flow diversion valve to the second stage milk-to-milk regenerator and to the homogenizer by the timing pump. From the homogenizer the milk is discharged through the first stage regenerator to the final cooler and to filler. In this installation the controls are the same as those for Group IV-A, except that requirements for the use of a booster pump upstream from the first stage milk-to-milk regenerator must be satisfied by use of a non-adjustable pressure differential valve and pressure switch in the pasteurized milk outlet line from the first stage milk-to-milk regenerator.

B. *One or two chambers—High-heat pasteurization* —The controls and flow through in this equipment when two chambers are used are the same as that described in Group IV-A (Fig. 6). If only one chamber is used, it is located on the downstream side of the raw regenerator and the temperature in this chamber must be controlled by limiting vacuum and temperature so that excessive concentration will not occur. A temperature differential controller will automatically control the concentration. If a booster pump is used, it must meet the code requirements.

Group IV—Flavor control equipment employing vacuum treatment used in conjunction with high-temperature, short-time pasteurization.

A. *Two chambers* (No. 1 chamber downstream from raw side of regenerator, No. 2 chamber upstream from pasteurized side of regenerator). In this system 40°F. raw milk from the balance tank of the H.T.S.T. pasteurizer is drawn through the raw

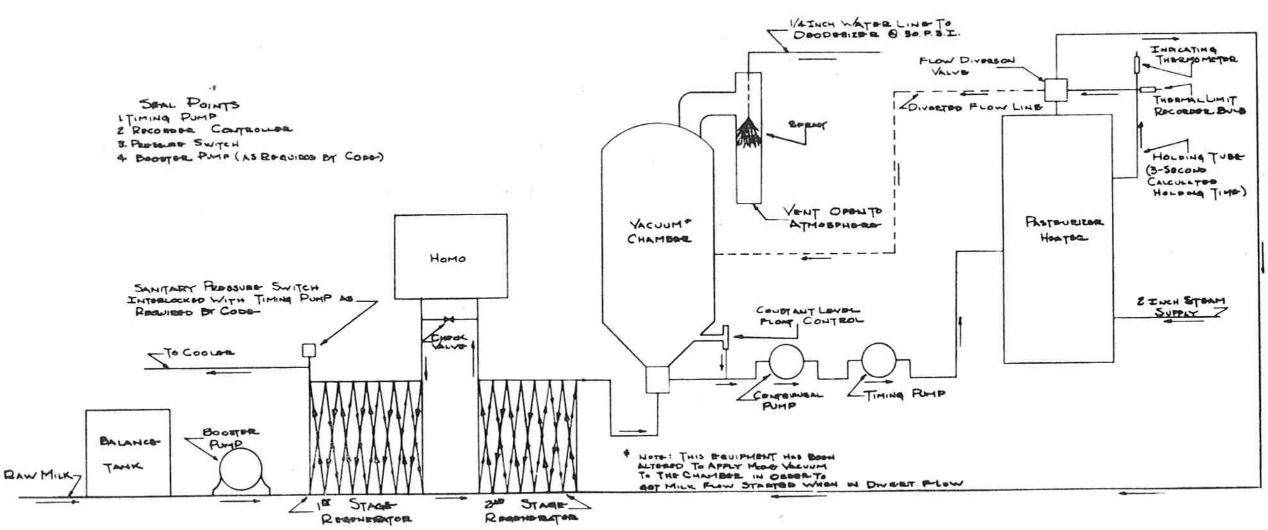

Fig. 5

VACUUM TREATMENT WITH HIGH-HEAT PASTEURIZATION

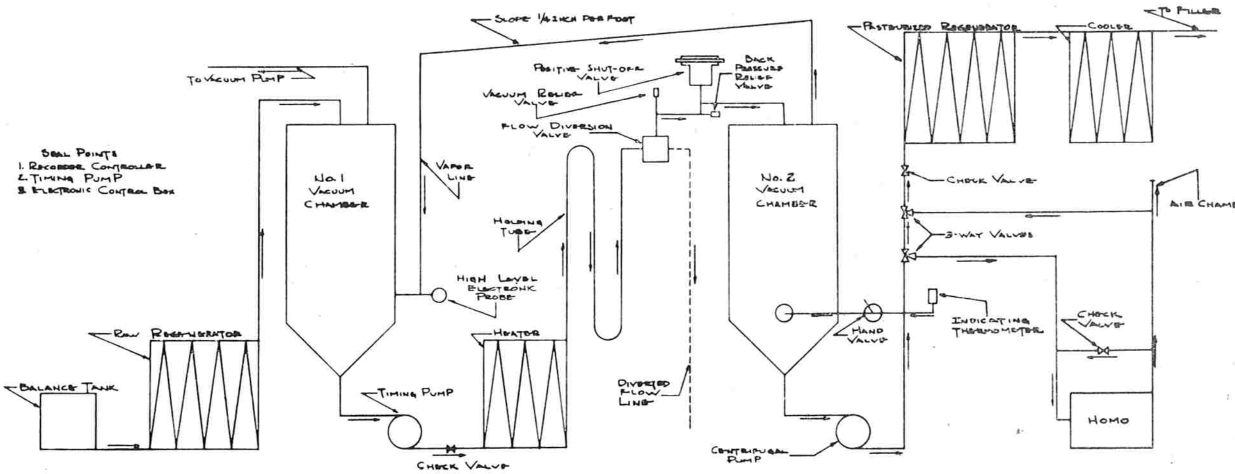

Fig. 6

FLOW DIAGRAM- 2 CHAMBER - NO STEAM H.T.S.T. UNIT

milk side of the regenerator into chamber No. 1 by vacuum. Both chambers are interconnected through a vacuum-vapor line to the source of vacuum. The vacuum in both chambers will be about the same or approximately 24″ Hg. Preheated raw milk enters the top of chamber No. 1 at approximately 130°F., depending upon the amount of heat transfer to the raw milk in the regenerator. At 24″ of vacuum, and 130°F., which is less than the saturation temperature of the milk, no flashing or boiling occurs in this chamber. Vapors entering chamber No. 1 from chamber No. 2 through the vapor line, contain latent heat at a higher temperature than the vapors in chamber No. 1. This heat is given up as water of condensation in chamber No. 1. In so doing, approximately 50% of the water vapor is condensed and recombined with the milk thereby raising its temperature. From the bottom of chamber No. 1 the milk is drawn by the timing pump of the H.T.S.T. pasteurizer and pumped through the heater section, holding tube, and flow diversion valve to vacuum chamber No. 2. Neither vacuum from this chamber nor excessive back pressure (more than the valve is designed for) should be permitted on the forward flow port of the flow diversion valve to interfere with its proper function. This is accomplished by means of a vacuum breaker, a back pressure relief valve, and a positive shut-off valve. The latter is air operated and wired through the micro-switch of the flow diversion valve. This valve and the flow diversion valve operate in unison. All these devices are located between the flow diversion valve and chamber No. 2. Pasteurized milk entering the side of chamber No. 2 at 161°-170°F. flows in a thin film down the sides of the chamber. The vacuum treated milk is reduced in temperature to not less than 141°F. (24″ vacuum—see Table 1) and is drawn from the bottom of this chamber by a centrifugal pump and discharged through a float and by-pass assembly to the homogenizer or, when processing creamline milk, to the pasteurized side of the regenerator in the H.T.S.T. pasteurizer unit as described in I-A (Fig. 6).

B. *Two chambers*—Both vacuum chambers are located in parallel in the milk circuit immediately downstream from the raw regenerator of the H.T.S.T. unit. The milk is drawn by vacuum and/or a booster pump (installed as required by U. S. Public Health Service Code) from the raw milk balance tank through the raw regenerator and enters the top of the vacuum chambers through baffled drop tubes. Air is introduced into the milk intermittenly through bacteriological filters located on top of the chambers. Milk is drawn from the bottom outlets of the vacuum chambers by the timing pump and is discharged to the homogenizer and to the heating section, holding tube, pasteurized side of regenerator, and cooling section of the H.T.S.T. unit. When creamline milk is being processed, the homogenizer is by-passed. When processing homogenized milk, the homogenizer becomes the timing pump as is discussed elsewhere in this paper in connection with other installations (Fig. 7).

C. *One chamber downstream from the raw regenerator section with or without a booster pump*—In installations not using a booster pump the raw milk is drawn from the balance tank through the raw side of the regenerator to the vacuum chamber by the vacuum being applied on the chamber. Milk is drawn from the bottom of the chamber by the timing pump of the H.T.S.T., through the constant level control or by-pass assembly, to the homogenizer or to the heater section of the H.T.S.T. unit. If a booster

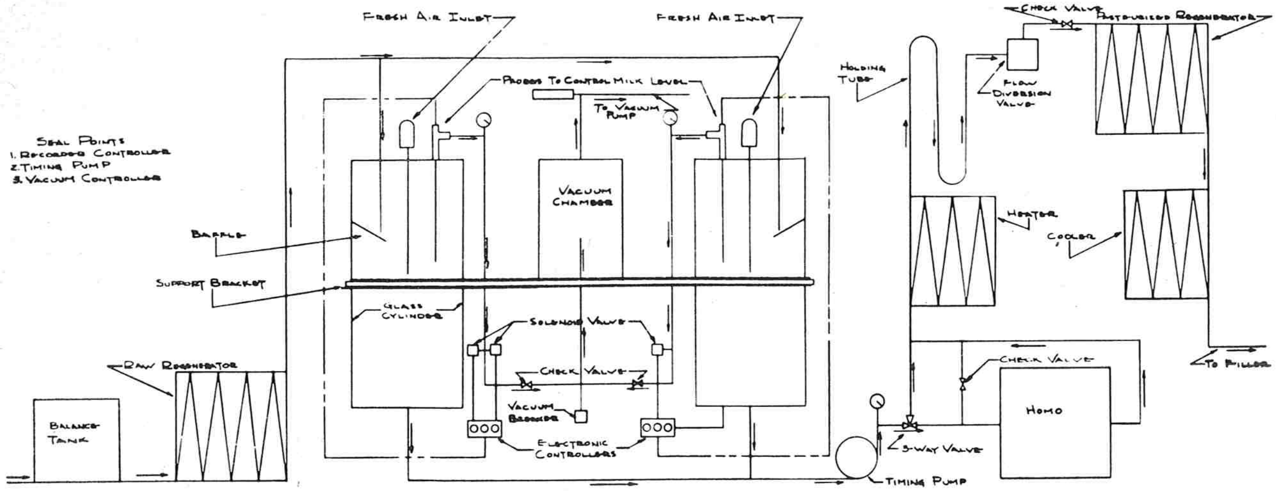

Fig. 7

VACUUM TREATMENT - NO STEAM 2 CHAMBER
DOWNSTREAM FROM RAW REGENERATOR

pump is used, the applicable provisions of the Public Health Service Ordinance for booster pumps must be satisfied. The flow of milk through the H.T.S.T. unit is the same in either case since the vacuum chamber remains on the downstream side of the raw regenerator. A water jacket to facilitate pumping and to assist in the recovery of water of vaporization from the milk is used around the outlet and bottom of the vacuum chamber. Waste water from this jacket is regulated to run warm and is discharged to waste through an open trapped drain (Fig 8).

Group V—Flavor control equipment employing vacuum treatment used in conjunction with vat pasteurization.

Pasteurized milk is drawn from the pasteurization vat through a two-way throttling valve to the vacuum chamber. The product entering the chamber is broken up into a spray by a float throttling valve and the milk falls toward the bottom of the chamber over a series of baffles. The milk is exposed to vacuum in this chamber and the temperature is lowered to the saturation point (125°F.) for the vacuum applied (26″ Hg.). Vapors and/or volatile gases are drawn off through the vapor line through a water cooled condenser to the vacuum pump and to waste. Water vapors from the milk are condensed and flow back by gravity into the milk. The non-condensable vapors are discharged to waste through the vacuum system. The vacuum treated product is removed from the bottom of the chamber by a sanitary pump which feeds the homogenizer. From the homogenizer the milk is pumped to the cooler and to filler or

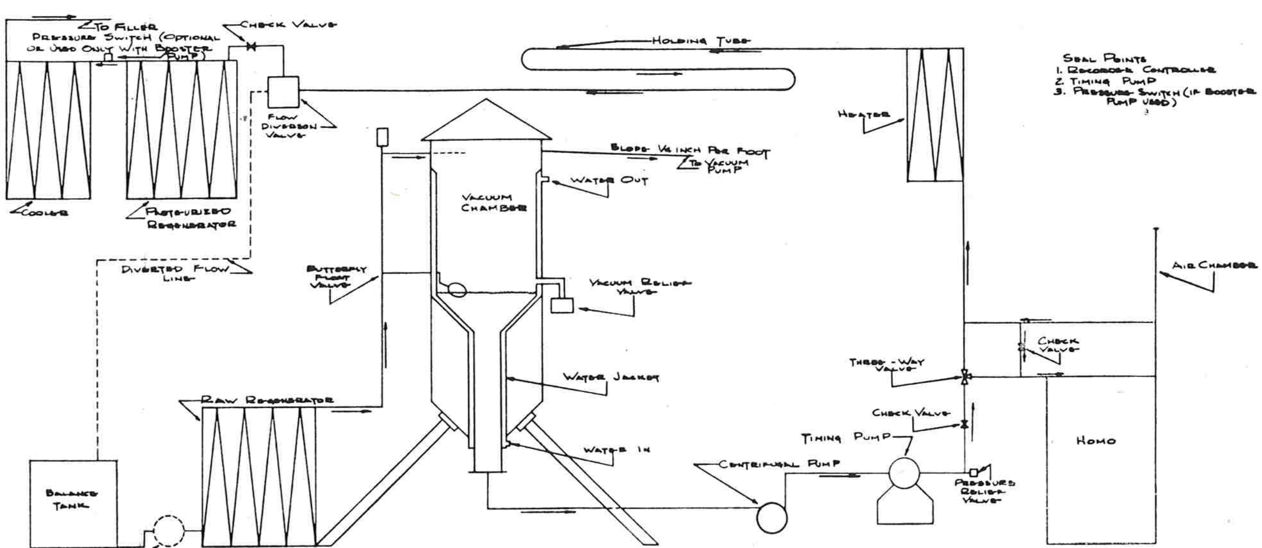

Fig. 8

ONE-CHAMBER DOWNSTREAM FROM RAW REGENERATOR
WITH OR WITHOUT BOOSTER
PUMP

storage. Maximum limitations for temperature (150°F.) and vacuum (26″ Hg.) treatment and condenser controls (minimum of five pounds water pressure) were established to prevent excessive concentration of the product (Fig. 9).

CONTROL AND INSPECTION POINTS

Primary Control Factors

In H.T.S.T., vacuum and high-heat pasteurizers, employing regenerative heating and cooling with both sides closed to the atmosphere, there are three primary control factors. These are necessary to satisfy the applicable requirements of the U. S. Public Health Milk Ordinance and state laws and regulations. The control factors are: (*a*) holding time (and temperature for vacuum and high heat pasteurizers); (*b*) maintenance of a pressure differential in the regenerator section (at least 1 pound greater in the pasteurized side); and (*c*) adulteration and excessive concentration of the product. In Group I-A and B and in Group IV-A the holding time can be influenced by vacuum or excessive back pressure at the forward flow port of the flow diversion valve. Vacuum is prevented from spreading to the flow diversion valve by the installation of a vacuum breaker immediately downstream from the forward flow port, by a back pressure regulating valve and/or a positive shut-off valve located between the vacuum breaker and the entrance to the vacuum chamber; and when a variable speed timing pump is used, by limiting minimum flow which must be determined for each installation. A minimum of 5 p.s.i. pressure is required to keep the vacuum breaker closed except in the case of an air operated vacuum breaker which opens to the atmosphere when the flow diversion valve is in diverted flow. Any vacuum on the flow diversion valve may speed up flow, shorten holding time and prevent leak detector or poppet valves from functioning properly when the valve changes position. Excessive product back pressure (more than the valve is designed for) on the flow diversion valve will cause sluggish operation and failure to divert in one second as required, or hold the valve in a partially diverted position. Where excessive product back pressure is anticipated, a pressure differential valve open to the atmosphere and adjusted no higher than maximum product pressure of the flow diversion valve, is installed immediately downstream therefrom. When pasteurized milk is homogenized and the legal maximum flow (15 seconds holding time) exceeds the homogenizer capacity, the variable speed timing pump must be reduced to the same or less capacity as the homogenizer; thereby making a bypass or equalizer line mandatory from the discharge to the intake lines of the homogenizer. If the speed of the timing pump is adjusted as described above, the need for a relief line from the intake line of the homogenizer back to the raw milk balance tank is eliminated. Such a line is illegal and hazardous if the capacity of homogenizer is not satisfied at all times. This facilitates uniform flow and meets requirements for pumps capable of producing forward flow located downstream from the holding tube or holder.

In a three-chamber vacuum treatment unit (Group I-C) both the variable speed timing pump and the homogenizer must be wired in with the recorder con-

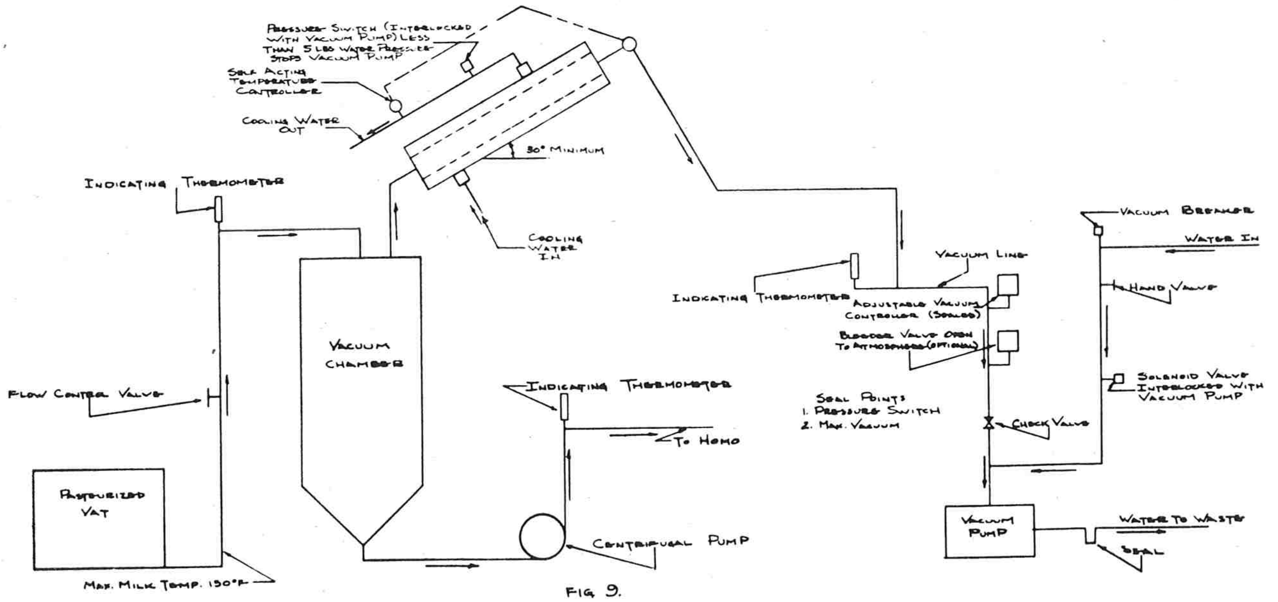

FIG. 9.

FLOW DIAGRAM - SINGLE VACUUM CHAMBER · VAT PASTEURIZATION
NO STEAM

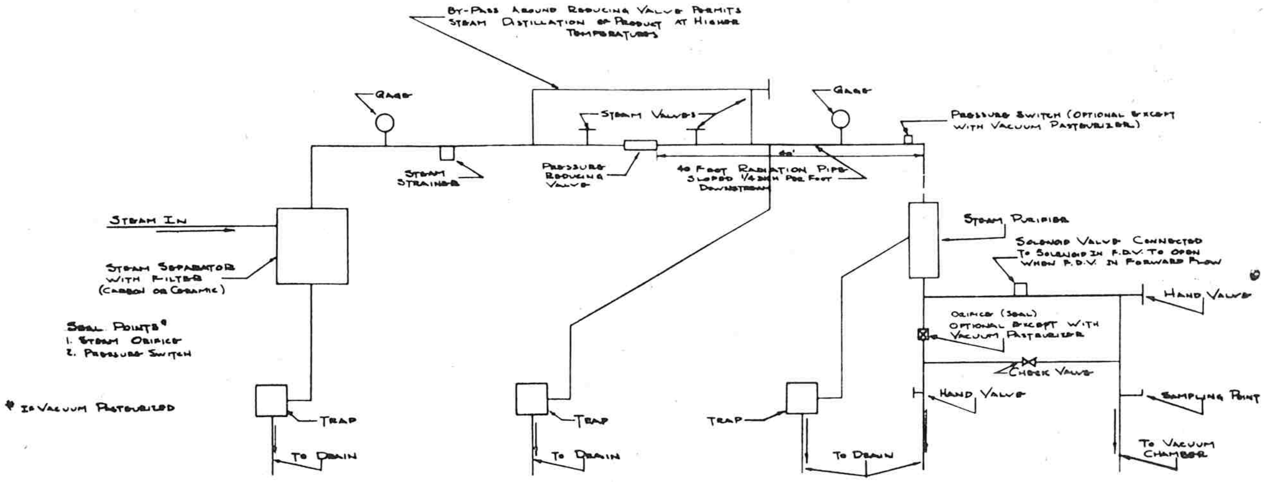

Fig. 10
TYPICAL STEAM SUPPLY ASSEMBLY

troller since the homogenizer is the timing pump when not processing creamline milk.

The requirement that the pasteurized milk in regenerative heater coolers must automatically be under greater pressure at all times than the raw milk is satisfied by providing bypasses on the centrifugal pump in the outlet line from the final vacuum chamber and on the homogenizer. These bypasses assure uniform flow by preventing surging, foaming and pump cavitation. A check valve located downstream from the homogenizer bypass line keeps the pasteurized regenerator section full at all times and satisfies maintenance of the pressure differential requirement.

In a vacuum pasteurizer using regenerative heating and cooling, the same requirements for maintenance of the pressure differential must be satisfied as in a H.T.S.T. unit employing regenerative heating and cooling.

In steam treatment equipment, adulteration and concentration is controlled automatically by an automatic temperature differential controller provided the steam is supplied as shown in Fig. 10. By agreement with equipment companies and with state regulatory officials, a limitation of 1% concentration or dilution, based upon Mojonnier tests, was established. The automatic temperature differential controller was set slightly on the concentrated side to take into account radiation heat loss through the equipment.

In equipment not using steam, the controls can be manual or automatic. Manual controls consist of setting and sealing temperature and vacuum controls at maximum allowable (Table 1) to prevent more than 1% concentration mentioned above. For field use, a fairly accurate method of estimating dilution or concentration is to consider 1% gain or loss of moisture for each 10°F. gain or loss of temperature, taking into consideration approximately 3° to 5°F. radiation heat loss through the equipment. Water jackets on the vacuum chambers will distort this field method somewhat in that heat will be removed without removing moisture.

In Group II-A, the vacuum pasteurizer, a milk pump-stop installation, all primary control factors have been discussed previously except those that apply to this particular equipment only, viz., vacuum pasteurizer with regenerative heating and cooling. Before this equipment will operate, when properly installed, the temperature at the outlet of the pasteurizing chamber must be at least 194°F., the vacuum in the intermediate chamber must be at least 8″, and the steam supply pressure must be above 35 p.s.i. (Figs. 4 and 10). The controls are as follows:

(*a*) The infeed product pump must be set and sealed at a rate not to exceed the manufacturer's rated capacity of the vacuum pasteurizer. The infeed pump must be so wired that it reverses for 2 seconds immediately after stopping to relieve pressure on the product flow stop and allow it to close within the required one second.

(*b*) The vacuum switch on the intermediate chamber must be set at a minimum of 8″. Failure to maintain 8″ vacuum in this chamber stops the infeed product pump. Sealing of this switch is optional.

(*c*) A minimum pressure switch on the steam line is set and sealed so that the infeed pump stops when the steam pressure falls to 35 p.s.i.

(*d*) A steam orifice plate in the incoming steam line is sized by trial and error to give a minimum temperature of 194°F. at maximum flow and under all operating conditions. When the correct orifice size has been determined, the orifice union is sealed so that it cannot be changed by an unauthorized person. For higher operating temperatures, the orifice may be bypassed (Fig. 10).

(*e*) The recorder controller must be adjusted so that neither cut-in nor cut-out is below 194°F. and wired so that the infeed pump stops if the temperature falls below this point. Seal controller plate.

(*f*) The automatic temperature differential controller would be set at a ratio of 1:1 if there were no heat loss through radiation, and the outgoing temperature would be exactly the same as the incoming temperature. However, a ratio setting of one to slightly less than one takes the radiation loss through the vacuum chamber walls into account. Room temperature and design of equipment are some of the factors determining radiation loss. This instrument must be sealed.

Steam Supply for Steam Treatment (Fig. 10)

From the flow diagram it should be apparent that a clean, saturated, and adequate steam supply with automatic controls is essential.

Boiler waters that need treating should be treated before entering the steam generating equipment unless treatment is for slight hardness only. The use of boiler compounds is not recommended. However, if compounds are used in the boiler, the manufacturer of such materials should present written evidence that they are free from odors and from toxic and volatile substances.

All control devices such as separator with filter, pressure gauges, condensate traps, pressure regulator, strainer, bypass lines with valves for manual operation, radiation pipe, purifier, blow down line and orfiices should be installed in the relative position and manner as indicated in the diagram (Fig. 10).

Sufficient condensate traps, including a separator, with filter properly located in the steam supply line, are needed to furnish a saturated steam supply free from non-volatile substances and from water of condensation. These traps should drain to open traps or to the atmosphere. Free drainage to the atmosphere is recommended since back-pressure, air locks, and failure of trap to function in closed condensate return lines to the boiler, may go unnoticed and the trap be inoperative for a considerable period of time.

The two steam pressure gauges are needed to determine (*a*) if the source of supply is adequate at all times, and (*b*) if the reduced saturated supply (35-40 p.s.i.) is constant for milk treatment.

The bypass lines around automatic controls are needed for manual operation should the automatic controls become inoperative or if processing is desired at a higher temperature. When the automatic controls are bypassed, no hazard is involved since milk cannot be processed at a temperature lower than the automatic controls, if in use, would permit.

A steam pressure regulator is needed to provide a constant pressure (35-40 lbs.) of saturated steam from the source of supply to the milk treatment unit. The 40 feet of radiation pipe installed in a horizontal position is required to remove super heat and to provide saturated steam for the treatment unit. This radiation pipe should extend from the pressure regulator to the point of application and slope 1″ in 20 feet upward to the pressure regulator.

A steam purifier with condensate trap and blowdown line, should be installed vertically and as close to the point of application as possible.

In H.T.S.T. units the solenoid valve in the line upstream from the point of steam application should be wired through the flow diversion valve and vacuum pump or other vacuum creating devices so that steam will not be applied to the treatment unit or line unless the vacuum pump is on and the H.T.S.T. unit is in forward flow. In other types of installations, for safety purposes, it should be impossible to apply steam without first starting the vacuum pump or other vacuum creating devices. The added requirement that the unit be in forward flow when steam is applied prevents waste of steam, possible adulteration of milk with water of condensation from the steam being applied when milk is not entering chamber, improper operation of instrument (automatic temperature differential controller) to control adulteration or excessive concentration of the processed milk, and to eliminate the necessity of hand-operation of the steam control valve. All steam supply assembly controls, inspection, and seal points should be inspected routinely to see if they are functioning properly and to see that no unauthorized changes have been made to the installation since the last inspection.

Typical Vacuum Systems With or Without Steam Treatment (Fig. 11)

Most of the vacuum systems being used have similar characteristics. If steam is used, vapor cooling facilities in addition to water sprays or baths may be used. The water vapor and most of the volatile gases are drawn off through the vapor line from the top of the chamber into water sprays, baths, or condensers. Water vapor and some of the volatile gases are recondensed and discharged to waste through a drain open to the atmosphere. When a plant water supply is used to recondense water vapors drawn off through a plate condenser section or other sanitary heat transfer equipment, the water may be re-used in other plant operations such as bottle washers and steam generating equipment. Ejector-condensers requiring large amounts of water may have a recirculating system to permit re-use of water, providing it is protected from contamination (Fig. 12).

From the drawing you will note that the horizontal vapor line is of sanitary construction from the top of the chamber to a point at least 12 inches below the top of the chamber. This sanitary vapor line should slope a minimum of ¼ inch per foot toward the source of vacuum. The ¼ inch slope in the vapor line is to prevent any water or other contaminating material from draining back into the milk when the vacuum is off. A check valve is required above the point at which the water is introduced into the vapor line to prevent fouled water from backing up into the vacuum chamber via this vapor line from the vacuum pump. Water lines for sprays, baths, pumps, make-up line for water ejectors, and other devices with submerged inlets should be protected against back siphonage by an open air gap or siphon breaker in the supply line. An automatic air or electrically operated solenoid valve wired in with vacuum pump or vacuum device to cut off the water when the vacuum is off, prevents waste of water and possible flooding of the vapor line and chamber.

The amount of vacuum used in treating the product is regulated automatically by an instrument (automatic temperature differential controller) when steam treatment is used. If steam is not used, the maximum temperature and vacuum to be used are set and the regulators are sealed at these maximum settings. Instruments for controlling vacuum and/or temperature automatically should be provided if steam treatment is not used. This takes the "human element" out of the plant operation, and a more uniform product is the result.

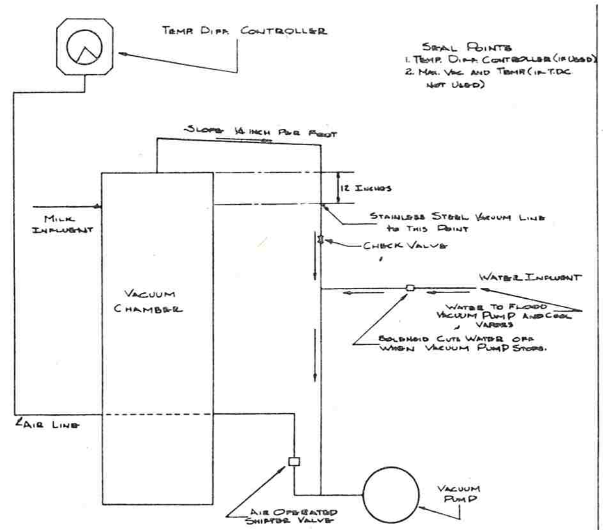

FIG. 11
TYPICAL AUTOMATIC VACUUM SYSTEM

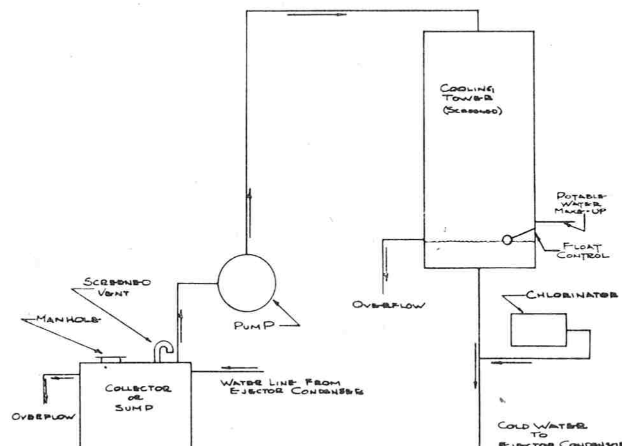

FIG 12
RECOMMENDED COOLING TOWER PROTECTION IF EJECTOR CONDENSER WATER IS RE-USED

SUMMARY AND CONCLUSIONS

An attempt has been made to discuss the major types of flavor control equipment using vacuum and vacuum and steam in the processing of fluid milk. This equipment is used in connection with vat, high-temperature short-time, high-heat and vacuum pasteurization.

Although there are many possible variations in such equipment, the controls are generally the same, depending only upon the type treatment used.

The primary control and inspection points, their functions and need have been discussed and drawings have been used to further simplify their installation in the several types of equipment. In addition specific controls for high heat pasteurization have been listed. A schematic drawing outlining the re-use of water from ejector-condensers, used in connection with vacuum pasteurizers is given.

It is concluded that:

(*a*) Vacuum and vacuum-steam treatment of milk for off-flavors is apparently successful as evidenced by sales charts of various milk plants. Although numerous processors have indicated that this equipment does not eliminate the importance of quality raw milk or of rigid platform inspection, certain amounts of undesirable flavors in milk such as onion, garlic, certain feed and weed flavors, and barny odors can be removed while bitter weeds and some other non-volatile flavors cannot be removed.

(*b*) Specific controls are necessary when this equipment is used. Even though some of the controls discussed were evolved by the trial and error method, they have proven to be necessary in protecting the safety of the product and in satisfying the applicable requirements of the U. S. Public Health Service Milk Ordinance. In this field study in Tennessee, laboratory tests have indicated that when steam treatment is used, an automatic temperature differential controller is necessary to prevent excessive concentration and/or dilution.

(*c*) The writers are in agreement that basic research on the operation and control of this type equipment should be done by the manufacturer in conjunction with the U. S. Public Health Service prior to the time it is installed in a commercial milk plant.

(*d*) The next revision of, or supplement to, the U. S. Public Health Service Milk Ordinance and Code should give specific, official coverage to flavor control equipment, vacuum pasteurization and to the definition of high-heat pasteurization. This would standardize installation and inspection of this equipment.

(*e*) The sanitary design and construction of equipment such as steam injectors or booster heaters, vacuum breakers, pressure differential valves, vacuum chambers and product flow stops should be evaluated and 3-A standards developed therefor.

(*f*) Vacuum and high-heat pasteurization equipment included in this study were found adaptable to circulation and in place cleaning with the exception of areas exposed to the highest temperature and/or low turbulence. Areas difficult to clean have been found to be domes of vacuum chambers, baffles, distribution nozzles, vacuum breakers, air operated valves and steam injection devices.

(*g*) In view of the recent Federal Food and Drug Administration ruling that the tolerance for any foreign substance in milk is zero, the use of boiler compounds in steam generating equipment, used in connection with steam-vacuum treatment of milk, needs further study. The treatment of infeed potable water to steam generators should be done, when practical, before it enters the boiler. Since each water supply may be an individual problem, a reputable chemical firm that specializes in treating boiler water should be consulted. A number of different chemicals now in general use for the treatment of boiler water and which have been found to be satisfactory are: sodium triphosphate, sodium hexametaphosphate, sodium hydroxide, sodium sulfite, sodium silicate, sodium aluminate, and sodium alginate, all of which are nonvolatile. Tannin is also frequently added to boiler water to facilitate the removal of sludge during the blow down of the boiler. This product is essentially nonvolatile but is reported by processors to create an odor problem in the milk or milk products. Therefore, tannin should be used with extreme caution. The naming of the above compounds is not a proprietary endorsement and does not represent a complete list of all chemical compounds which are nonvolatile, nontoxic and odorless and to which no objection has been found. Volatile chemicals used to prevent corrosion and scale in boilers or to facilitate the removal of sludge, cannot be used when steam is injected directly into the milk.

(*h*) The experience gained in working with flavor control equipment has convinced the writers that a thorough, practical knowledge of the U. S. Public Health Service Ordinance and Code is very necessary if the regulatory official is to adequately supervise the installation and operation of this equipment. Every opportunity should be used to gain a working knowledge through the study of reliable texts, brochures, flow diagrams, and through discussions with installation engineers and plant operators.

ACKNOWLEDGEMENTS

The authors wish to express their appreciation for the information and helpful suggestions made by dairy equipment company representatives through personal contact and by review of their brochures. Also, the cooperation and assistance of local health department personnel of this state in allowing this work to be done in their jurisdiction, has been most helpful.

We also wish to thank Mr. John D. Faulkner, Chief, Milk and Food Sanitation Program, U. S. Public Health Service, Washington, D. C., for his encouragement and constructive suggestions in the preparation of this paper; and Mr. James L. Church, Jr., Assistant Director, Division of Sanitary Engineering, Tennessee Department of Public Health, for his critical review of the manuscript.

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FACTORS GOVERNING THE RESPONSIBILITY OF INDUSTRY FOR THEIR INSPECTION OF NEW YORK STATE MILK SUPPLIES[1]

MEREDITH H. THOMPSON

Bureau of Environmental Sanitation

New York State Health Department, Albany

The New York State Sanitary Code change in reference to quality milk control was made to give definite recognition to the basic authority and responsibility of the dairy industry for quality control of its own product in the production, processing and delivery of milk, while the New York State Health Department maintained its overall responsibility for supervision and control of milk for the protection of the public health. It is no change in policy but a change in emphasis for economy, efficiency and public health protection carried out through continued cooperation.

This is not a new philosophy. The milk industry has always been directly responsible for the milk product they produced. The new code is merely spelling out some of the specifics for which the complete industry should assume direct responsibility. This philosophy, of course, is not restricted to the milk industry.

A community or a private water corporation is responsible for the quality of the water product which they deliver to the consumer. Although the State Health Department has a direct responsibility to see that water plants are operated continuously in an effective and efficient manner by qualified personnel and that the water supply to the consumer is of a safe, potable character at all times, it is the direct responsibility of the community or private water corporation to maintain adequate facilities, to process and deliver a safe and potable water supply at all times and to make necessary chemical, bacterial and biological determinations. This is also, of course, true in the area of food and drugs. In this instance, it is necessary that the industry actually determine and indicate that nothing is contained in the food or drug which may be injurious to public health. This is the type of responsibility which the dairy industry has been assuming progressively over the years. As the number of dairy farms and pasteurization plants decrease, with larger dairy farms and pasteurization plants increasing and with fewer companies encompassing larger areas, it is progressively more important that these companies become more directly involved with the quality control of the production, processing and delivery of their product over a large area.

It is, therefore, a matter of economics and efficiency that the milk industry continues to recognize and accept its expanding responsibility. In the past, some areas of the State received little rountine inspection of dairy farms from health agencies. Consequently, the quality control on the dairy farm was done by industry itself. On the other hand, there are areas where dairy farm and processing plant inspection involves duplicate, triplicate and quadruplicate inspections. Duplicate inspections are inefficient and it is impossible for the farmer or processor to conform to the many different interpretations and recommendations made concerning one item. This duplication of inspection, or in some cases no inspection at all, by health agencies can be eliminated only through a coordinated industry inspection and quality control by its own facilities. The health agencies will maintain their responsibility by spot-checking the dairy farms, milk processing plants and laboratory facilities to make certain that the work was not only being done but being done in a satisfactory manner. This role of the New York State Health Department makes it possible for the New York State Health Department to certify milk supplies shipped intra-state from one community to another without requiring duplicate and triplicate inspections. Industry is able to pool its inspection staffs and to use its own inspectors over as large an area as is feasible.

Actually industry is already in this field and has the best opportunity of anyone to make certain that dairy farms are satisfactory. This, of course, refers to the first time that a dairy farmer is taken on as a producer. This, of course, is the golden opportunity to make certain that all sanitary conditions on the dairy farm are satisfactory to the industry intending to purchase that milk. Industry at this time must not accept dairy farms which have been excluded from some milk plant for not meeting code requirements. The problem cannot be solved if one milk plant excludes a dairy farm and another milk plant will accept that milk. If dairy farmers know that if they are excluded by one milk company, another milk company will not accept their milk, it will be easier to secure compliance with Health Department rules and regulations.

One of the big problems in the past, and may con-

[1]Presented at the 13th annual meeting of the Dairy Products Improvement Institute, Inc., Hotel Governor Clinton, New York City, February 18, 1960.

tinue to be a problem, is that of the uniformity of inspection of dairy farms and processing plants. Industry and Health Department personnel must, insofar as possible, be able to look at the same condition on a dairy farm or pasteurization plant and arrive at the same interpretation of the code and recommendation. I am certain we are all familiar with trying to interpret what is adequate lighting on a dairy farm. One inspector may say lighting is adequate if there are a certain number of foot-candles at a specific area. Another inspector may say lighting is adequate if he can read the score sheet in the darkest part of the barn. These two inspectors would probably have different recommendations. These are the kinds of problems which must be solved. Training must be provided to industry and health agency personnel so as to develop uniformity of interpretations and recommendations. The milk industry has taken a big step in this direction by its adoption of a uniform industry score sheet for dairy farms. The New York State Health Department has and will continue to assist in the training of industry dairy inspectors, so that a satisfactory and uniform inspection can be made of all dairy farms throughout New York State. Training for uniformity of interpretation and recommendation involving joint field inspections by industry and health agency personnel is necessary.

There is, therefore, no change in the basic responsibility of the dairy industry for the quality control of its milk product, but merely a restatement of this responsibility with an indication of definite activities which they must undertake. The health agencies will continue to assume their full responsibility for the overall protection of the milk supply sold to the consuming public. With fewer large dairy farms and fewer large pasteurization plants, it is more economical and efficient for industry to increase specific activities in the production, processing and delivery of milk. This can be accomplished through continued mutual respect and cooperation.

PROGRAM

FORTY-SEVENTH ANNUAL MEETING

INTERNATIONAL ASSOCIATION OF MILK AND FOOD SANITARIANS, INC.

in cooperation with

THE ASSOCIATED ILLINOIS MILK SANITARIANS

Morrison Hotel **October 26 - 29, 1960** **Chicago, Illinois**

REGISTRATION

Tuesday, October 25 — 1:30 - 5:00 P.M. (Burgandy Room)
Wednesday, October 26th — 8:00 A.M. - 6:00 P.M. (First Floor Foyer)
Registration fee — $5.00
Ladies Hospitality Suite — October 26-28 — Suite 1384-85

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WEDNESDAY, OCTOBER 26, 1960

9:00 a.m.–10:15 a.m.–Meeting of Local Arrangements Committee – *Presidential Suite*

10:15 a.m.–11:45 a.m.–Meeting of Affiliate Council – *Parlor B, First Floor*

GENERAL SESSION

Grand Ballroom

Dr. Franklin W. Barber, Junior Past President, *Presiding*

1:30 p.m.–Invocation – Reverend John R. Cortelyou, Chairman, Department of Biology, DePaul University, Chicago, Illinois

1:35 p.m.–Address of Welcome – Dr. Samuel Andelman, Commissioner of Health, Chicago, Illinois

1:50 p.m.–Presidential Address – Mr. William V. Hickey

2:30 p.m.–Sanitation – More or Less in the Sixties? – Dr. R. F. Sondag, Assistant Director, State Department of Public Health, Springfield, Illinois

3:15 p.m.–Charge to the Nominating Committee – *President* William V. Hickey

3:30 p.m.–Protection of Food Processing Plants During National Emergencies – Mr. J. W. Bell, National Canners Association, Washington, D.C.

4:30 p.m.–Announcements

8:00 p.m.–Reception sponsored by the Associated Illinois Milk Sanitarians – *Grand Ballroom*

THURSDAY, OCTOBER 27, 1960

MILK SESSION

Grand Ballroom

HAROLD B. ROBINSON, *Senior Past President, Presiding*

9:00 a.m.–Door Prizes

9:10 a.m.–Report of Committee on Farm Practices – DR. ROBERT METZGER, *Chairman*

9:30 a.m.–Blend Temperatures of Mixed Milk in Farm Tanks – DR. LEON CHARITY, Iowa State University, Ames, Iowa

10:00 a.m.–Operation of Cow Pools – DR. MILTON FISHER, Department of Health and Hospitals, St. Louis, Missouri

10:45 a.m.–Organizing an Effective Mastitis Control Program – DR. I. A. SCHIPPER, North Dakota State College, Fargo, N. D.

11:15 a.m.–Some Recent Experiences with Control of Milk Watering – MR. BLANTON C. WIGGIN, Newton Highlands, Massachusetts

11:45 a.m.–Report of Committee on Sanitary Procedures – MR. C. A. ABELE, *Chairman*

12:00 noon–Discussion

12:15 p.m.–Adjournment

FOOD SESSION

Cotillion Room

VINCENT T. FOLEY, Secretary-Treasurer, *Presiding*

9:00 a.m.–Door Prizes

9:10 a.m.–Report of Committee on Food Equipment and Standards – MR. KARL JONES, *Chairman*

9:20 a.m.–Application of Food Sanitation Practices in Industry – MR. FAEGIN PARRISH, State Department of Public Health, Atlanta, Georgia

10:00 a.m.–Food Sanitation and Quality Control – Facts and Fallacies – MR. PAUL E. LAUGHLIN, National Biscuit Company, New York City

10:40 a.m.–Report of Committee on Frozen Food Sanitation – MR. FRANK FISHER, *Chairman*

11:00 a.m.–Food Injuries – DR. ROSEMARY HARVEY, Wichita-Sedgwick County Department of Public Health, Wichita, Kansas

11:45 a.m.–Report of Committee on Baking Industry Equipment Standards – MR. VINCENT T. FOLEY, *Chairman*

12:00 noon–Discussion

12:15 p.m.–Adjournment

ENVIRONMENTAL SANITATION SESSION

Embassy Room

CHARLES E. WALTON, First Vice President, *Presiding*

9:00 a.m.–Door Prizes

9:10 a.m.–Sanitation in Suburbia – MR. ARTHUR NEIL, Chief, Technical Services Section, General Engineering Program, Public Health Service, U. S. Department of Health, Education, and Welfare.

10:00 a.m.–The Lagoon Method of Sewage Disposal – MR. CHARLES E. CARL, Director, Division of Sanitary Engineering, South Dakota Department of Health, Pierre, South Dakota

10:45 a.m.–How Virginia's Tourist Establishment Sanitation Program Affects Her Economy – MR. JAMES W. SMITH, Director, Bureau of Tourist Establishment Sanitation, State Department of Health, Richmond, Virginia

11:15 a.m.–Recent Advances in Food and Milkborne Diseases – DR. WALTER S. WOOD, Department of Preventive Medicine, University of Illinois Medical School, Chicago, Illinois

12:00 a.m.–Discussion

12:15 a.m.–Adjournment

GENERAL SESSION

Grand Ballroom

WILLIAM HICKEY, President, *Presiding*

1:30 p.m.–Door Prizes

1:45 p.m.–Report of Nominating Committee

1:50 p.m.–Observations on the Administration of Grade A milk Programs – DR. L. R. DAVENPORT, Deputy Director, Division of Milk Control and Veterinary Public Health, State Department of Health, Springfield, Illinois

2:30 p.m.–Report of Committee on Education and Professional Development – MR. W. HOWARD BROWN, *Chairman*

2:45 p.m.–Current Trends in the Interstate and Intrastate Shipment of Milk and Their

Impacts on Local Milk Sanitation Programs — MR. JOHN D. FAULKNER, Chief, Milk and Food Program, Division of Engineering Services, U.S.P.H.S. Washington, D. C.

3:30 p.m.—Annual Business Meeting
Executive Secretary's Report
Election of Officers

4:30 p.m.—Adjournment of General Session

6:00 - 7:00 p.m.—Cocktail Party — *Terrace Casino*

7:00 p.m.—Annual Awards Banquet and Entertainment — *Terrace Casino*
Presiding, WILLIAM HICKEY, *President,* IAMFS
Presentation of Awards — MR. HAROLD ROBINSON, Senior Past President, IAMFS, Chairman of Committee on Recognition and Awards
1. Sanitarians Award
2. Citation Award
Installation of Officers
Entertainment

FRIDAY, OCTOBER 28, 1960

GENERAL SESSION

Grand Ballroom

DR. JOHN J. SHEURING, President-Elect, *Presiding*

9:00 a.m.—Door Prizes

9:10 a.m.—Panel Discussion — Industrial Uses of Welded Pipelines, DR. F. W. BARBER, *Moderator*
1. A Theoretical and Practical Look at Circulation Cleaning — Professor R. BURT MAXCY, University of Nebraska, Lincoln, Nebraska
2. National Dairy Products Corporation's Experiences — MR. KARL FOWLER, New York City
3. Safeway Stores' Experiences — MR. DAVID HENNIGH, Denver, Colorado
4. Regulatory Aspects — DR. GEORGE COFFEE, *Chief,* Milk and Veterinary Division, Government of District of Columbia, Washington, D. C.
5. Discussion of papers

10:30 a.m.—Report of Committee on Ordinances and Regulations — MR. DONALD H. RACE, *Chairman*

10:45 a.m.—Ethical Standards for Sanitarians — DR. W. L. MALLMANN, Professor of Bacteriology, Michigan State University, East Lansing, Michigan

11:45 a.m.—Report of Activities of the Sanitarians Joint Council — Professor HAROLD S. ADAMS, IAMFS representative

12:00 noon—Adjournment

GENERAL SESSION

Grand Ballroom

RAY BELKNAP, Second Vice President, *Presiding*

1:30 p.m.—Door Prizes

1:40 p.m.—Report of Committee on Communicable Diseases Affecting Man — MR. JOHN H. FRITZ, *Chairman*

2:00 p.m.—Spray Residues on Fruits and Vegetables — MR. T. E. SULLIVAN, Director, Division of Food and Drugs, Indiana State Board of Health, Indianapolis

2:45 p.m.—Regulation of Bactericides Under the Federal Insecticide, Fungicide, and Rodenticide Act — MR. L. S. STUART, Pesticide Regulation Branch, U. S. Department of Agriculture, Washington, D. C.

3:30 p.m.—Report of Committee on Research Needs and Application — DR. SAMUEL H. HOPPER, *Chairman*

3:45 a.m.—Announcements

4:00 p.m.—Adjournment

SATURDAY, OCTOBER 29, 1960

9:00 a.m.—Committee meetings, *Parlors B, C and D*

9:00 a.m.—Executive Board Meeting — *Presidential Suite*

NEWS AND EVENTS

QUESTIONS AND ANSWERS

Note: Questions of technical nature may be submitted to the Editorial Office of the Journal. A question in your mind may be in the minds of many others. Send in your questions and we will attempt to answer them.

QUESTION:

We distribute milk and milk products in many areas whose health departments operate "official" laboratories. The chemical and bacterial data reported on replicate samples by them, our own and commercial laboratories we use, sometimes vary widely. We have been discouraged by health department administrators assuming the results from their own "official" laboratory to be infallible, even when data on certified replicates from another equivalently "official" laboratory differs markedly.

Is there any way whereby the performance of all laboratories, official, industrial and commercial, can be standardized, to decrease, if not to completely eliminate, the current confusion?

ANSWER:

The need for proper and standardized performance of laboratory tests on dairy products has been recognized by many. Substantially all of the United States have, for many years, relegated to their Departments of Agriculture the licensing and policing of industrial, commercial, cooperative association and institutional laboratories and personnel involved in fat contents and other chemical testing on which payments are based. Request your state agency, when discrepant data is obtained, to investigate; it will undoubtedly check the chemical testing at all the laboratories concerned.

Examining, licensing and supervising of "official" and other laboratories and personnel involved in the bacteriological testing of dairy products, although practiced for many years by New York and Connecticut, has only recently been begun by a majority of the other states (Departments of Agriculture or Health) stimulated by the Interstate Milk Shipment Laboratory Certification program of the Bureau of State Services of the Public Health Service. (See "Methods and Practices for State Milk Laboratory Survey Officers" manual issued by PHS Taft Sanitary Engineering Center, Cincinnati 26, Ohio, February 1960; "Recent Progress in Certification of Milk Laboratories" By L. A. Black, J. Milk & Food Technol., **23**, 13-18, 1960.)

In brief, the certification program requires laboratories which test dairy products for bacterial contents to possess adequate facilities and trained, experienced personnel. Laboratory performance is rated continually through data derived from "split samples" distributed by the state's rating agency. Marked improvement in data grouping of replicate samples has been found to be developed rapidly, where the certification programs have been prosecuted vigorously.

If the state or states in which you do business have not yet begun to inspect, license and supervise bacteriological laboratories testing dairy products, or are not doing this actively, your local trade associations may be able to obtain the action you need by its members bringing the situation to the attention of your legislators.

QUESTION:

What bacteriological standards are used to estimate the sanitary quality of raw shucked oysters intended for sale in retail markets?

ANSWER:

On the basis of data presented at the 1956 Shellfish Sanitation Workshop, the Public Health Service (See Manual of Recommended Practices for the Control of the Shellfish Industry, PHS Pub. 33, 1957.) recommended the following provisional standards for shucked market oysters.

Class 1. Acceptable: Shucked oysters with a Most Probable Number (MPN) of coliform bacteria of not more than 16,000 per 100 ml., and/or a Standard Plate Count of not more than 50,000 per ml.

Class 2. Acceptable on Condition: Shucked oysters with a coliform MPN greater than 16,000 per 100 ml. but less than 160,000 per 100 ml., and/or a Standard Plate Count greater than 50,000 per ml. but less than 1,000,000 per ml. (The oysters will be accepted on the condition that the shellfish sanitation authority in the originating State will make immediate investigations of the producer's plant and operations, and will submit a report of such investigations to the control agency in the market area. On the basis of this report, the control agency in the market area will reject or permit further shipments from the producer in question.)

Class 3. Rejectable: Shucked oysters with a coliform MPN of 160,000 or more per 100 ml., and/or a Standard Plate Count of 1,000,000 or more per ml.

The foregoing provisional standards are based on results obtained from an on-going collaborative study of oysters from the Eastern and Gulf Coasts of the United States. They may not be strictly applicable to the different species of oysters harvested on the Pacific Coast.

Tentative changes in the recommended standards are being made as the collaborative study progresses (See R. A. Taft Sanitary Engineering Center (PHS) Technical Rep't. F 60-2, 1960). In fact, the 1958 Shellfish Sanitation Workshop adopted the following interim bacteriological standards for shucked Eastern oysters at the market level during 1959 and 1960.

Satisfactory: A fecal coliform density (MPN) of not more than 78 per 100 ml. of sample, and a plate count of not more than 100,000 per ml. of sample, except that a fecal coliform density up to and including 230 per 100 ml. of sample and/or plate count up to and including 500,000 per ml. of sample will be acceptable in occasional samples. (For convenience, these will be referred to as Class I-A and I-B samples, respectively.)

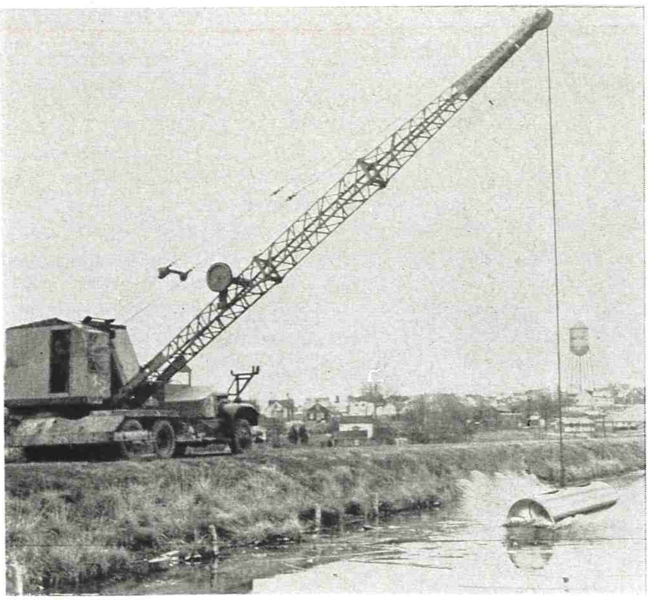
The official agency in the receiving area should notify both the shipper and shellfish control agency at the point of production of any Class I-B results. If two consecutive Class I-B shipments are found, the receiving area is justified in excluding the shipper from the market area until a satisfactory report on the shipper is received from the State control agency in the producing area.

Unsatisfactory: A fecal coliform density (MPN) of more than 230 per 100 ml. of sample or a plate count of more than 500,000 per ml. of sample. (For convenience, these will be referred to as Class II samples.)

The official agency in the receiving area should immediately notify both the shipper and shellfish control agency in the producing area of a Class II result. A single Class II result is justification for excluding the shipper from the market pending receipt of a satisfactory explanation from the official control agency in the producing area.

For the purpose of use in the interim bacteriological standard, the term "fecal coliform organisms" is defined as those organisms which, on transfer to E. C. medium from gas-positive presumptive broth tubes, show the production of gas after incubation for 48 hours at 44.5°C. in a water bath

POND-DUNKING INSULATION TEST



This photo—showing the new 1960 ZERO T-20 VACUUM AUTOMATIC BULK MILK COOLER being dunked in a farm pond—does far more than illustrate the non-corrosive quality of the gleaming stainless steel from which this farm bulk milk tank is made. It's a photo of ZERO's *Pond-Dunking Insulation Test*, which dramatically demonstrates the astonishing *moisture-repelling* property of a revolutionary, new type of insulation, called *Urethane*—that is now being used as standard insulation in all new ZERO farm bulk milk tanks.

Because of Urethane's unusual moisture-resistance, the ZERO tank is water-proof as well as air-proof; *Urethane* insulation greatly increases the ZERO tank's milk-cooling efficiency—lengthens its life—and makes it possible to decrease the exterior dimensions of every size ZERO tank without decreasing its milk-storage capactiy. In addition, because of its unusual strength, *Urethane* helps make the ZERO the strongest farm bulk milk tank possible to produce.

Dairy farmers, of course, do not install bulk milk tanks on ponds. But it has been calculated by the ZERO Corporation of Washington, Missouri—manufacturer of the ZERO tank—that submerging a bulk milk tank for one day's exposure to water in a farm pond could be equivalent to two years of normal exposure in the dairy farm milk house, where humidity is usually at the saturation point, where the temperature changes each day, and where the tank itself undergoes extreme changes in temperature caused by cold milk and hot wash water. All of which are factors that create a breathing condition which draws milk house moisture into the older-fashion type of insulation, often to the saturation point.

Urethane is a white plastic foam—which, after hardening, has the appearance of thick soap suds. But it resembles soap suds in appearance only. The hardened *Urethane* plastic foam is just about as hard as a rock.

Special equipment forces the foaming *Urethane*, under high pressure, through openings in the bottom of the outer shell, or jacket, of the ZERO tank—completely filling the space between the stainless steel lining and the jacket which contains the freon evaporator that cools the milk. Then the *Urethane* hardens —forming a hard, solid liner-to-jacket wall—which creates five pounds pressure per square inch on both the lining and the jacket of the tank. It *makes the ZERO the strongest farm bulk milk cooler possible to produce.*

The hardened *Urethane* insulation—while just about as solid as a rock—is light in weight and composed of tiny air cells. *These air cells are subject to less than 5% absorption of moisture.* This means that whether submerged for a day in a farm pond—or exposed for many years to the normal, high humidity of a milk house—only such a minute amount of moisture as to be negligible can enter the insulation area of the ZERO tank.

As a result, the milk-cooling efficiency of the ZERO Tank is even greater than previously. Furthermore, deterioration of liner, jacket and freon evaporator has been reduced to a minimum—enabling the ZERO tank to give even more years of trouble-free service.

The use of the new *Urethane* insulation has also made it possible to decrease the space between the liner and the jackt of the ZERO tank—thus decreasing the exterior dimensions of all sizes of ZERO tanks without decreasing their milk-storage capacities. As an example, the new 400-gallon ZERO tank has the smaller-dimension jacket formerly used on a 325-gallon tank. This enables the dairy farmer to install a larger capacity tank without the expense of enlarging the milk house.

SAN BERNARDINO HEALTH DEPARTMENT RECEIVES NATIONAL HONOR

Dr. Malcolm H. Merrill (left), California State Health Director and President of the American Public Health Association, presents the Samuel J. Crumbine award for the development of an outstanding program of environmental sanitation to Dr. M. E. Cosand, Health Officer of San Bernardino County for the achievement of his department. Medallions for personal achievement were presented to Dr. Cosand and to Richard E. Elliott (right), for his role as Director of Sanitation Services. Award was made at the annual meeting of the Western Branch of the American Public Health Association.

The County Health Department of San Bernardino, California, received on May 24, 1960 the highest award for its achievement in the field of environmental sanitation, in a competition open to more than 1,200 local health departments throughout the country. Dr. Malcolm H. Merrill, California State Health Director, and President of the American Public Health Association, presented the award at the annual meeting of the Western Branch of the American Public Health Association.

The coveted honor was the Samuel J. Crumbine award for outstanding achievement in the development of a comprehensive program of environmental sanitation, sponsored each year by the Public Health Committee of the Paper Cup and Container Institute.

Dr. Merrill presented a plaque to Dr. M. E. Cosand, Health Officer of San Bernardino County, for the achievement of his department. In addition to the plaque, bronze medallions were given to Dr. Cosand and to Richard E. Elliott, Director of Sanitation Services, for their personal leadership in the winning program.

The jury for this year's awards consisted of Ralph T. Fisher, New Jersey State Department of Health, Chairman; Miss Martha Allen, National Director, Camp Fire Girls; Prof. William C. Gibson, Acting Dean, School of Public Health, University of Michigan; Karl Mason, Pennsylvania State Department of Health; Dr. John D. Porterfield, Deputy Surgeon General, U. S. Public Health Service, and Prof. K. G. Weckel, University of Wisconsin.

NOTES ON USE OF PESTICIDES ISSUED BY USDA

The position of the Pesticides Branch, U. S. Department of Agriculture on insecticides most generally considered for use on dairy farms and in milk processing plants is given through the following release.

"*Space and Contact Sprays* – We are accepting water and oil base sprays containing suitable amounts of pyrethrins with any of the usual synergists, such as piperonyl butoxide, sulfoxide, n-propyl isome, MGK-264 and sesame oil. Allethrin in varying amounts is also included in some of these formulations. Thanite and Lethane 384, both regular and special, are also acceptable. These sprays also sometimes contain various amounts of DDT or methoxychlor in amounts ranging up to 6.0%, which is the maximum acceptable level for these insecticides. We have not attempted to establish any specific upper limits for the other pesticides named. The minimum concentration should, in all cases, be sufficient to produce a Grade B spray against house flies when tested by the Peet-Grady method as provided in Commercial Standard CS-72-54. However, most of these sprays actually qualify as Grade AA fly sprays under this Commercial Standard. The label should, in all cases, warn against any contamination of milk and should provide for the removal, protection or cleaning of all utensils or equipment which might otherwise be contaminated.

"*Residual Sprays (Chlorinated Hydrocarbons)*—We have previously accepted directions for the use of DDT, methoxychlor, toxaphene, lindane, dilan and chlordane with directions for use in food processing plants. In all cases, the labeling is required to include proper safe-guards to prevent contamination of milk or other food with pesticidal chemicals or dead insects. All food or food processing equipment should be removed unless it can be thoroughly protected from contamination by the pesticide. While our acceptance of labeling for these pesticidal chemicals is quite broad, we do not find any specific statement of usage in milk rooms. Except in the case of lindane, it would usually be desirable to deposit residues of the pesticide at the rates of 100 mgs. to 200 mgs. per square foot on the room surfaces being treated. Residues of lindane usually range around 25 mgs. per sq. ft. However, the treatment should be limited in all cases to spot applications to those areas of the room where the insects, such as flies or roaches congregate.

"*Residual Sprays (Phosphates)*—We have no specific acceptance for any of the organic phosphates in milkrooms. Of those phosphates which have been accepted for use in dairy barns, there are some which might be considered for use in milkrooms. The following explanatory comments summarize our general position on this subject:

"*Malathion, Chlorthion & DDVP*—While all of these phosphates have been accepted for some type of use in dairy barns, we are requiring at the present time specific cautions against any use in milkrooms. We have not received any specific proposals for the use of these pesticides in food processing plants.

"*Diazinon, Korlan*—Both of these phosphates have been accepted specifically for use in dairy barns, and 'food processing plants.' Rather stringent warnings are required in such cases to prevent the contamination of food. The labels of these products have always included warnings against any use of these pesticides in milkrooms.

"*Bayer L 15/39 (Dipterex)*—This phosphate has been accepted as a bait application for use in dairy barns without specific warning against use in milkrooms. However, at the present time, we have not received any proposals for the use of this phosphate in food processing plants. We do not consider that we have accepted any use of dipterex in milkrooms at the present time. We will need to consider a clarification of this matter when specific directions for use in milkrooms are submitted to this Section for review.

"*Fly Cords*—We are accepting cords impregnated with parathion, diazinon or a combination of these two toxicants for killing flies. These cords are primarily intended for use in dairy barns, but may also be used in other farm premises, including milkrooms. We have accepted the following approximate concentrations impregnated into cords:

15% parathion alone
30% diazinon alone
14% parathion plus 4% diazinon

"These cords are hung from the ceiling at the rate of 300 linear feet of cord per 1,000 square feet of floor area. The labeling for these products includes strong warnings to the effect that any food products which have been accidentally contaminated are to be discarded. We have not yet received any specific proposals for the use of these fly cords in food processing plants."

The Technology Branch, Communicable Disease Center, PHS, has reviewed the above quoted statement and has indicated its concurrence with the provisions concerning both application and use. It is recommended that the information contained in the statement be used in interpreting the applicable provisions of the Milk Ordinance and Code relating to the use of insecticides on dairy farms and in milk processing plants.

Attention is invited to the precaution statement that appears in Appendix B (Page 146) of the Milk Ordinance and Code that all chemical sprays are poisonous to man and animals in varying degrees, and must be so applied and stored as to avoid contamination of milk, equipment, and animal feed. As is well known, accidental contamination of feed by insecticides may result in the presence of insecticide residues in the milk.

It is also desired to re-emphasize certain statements made in the Milk Ordinance and Code to the effect that dairy farmers, milk processors, and regulatory officials should not rely upon the use of insecticides as the sole means of fly control. The prime factor in any effective fly-control program is the elimination of fly-breeding sources through the application of basic sanitation practices such as those outlined on page 147 of the Milk Ordinance and Code.

CONFERENCE HELD ON MICROBIOLOGICAL STANDARDS FOR FOOD

A conference dealing with microboological standards for foods was held June 8-9, 1960, in Washington, D.C., under the auspices of the National Research Council, Sub-Committee on Food Sanitation.

The conference was mainly exploratory and attempted to bring together, from a number of sources, expert opinion upon this important subject.

A number of significant points were brought out by the conferees, some of which were:

1. Microbiological standards by themselves would not be sufficient to protect consumers from poison or spoilage. Real gains in consumer protection would require further advances in knowledge and the practice of improved sanitation by professionals and technicians, by industry and by the consumer.

2. The selection of classes of food for application of standards was a point upon which opinion was divided. Certain of the conferees favored selection of certain classes of foods according to the substance and method of preparation, as indications of possible contamination. Others favored attention to foods which, from past experience have demonstrated a particular hazard.

3. There was general agreement that there could be no single standard test for all foods. It was further agreed that the variety of food, sampling methods, processes, microbial flora and the possible presence of toxins, required a battery of tests and stanards. The zero requirement for coliforms on frozen foods was asserted to be impractical. There is far too little epidemiological knowledge at present on which to base precise limits in all circumstances.

4. There was general agreement that numerical rather than qualitative standards are preferable, yet some practical difficulties were noted, viz: what quantity of growth is hazardous in a given test or situation? Complicating the problem further is the need to determine the presence of specific pathogens such as *staphylococci* and *salmonellae*. A further consideration is the absence of sufficient personnel and laboratories to perform the many tests that appear theoretically desirable.

The conference agreed that continuing and increasing research should be done in this field. It took cognizance of the many variables involved. Stressed by nearly all participants was the need for fact finding, education, carefully selection of ingredients, and good sanitary control.

Among those who participated in the conference were the following:

Dr. Robert F. Korns, Deputy Health Commissioner, New York.

Dr. D.A.A. Mossel, Central Institute for Nutrition Research, Netherlands

Dr. Glenn G. Slocum, Food and Drug Administration, Department of Health, Education and Welfare.

Dr. F. S. Thatcher, Department of National Health and Welfare, Canada

Colonel John Rizzolo, U. S. Armed Forces Epidemiological Board

Professor Aage Jepsen, Royal Veterinary and Agricultural College, Demark

Dr. Harry E. Goresline, Quartermaster Food and Container Institute for Armed Forces, Chicago.

Dr. Millard Gunderson, Campbell Foods, Camden, N. J.

Dr. G. M. Dack, University of Chicago

Dr. Leon Buchbinder, New York City Health Department

Dr. John Silliker, Swift and Company, Chicago

The conference was chaired by Professor Walter D. Tiedeman, University of Michigan, assisted by Dr. Morris Shiffman, Philadelphia Department of Health.

A complete report of conference deliberations is now being prepared for publication in an early issue of Public Health Reports.

JAMES H. BERGSMA PASSES

It is with regret that the death of Jim Bergsma of Waterloo, Iowa is announced. At the age of 51, Jim died of a heart attack suffered on May 27, following an auto accident earlier that same day. Jim had been milk sanitarian for the City of Waterloo some twelve and a half years.

He attended Iowa State University for two years in the late twenties and during World War II served some thirty months in the Navy Medical Corp. He is survived by his wife and two daughters and by his father and one brother. The Association conveys sympathy to his family, friends and associates.

PUBLIC HEALTH SERVICE MILK AND FOOD PROGRAM PRESENTED CITATION BY NATIONAL RESTAURANT ASSOCIATION

The National Restaurant Association, at its first award ceremony, May 11, 1960, presented a Unit Citation to the Milk and Food Program of the Public Health Service. The Chief of this Program is John D. Faulkner.

The Citation, in the form of a very attractive plaque, is inscribed as follows:

The National Restaurant Association does hereby recognize the contributions of the Milk and Food Program, Public Health Service, Department of Health, Education and Welfare, Washington, D. C, to the food service industry and to the Nation through achievements in marketing, scientific development and research.

The plaque is presented in appreciation of the efforts of dedicated men and women and of the funds spent for the advancement of the food service industry.

At this same ceremony, the National Restaurant Association awarded Secretary Arthur S. Flemming a silver medallion in recognition of his service to humanity, and awarded the Department of Heath, Education and Welfare a silver scroll for leadership in research in the field of public health, education and foods. These awards were accepted in the name of the Secretary by Assistant Surgeon General Theodore J. Bauer.

INDIANA ASSOCIATION OF SANITARIANS HOLDS TENTH ANNUAL MEETING

The tenth annual meeting of the Indiana Association of Sanitarians was held at Indianapolis, June 7-9, 1960. A number of timely and interesting topics were presented on a variety of subjects in the field of environmental sanitation. The meeting was set up on the basis of separate sections dealing with, General Sanitation, Milk Sanitation and Food Sanitation.

Topics presented at the Section meeting included the following:

Treatment of Small Water Supplies. In this discusion considerable attention was given to treatment of pond water supplies which are becoming more prevalent in areas of the State where good ground water is not available.

Fringe Area Sewage Disposal Problems. Treated in this section was the matter of package disposal plants used at schools and shopping centers.

Public Health and Bathing Places. Here discussion dealt with swimming pools and natural bathing areas and with treatment and quality standards.

What I Expect from a Dairy Field Man. Here the speaker outlined the duties and responsibilities of the field man and his services to the dairy industry and official agencies.

Radionuclides in Milk and Food. Discussed under this topic was the sampling program and the research being carried on at the Taft Sanitary Engineering Center, Cincinnati, Ohio.

Mastitis, the Cause of Antibiotics in Milk. The speaker indicated how the indiscriminate use of antibiotic drugs could cause serious consequences in terms of mastitis control.

Federal Regulation of Pesticides and Bactericides. A representative of the USDA, Pesticides Branch, discussed the legal requirements and administrative aspects of pesticide regulation and control.

My Three Years With Vending. An illustrated lecture was presented covering the construction, regulation and operation of food and beverage vending and the part the industry is playing to insure good sanitation and the promotion of uniformity through public health agencies.

Progress on the New Food Ordinance. The speaker, representing the Public Health Service, Region V office, detailed some of the proposed changes and indicated how a national committee had been working with and serving as consultants to the Milk and Food Program to bring out an enlarged and improved document on the important subject of food and drink service establishment sanitation. A recent draft has been reviewed by State and local health agencies and consideration is given to such suggestions as these agencies have made.

New Officers elected were as follows: President, Samuel T. Elder, Evansville; President Elect, Ronald Brown, Indianapolis; First Vice President, Thomas Snider, Ft. Wayne; Second Vice President, Robert Nelson, Muncie; Treasurer, George Nuffer, Lafayette; Secretary, Karl K. Jones, State Board of Health, Indianapolis; Auditors: Lewis Stoy, New Albany and John Turpin, Fort Wayne.

DISA ISSUES 16-PAGE BOOKLET FOR PROSPECTIVE VISITORS TO DAIRY INDUSTRIES EXPOSITION

Much information the prospective visitor to the 22nd Dairy Industries Exposition, October 31-November 5, International Amphitheatre, Chicago, will welcome is contained in a compact 16-page booklet just published by the Exposition's sponsor, Dairy Industries Supply Association.

Heralding the biennial Big Show of dairy industrial equipment, supplies and services as "Showcase 60, Products - Methods - Profits," the illustrated booklet sets forth details of these — and many other — important Exposition-and-Conventions Week arrangements:

Exhibits — a preview of the displays planned by the more than 400 exhibiting firms, makers of the tools and ingredients for operation of the modern dairy processing industries.

International Amphitheatre — how it measures up as the most ideal site ever made available for a midwest staging of the Exposition.

Admission rules — procedures by which an expected 25,000 dairy industry men and women will be welcomed to the Show.

Housing — how to get information about, and Exposition Week reservations in, Chicago hotels and motels.

Concurrent convention — time-table of the annual meetings to be held at Exposition time by eight national and international dairy industry organizations.

Special events — ouline of activities such as the 26th Collegiate Students' International Contest in Judging Dairy Products and all-industry evening entertainment to be featured during Show Week.

Chicago — tips on how this great city, with its fine stores and theatres, can make profitable business trip double as an exciting family holiday.

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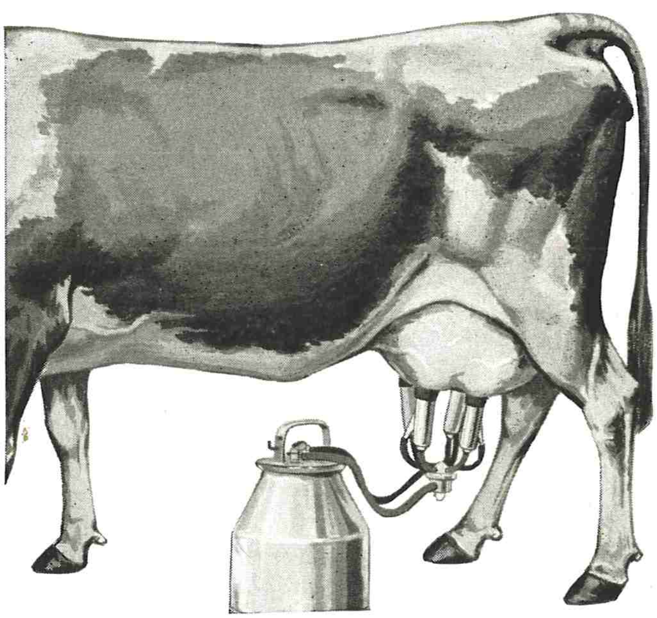

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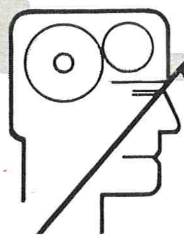

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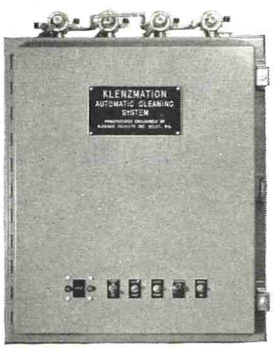

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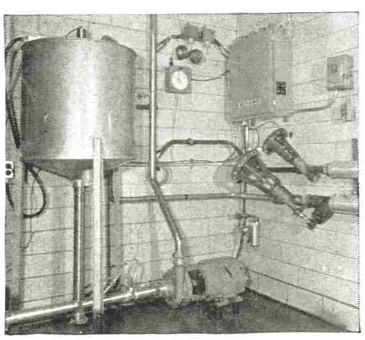

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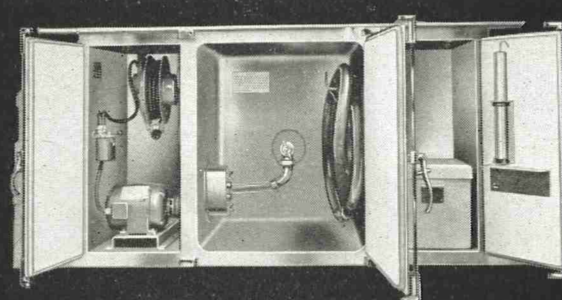

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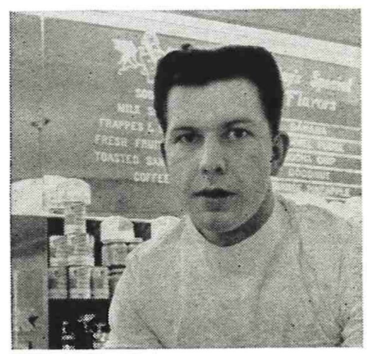

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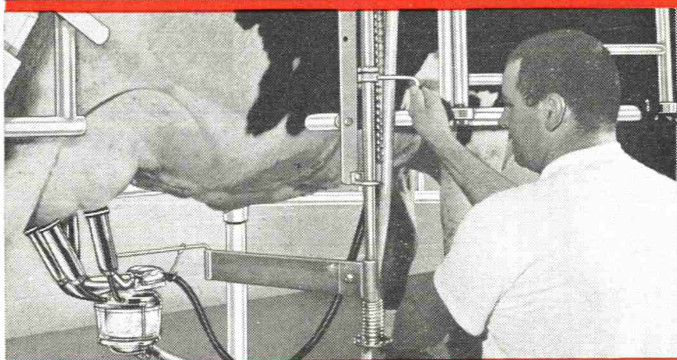

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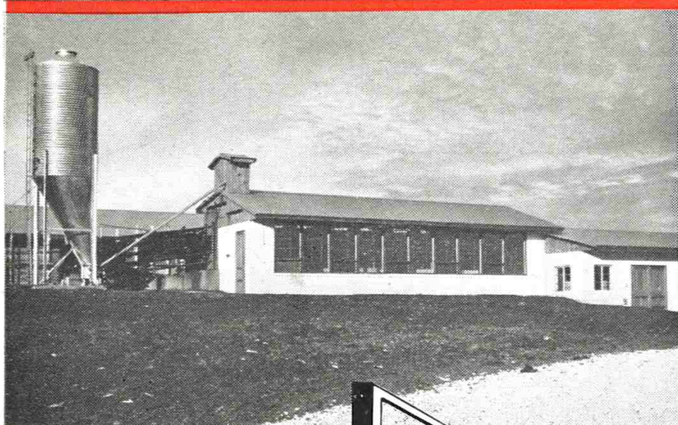

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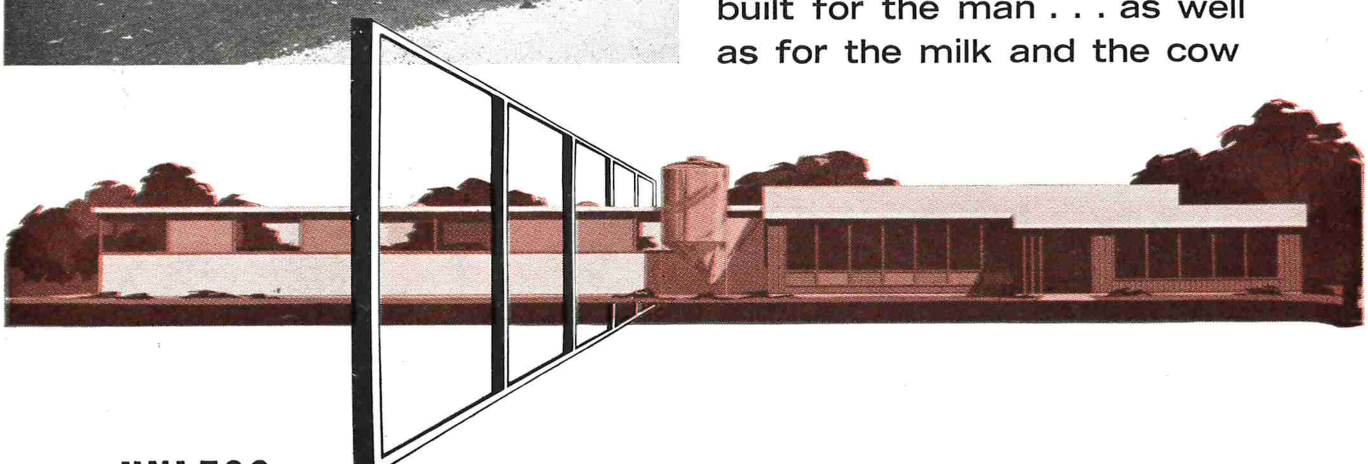

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