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JOURNAL of MILK TECHNOLOGY

Volume 9 January–February, 1946 Number 1

The opinions and ideas expressed in papers and editorials are those of the respective authors. The expressions of the Association are completely recorded in its transactions.

Message of the President

HAPPY New Year!—This favorite American greeting takes new meaning as we start the first New Year of hard-earned peace. May the peace that finally came after the years of terrific and costly warfare be everlasting, and may we devote our present and future efforts to building a better world in which all may live. America's "Know How", abundant energy, and resources, the vital factors in the successful termination of the war, are now being turned to peaceful pursuits with new and better products being marketed daily.

The nation has turned from war to peace, from designing, building, and using all resources for destruction of a common enemy to the utilization of these same talents for building, to satisfy the desire of all for a better way of living.

During and after the reconversion period, milk sanitarians should carefully study their particular problems. Many war enforced changes were really improvements that may well be used in peace times. Now is the time for more cooperation to be developed between urban communities so all may benefit by elimination of special requirements not materially affecting the safety and quality of the products concerned. The free interchange of safe, high quality dairy products can well be fostered. Uniformity of requirements that are economically feasible will make this possible. Milk must continue to be available to all.

The use of milk builds health and the milk sanitarian's job will continue to be one of watchfulness over this vital supply. However, the milk sanitarian should not be hasty, he must see that requirements that will enhance the safety or quality of the product are enacted, and not adopt frills or needless items. We must all lend every bit of our energy towards the impartial and efficient enforcement of essential requirements that all milk will be safe and desirable.

May the New Year bring increased cooperation within the Association, an increased willingness to work on Association problems, and a firm resolution to attend the annual meeting, where through an exchange of ideas and hearing the presentation of latest development in the industry, we can all profit and do a better job, for a better world.

RUSSELL R. PALMER,
President

Standardization of Sanitary Equipment

THE presentation, in this number of the JOURNAL, of drawings and dimensions of twenty-seven milk piping fittings which have been approved by the Dairy Industry Committee, by the United States Public Health Service, and by the Committee on Sanitary Procedure of this Association, marks the initial achievement of a project—it might well be termed a movement—which has much promise for milk sanitarians.

It will be recalled that, at the 1944 Annual Meeting of the Association, it was announced that the Dairy Industry Committee, composed of representatives of the International Association of Milk Dealers, the International Association of Ice Cream Manufacturers, the Evaporated Milk Association, the Dried Milk Association, the National Cheese Institute, the American Butter Institute, and the Dairy Industries Supply Association, wished to collaborate with this Association in the formulation of sanitary standards employed in all branches of the dairy industry. Early in 1945 the Sanitary Standards Subcommittee of the D.I.C. was organized, and has, in the interim, held four meetings.

In addition to the standards currently presented, standards for another type of equipment have been submitted to the Committee on Sanitary Procedure by the Sanitary Standards Subcommittee, and are currently being studied by a subcommittee. Standards for a number of other types of milk plant and dairy farm equipment are in the formative stage, and will shortly be submitted to the Committee on Sanitary Procedure for consideration.

The speed and energy with which the need for betterment in the design, construction, and finish of some types and brands of milk-handling equipment is being met by the Sanitary Standards Subcommittee indicates unmistakably the interest of equipment manufacturers and the dairy industry in this program, the sincerity and industry of the members of that Subcommittee, and, possibly, the need for enlargement of the Committee on Sanitary Procedure, so that the latter group may be in position to keep pace with the former.

In a resolution adopted by the Committee on Sanitary Procedure it was declared to be a function of the Committee

"To cooperate with the Dairy Industry Committee, the United States Public Health Service, and health regulatory officials, in attaining universal acceptance of the sanitary standards upon which mutual agreement has been reached."

The standards agreed upon are considered minima. They may or may not embody all of the requirements now prescribed in a small number of fluid milk markets. But they are to be accepted by the several branches of the dairy industry as the *sine qua non* for new equipment and replacements, until more rigid standards, founded upon advances in manufacturing and fabricating technique, are evolved.

The agreement of the President of this Association to cooperate to the fullest extent with the Dairy Industry Committee, and the action of the Committee on Sanitary Procedure in approving the standards for a certain number of fittings, are not necessarily binding on all members of this Association. Nevertheless, acceptance and approval of fittings conforming to these standards, by milk sanitarians—particularly those who are members of this Association—is not only in their general interest, but is essential for the establishment of that degree of mutual respect and trust between this Association and the Dairy Industry Committee, without which the program so promisingly begun will surely fail.

Other standards will be presented for consideration, and acted upon, in quite rapid succession during the next twelve months. Equipment which conforms to approved standards will be given a distinctive designation by manufacturers. It may become desirable to publish a compilation of drawings, dimensions, and specifications of equipment for which standards have been evolved, to be augmented from time to time. It is not possible, at this stage of the program, to circumscribe the possibilities of this project for benefit to the dairy industry and for credit to this Association, except by the human limitations of the personnel involved.

The members of the Committee on Sanitary Procedure are devoting much time and effort to the study of the tentative standards presented to them. They ask, in recognition of this service to the Association, the tangible support of the membership, as evidenced by the general acceptance and application of the standards approved.

C. A. A.

Postwar Improvement in Milk Sanitation

Now that the fighting is over, it is high time for health officers, milk sanitarians, and the milk industry to raise their sights on milk sanitation. The conditions which forced a lowering of milk quality are fast losing their grip. It is time we all took stock of the wreckage and set to work to reconstruct our milk control programs and to restore public confidence in our milk supplies.

That milk quality has deteriorated during the war period can be denied by no one with a seeing eye and an open mind. It is evident in the sanitation ratings of milk sheds submitted to USPHS by State health departments. Many cities which had achieved ratings of 90 percent or more before the war have fallen by the wayside. Some areas experiencing extreme milk shortages have been forced to use uninspected or ungraded supplies rating 30–40 percent as compared to 80–90 percent for the inspected supplies. Worse still, the rating of pasteurization plants in some communities has slumped to below 50 percent. Bacteriological tests made by USPHS mobile laboratories reveal an equally unsatisfactory situation in many parts of the country. Quite frequently milk supplies are being used that show counts of well over 1,000,000 before pasteurization and over 100,000 after pasteurization, with positive phosphatase tests and numerous coliform organisms. To complete the picture, disease outbreaks from pasteurized milk and milk products compiled by USPHS increased from 6 in 1942 to 14 in 1943. Even the dairy industry journals are preaching improved quality of milk and dairy products to dealers who want to retain their business in the postwar competition.

A brief diagnosis of contributing causes may offer a hint as to the proper course of treatment to effect a cure. For the most part the factors responsible for lowered milk quality were war-connected and are now a matter of history. Many experienced milkers on the farm and milk plant employees in the city were inducted into the military services or were enticed by the higher pay of war industries, to be replaced, if at all, by inexperienced workers with no background of milk sanitation. The shortage of critical materials used in the manufacture of dairy equipment and in the transportation of milk affected both the milk producer and the dairy plant. Price ceilings were such as to offer no adequate differentials (a) between manufacturing milk and fluid milk so as to encourage diversion to fluid milk channels, and (b) between grade A and lower

grades so as to maintain high-grade production. To top things off, milk control staffs were depleted and their replacement with qualified sanitarians became increasingly difficult; thus, when public health supervision was needed most it became least effective.

These conditions existed nation-wide. They were aggravated, in many Southern cantonment and war-industry areas, by critical shortages of supplies of fluid milk arising from huge influxes of population. Measures for meeting the abnormal demand included the promotion of increased production by existing market milk producers, the geographic expansion of existing milk sheds, the importation of surpluses from outside milk sheds, sometimes not under supervision, the diversion of inspected milk from dairy products to fluid channels, and the diversion of uninspected milk from manufacturing producers. In some areas standards had to be lowered and excellent control programs were disrupted; lower grades of milk were permitted; grade labeling was abandoned. Fortunately, most State health officers opposed the pooling of high grade and low grade milk and the elimination of grade labels.

The more squarely we face the facts of wartime deterioration of milk quality, the sooner we can dig into the work of reconstruction. Now is the time to begin reconversion. Where necessary, standards must be restored, enforcement improved, new equipment provided on the farm, at the dairy, and for transportation. Proper handling of milk by producers and processors must be achieved through educational training courses for producers and plant operators, with a view to future licensing of operators. Some thought might be devoted to increased pasteurization or even compulsory pasteurization, as well as to the adoption of standards to insure the safety of cheese. Last, but not least, inservice training courses should be instituted for milk control staffs.

A. W. F.

Oklahoma—We Welcome You

SOME of the old-timers in milk control work recall the days when sanitation in the milk industry received its preponderant emphasis along the Atlantic seaboard. But thanks be, the center of gravity of this interest is moving west. The most recent group of milk sanitarians to become an affiliate of the INTERNATIONAL ASSOCIATION OF MILK SANITARIANS is the newly organized Oklahoma Association of Milk Sanitarians. It seems that the same energy and industry and vision that has raised this great state to industrial eminence is exerting its influence in the milk field. Just as surely as "a city set on a hill cannot be hid," so an up and coming community makes itself known by the character of the accomplishments of its sons. There is just something about milk control that stimulates enthusiasm, hard work, and collaboration among its operators. Oklahoma is widely known for its oil, but we prize just as much the things that widen the horizons of the spiritual vision in the interest of human welfare. We feel this stimulus from great Oklahoma. Greetings, fellow milk sanitarians!

J. H. S.

The Relationship of Sediment to the Flavor of Milk

J. C. MARQUARDT

New York State Department of Agriculture and Markets

THE consumer judges milk mainly by its flavor, appearance and price. Unclean flavors are very objectionable.

During 1944 the author demonstrated that when more than 25 percent of the milk received contained excessive amounts of sediment, an unclean flavor was developed in a mixed tank of milk. This according to numerous observations took place in less than 6 hours even when the milk was cooled and held at 40° F. or below.

Following these observations, the milk supplies of five large milk companies were "cleaned up". After this program, the milk was satisfactory to the consumer after 7 days of storage in a 40° F. refrigerator. This milk was scored each day for 7 consecutive days from a quart not previously opened. The milk when bottled scored from 22.0 to 23.5. After 7 days, the scores ranged from 21.0 to 22.0. This is considered a satisfactory milk. Before the program started, frequently the freshly bottled milk scored as high as 22.0. However, after 2 days the score was down to 19.0; a flavor quality that is objected to by many consumers. These numerical values were given to establish the relationship between consumers' acceptance and laboratory ratings. The flavor rating system will be discussed.

The findings obviate the fact that sediment in milk, poor flavor, and high bacteria counts are related. A project was organized to get data on these points. The interest in the project was stimulated by Public Health Officials who clearly indicated that there was a need for keeping milk physically clean.

PROCEDURE

In this project 3 plants were selected. Two were approved for the New York City fluid market; and the third one was approved for New York City to produce cream and products for manufacturing ice cream. The one fluid plant located in New York State had 97 producers; the other one located in Pennsylvania received milk from 150 farmers. The manufacturing plant located in New York State received milk from 140 farmers. The fluid plants are referred as as A and C; the manufacturing milk plant will be designated as B.

At the New York State fluid plant, 31 producers delivering from 4 to 20 cans daily during June were selected. They collectively delivered on the average 215 cans of milk each day. Six producers delivered 10 or more cans each day.

At the New York State plant approved for manufacturing milk for New York City, 20 of the 140 producers were selected. They delivered from 2 to 14 cans daily; 7 delivered 10 or more cans. Their total daily delivery averaged 150 cans.

At the Pennsylvania plant, 34 of the 150 farmers were selected. They delivered from 2 to 14 cans daily. Their total cans daily averaged 256 during the first 2 weeks of July. Eight producers delivered 10 or more cans daily.

The plan was to take a sediment test of each can of milk delivered at each plant for three consecutive days. The sediments were taken "off-the-bottom" of the can with L. and W. and Karkoff testers. Each disc was mounted. For each patron a weigh can composite was

PLATE 1

THE TYPE OF INFORMATION GATHERED AT THE FARM

Date .....

Patron's Number ..... Patron's Name .....
Address: City ..... State .....
Ships To: ..... No. of Cans .....
Breed of Cows ..... No. Milking .....
Hand Milked ..... Machine Milked .....
Milking Done by Owner ..... by Hired Help ..... by Children .....
Number of Milkers ..... or Units .....
Milking Machine Is New ..... Is Old ..... Make .....
Uses Cotton: Size ..... Type ..... Mfg. .....
Uses Flannel: Size ..... Type ..... Mfg. .....
Where Purchased .....
Type of Strainer ..... No. of Strainers .....
Strainer: Size ..... Type ..... Capacity .....
Where Purchased .....
Producer Has Milk House: Yes ..... No .....
Condition of Equipment: Good ..... Fair ..... Bad .....
Cooling of Milk: Mechanical ..... Ice ..... Water .....
Filters Milk in: Milk House ..... Barn ..... Outside .....
Milk Delivered by: Contract Hauler ..... Company Hauler ..... Local .....
Can Storage: Milk House ..... Barn ..... Outside .....
Cans are stored while empty with: Lids Up ..... Lids Down ..... Lids Off .....
Cans are stored while full with: Lids Up ..... Lids Down ..... Lids Off .....
Are Cans Rinsed before Using? Yes ..... No .....
Sediment Condition of Rinse Water Is: Good ..... Bad .....
Physical Condition of Strainer Picked Up: Good ..... Bad .....
Approximate Age of Strainer Picked Up: .....
Name of Strainer Left on Farm .....
Number of Strainers Left on Farm .....
Size and Type of Disks Left on Farm .....
Farmer's Reception: Good ..... Enthusiastic ..... Indifferent .....

GENERAL FARM CONDITION:

Barn Yard: 1. Good ..... Fair ..... Bad ..... 2. Wet ..... Dry .....
Buildings: 1. Good ..... Fair ..... Bad .....
Pastures: 1. Low Land ..... High Land .....

SEDIMENT TESTS:

		1.	2.	3.	4.
Before Checking Farms	First Day				
	Second Day				
	Third Day				
After Checking Farms		1.	2.	3.	4.
	First Day				
	Second Day				
	Third Day				

Flavor Score Before Checking Farms: 1. 2. 3. .....

Flavor Score After Checking Farms: 1. 2. 3. .....

BY .....

taken in a sterile bottle for flavor rating. The milk in bad number 4 cans was also sampled for flavor rating. Breed smears were made from the complete delivery of each patron each day. Smears were also prepared of cans containing excessive amounts of sediment.

The flavor rating was applied when the samples were taken and again after being held 4 to 6 hours at room temperature. All flavor ratings were conducted so that the scoring could not be associated with the patrons' number, his sediment or bacteria count ratings. The flavor rating system approved by the American Dairy Science Association was followed. Breed smears were made according to the Standard Methods of the American Public Health Association, 7th Edition. The sediment standards adopted in 1942 by the Illinois Department of Agriculture, Division of Foods and Dairies were followed.

After a 3 day period, the producers were visited. They were supplied with adequate filtering discs and new approved strainers. Then the same procedure of applying flavor ratings, sediments and smears for 3 consecutive days was followed.

The New York State plants were studied during June; and the Pennsylvania plant observations were made during July. At the conclusion of the work, the results were summarized. The general form used for each patron is given in Plate 1.

In the first preliminary statistical measurements, the supplies were rated on sediment as to No. 1, 2, 3 and 4 milk according to the 4 standards of the Illinois classification. However, a check-up on the data revealed that all graders do not agree on what constitutes a No. 3 and a No. 4. There was no disagreement on the percentage of No. 1 and 2's as against 3 and 4's by all graders. Therefore, in the final statistical evaluation the milk was graded as satisfactory when No. 1 or 2; and unsatisfactory when No. 3 or 4.

After tabelizing the results, discussing them and presenting the conclusions, a control program was formulated based upon a summary of the study.

RESULTS

Four tables are presented to give flavor and sediment correlations. The bacteriological values are presented without tabelization.

At the start of the project, five experienced men in grading sediment pads recorded their conception of No. 4's in two series. One series contained 163 and the other 226 pads. In series 1 the No. 4's selected by the five men individually were: 36, 53, 63, 78 and 78. In series 2, the No. 4's selected by the five men individually were 35, 36, 45, 57 and 96. In their classification trials all five agreed on the number of Nos. 1 and 2. as against the Nos. 3 and 4. This, therefore, became the standard for the sediment evaluations.

Irregularities of no significance in the tables are due to the fact that the percentage change from unsatisfactory to satisfactory milk was great after the improvement program was under way. Furthermore, in recording two classes including Nos. 1 and 2, and Nos. 3 and 4, there was no recognition given to the percentage of each grade in each classification. Weather conditions and the fact that a general clean-up was followed along with the special attention to filtering after the program was started, account for some of the improvement in the milk. The bacteriological values are used mainly to correlate flavors with low scores when the sediment was not a factor.

The results allow for the percentage of irregularities in rating milk on flavor. This factual matter is given before discussing the results in detail, so as to clarify minor irregularities which cannot be avoided in a study of this nature regardless of the extensiveness of the project.

The results in Table 1 show that over 55 percent of all the samples at

TABLE 1

THE RELATIONSHIP OF THE PERCENTAGE OF UNCLEAN MILK TO THE FLAVOR SCORE BEFORE AND AFTER THE IMPROVEMENT PROGRAM

Before Improvement Program

Day	Plant A			Plant B			Plant C		
	% *	Flavor Range	Av.	% *	Flavor Range	Av.	% *	Flavor Range	Av.
1	50.9	18.0–21.0	19.6	65.4	19.0–22.0	20.4	37.0	12.5–21.5	20.3
2	59.0	17.5–21.5	20.1	57.4	19.5–22.0	20.4	22.0	19.0–21.5	20.3
3	77.4	17.5–21.0	19.3	55.8	17.5–21.5	19.9	55.0	18.0–21.5	19.6

After Improvement Program

Day	Plant A			Plant B			Plant C		
	% *	Flavor Range	Av.	% *	Flavor Range	Av.	% *	Flavor Range	Av.
1	26.4	.....	....	34.6	18.0–21.5	20.7	17.0	.....	....
2	16.9	19.5–22.5	21.6	19.8	20.0–22.5	21.1	17.0	19.5–22.5	21.4
3	15.0	20.5–23.0	21.6	18.9	21.0–22.5	21.5	9.0	20.0–22.5	21.8

* % refers to percent unclean milk (Nos. 3 and 4)

the 3 plants before the clean-up were unclean: This value after the program was reduced to less than 19 percent. These percentages are based upon the total number of 3 and 4 sediment pads. The flavor score was increased from an average of all plants before the clean-up from 19.9 to 21.5 after the program. Table 1 like the others must be studied in detail for an appreciation of a statistical evaluation of a program that involves over 1,000 flavor determinations and more than 3,000 individual can sediment tests.

The values in Table 2 show that a patron's flavor score is related to the percentage of clean milk delivered. That is an increase in the percentage

TABLE 2

THE RELATIONSHIP OF FLAVOR TO THE PERCENTAGE OF UNCLEAN MILK BEFORE AND AFTER THE IMPROVEMENT PROGRAM

Before Improvement Program

Percentage Unclean Milk (Nos. 3 and 4)	Plant A			Plant B			Plant C		
	No.*	F. Range	Av.	No.	F. Range	Av.	No.	F. Range	Av.
0.0 to 0.0	13	19.0–21.5	20.1	9	20.0–22.0	20.8	33	19.0–21.5	20.5
0.0 to 24.9	4	19.0–21.5	19.8	1	20.5–20.5	20.5	18	19.0–21.5	20.1
25.0 to 49.9	8	18.0–21.5	19.6	4	20.0–21.5	20.5	21	18.5–20.0	19.8
50.0 to 74.9	16	18.5–20.0	19.5	20	18.5–21.5	20.1	3	18.0–19.5	19.7
75.0 to 99.9	17	18.5–21.0	19.4	11	18.5–22.0	20.0	15	18.0–19.5	19.6
100.0	26	18.0–21.5	19.3	27	17.5–21.5	19.5	9	12.5–19.5	19.6
Totals and Mean Values	84	18.0–21.5	19.6	72	17.5–22.0	20.2	99	12.5–21.5	19.9

After Improvement Program

Percentage Unclean Milk (Nos. 3 and 4)	Plant A			Plant B			Plant C		
	No.*	F. Range	Av.	No.	F. Range	Av.	No.	F. Range	Av.
0.0 to 0.0	34	21.0–23.0	21.8	15	20.0–22.0	21.5	32	19.5–22.5	21.7
0.0 to 24.9	11	21.5–22.5	21.8	13	19.5–22.5	21.4	12	19.5–22.5	21.5
25.0 to 49.9	6	21.0–22.5	21.7	14	19.5–22.5	20.8	16	19.5–22.5	21.5
50.0 to 74.9	5	21.5–22.5	22.0	11	19.5–22.0	20.8	4	19.5–21.5	21.0
75.0 to 99.9	3	21.5–21.5	21.5	1	19.5–19.5	19.5	4	19.5–21.5	21.0
100.0	1	21.5–21.5	21.5	2	19.5–21.0	20.2	0	.....	....
Totals and Mean Values	** 60	21.0–23.0	21.7	56	19.5–22.5	20.7	68	19.5–22.5	21.2

* No. of deliveries and including separate No. 4 can samples.
** Variation in number of deliveries before and after program is due to no flavor ratings being made on some producers due to shortage in personnel.

of 1 and 2's over 3 and 4's. The percentage of clean milk delivered was increased as a result of the program. The average flavor score before the program was 19.9, and after the program 21.2. The dirtiest milk delivered scored 19.4 before the program, and 20.8 after the clean-up. A score of 20.5 was the average of all the cleanest milk before the program; this value was increased to 21.6 after the clean-up.

Table 3 reveals that it was possible to increase the percentage of clean milk received at all plants from 27.7 to 66.6 percent as a result of the clean-up program. The flavor score increased from 20.4 to 21.6 as a result of the program.

The values in Table 4 show that aging at 70° F. for 4 to 6 hours decreases the flavor score of dirty milk more than it does in the case of clean milk. The flavor score of held milk decreased .5 before the program; and the averages for the 3 plants revealed that the cleaner milk after the program did not significantly change in flavor score as a result of being held.

The data showed that clean milk kept better than dirty milk. Pasteurizing the samples did not materially change the flavor scores. Poor scoring milk and high scoring milk on flavor did not have their scores significantly changed as a result of pasteurization.

As previously stated evaluating milk flavor scores must allow for tolerances due to the human factor. The bacteria counts were used in this respect to check irregularities in flavor

TABLE 3

THE RELATIONSHIP OF FLAVOR TO THE PERCENTAGE OF SATISFACTORY MILK ON SEDIMENT BEFORE AND AFTER THE IMPROVEMENT PROGRAM

Before Improvement Program

*Percentage Satisfactory * Milk (Nos. 1 and 2)*			*Plant A*		*Plant B*		*Plant C*	
Plant A	*Plant B*	*Plant C*	*Flavor Range*	*Av.*	*Flavor Range*	*Av*	*Flavor Range*	*Av.*
20.2	13.8	49.0	19.0–21.5	20.0	20.0–22.0	20.8	19.0–21.5	20.5

After Improvement Program

*Percentage Satisfactory * Milk (Nos. 1 and 2)*			*Plant A*		*Plant B*		*Plant C*	
Plant A	*Plant B*	*Plant C*	*Flavor Range*	*Av.*	*Flavor Range*	*Av.*	*Flavor Range*	*Av.*
74.9	50.1	75.0	21.0–23.0	21.8	19.5–22.5	21.5	19.5–22.5	21.5

* In this table all patrons milk with 75 per cent or more of the cans classified as Nos. 1 and 2 is considered as satisfactory milk.

TABLE 4

THE RELATIONSHIP OF FLAVOR WHEN FRESH AND HELD AT 70° F. FOR 4 TO 6 HOURS BEFORE AND AFTER THE IMPROVEMENT PROGRAM

Before Improvement Program

	Plant A		*Plant B*		*Plant C*	
	Range	*Average*	*Range*	*Average*	*Range*	*Average*
Fresh Score	17.5–21.5	19.6	17.5–22.0	20.2	12.5–21.5	20.0
Held Score *	17.5–21.5	19.0	17.5–21.5	19.6	12.5–21.5	19.5

After Improvement Program

	Plant A		*Plant B*		*Plant C*	
	Range	*Average*	*Range*	*Average*	*Range*	*Average*
Fresh Score	19.5–23.0	21.6	18.0–22.5	21.1	19.5–22.5	21.4
Held Score	19.5–23.0	21.5	19.0–22.5	21.0	19.5–22.5	21.5

* Held Score refers to samples held at 70° F. for 4 to 6 Hours.

scores, when it was not possible to associate flavor scores with the physical cleanliness of the milk.

On August 29, 1945, sediment tests were taken at the New York State plant approved for fluid milk. The plant manager was interviewed. At this plant 76 out of 87 sediment pads were classified as satisfactory, No. 1 and 2's. This means that 87 percent of the milk was satisfactory, and that the clean-up program had a lasting effect. The patrons supplied with special strainers and 6½ inch single service cotton discs produced 90 percent satisfactory milk. The manager commented that the program had resulted in the production of cleaner milk by all the producers. He reported further that the producers using new strainers and 6½ inch single service cotton discs were obtaining good results in every case.

On August 30th the New York State plant approved for manufacturing was revisited. At this plant 79 of the 152 sediments taken showed satisfactory milk. This is 52 percent. In contrast to this, 16 of the 20 patrons supplied with new strainers and the 6½ inch single service cotton discs produced satisfactory milk. This is 80 percent. The results at this plant are readily explained. The 48 percent delivering unsatisfactory milk were using low quality pads or flannel. These materials were not satisfactory to remove the type of dirt which was being encountered. A check-up at the plant revealed that 75 percent of the patrons were using flannel.

The observations at both plants indicate that producers using approved strainers and 6½ inch single service cotton discs can produce satisfactory milk.

DISCUSSION

These studies provided sufficient data to statistically evaluate the flavor of milk as it is related to dirt in milk.

It is common knowledge that dirty flavored products result when a high percentage of dirt is in the milk as delivered. The condensing industry and cheese manufacturers accept this as common knowledge.

These studies have revealed the importance of keeping dirt out of milk. The importance of immediately removing dirt particles that enter the milk pail has also been shown.

Flavor scores are important to producers. As a rule the consumer accepts milk with the flavor score of 21.5. The normal range is from 18.0 to 23.0. Milk scoring 19.5 or lower is objectionable to the consumer. Many detect flavor defects in milk scored 20.5 by experts.

Properly filtered milk will hold a score of 21.5 for 1 week in the average mechanical household refrigerator as commonly operated. Milk delivered to a plant with excess sediment cannot be processed into a fluid milk that will hold a satisfactory flavor for more than 2 or 3 days.

This study and closely related ones in progress indicate clearly that bad mastitis conditions and high counts frequently decrease as more attention is given to keeping the milk physically clean.

CONCLUSIONS

1. This study reveals that the percentage of clean milk produced can be increased through a well organized clean-up program. With a proper program 80 to 90 percent of the milk received can be rated clean milk.

2. The flavor of milk is improved in flavor as the percentage of clean milk delivered is increased.

3. The flavor of clean milk deteriorates slower than unclean milk when subjected to 4 to 6 hour holding periods at temperature of 70° F.

4. A check-up after 60 days revealed that a properly conducted clean-up program has lasting effectiveness.

5. Proper equipment and material along with guidance in the use of filtering material are essential in a sediment control program.

6. After physical sediments are taken, the patrons delivering unsatisfactory milk should be notified. This should be followed with re-inspections within 15 day periods until the set standard for cleanliness is attained.

7. The use of mounted and dried single service cotton discs by the producer proved to be most effective as a sediment check-up. It affords a farm check-up on the progress in keeping milk physically clean.

PROPOSED PROGRAM

1. It is proposed that each patron receive an approved strainer and satisfactory filtering material.

2. It is proposed that the producer be instructed to properly filter milk; and that he save his pads from one milking to the next to study his sediment condition.

3. Regular sediment tests should be taken twice each month. A system should be set up to check the improvement of each producer.

ACKNOWLEDGMENTS

The author acknowledges the cooperation and field service work of C. B. A. Bryant, Ralph L. Oliver, Fred M. Miller and L. C. Kimmer of Johnson and Johnson, Filter Products Division. Acknowledgment for plant service is due M. H. Roman and J. K. Wardwell, New York State Department of Agriculture and Markets.

The metal strainers used were: No. 718 of Superior Metal Products Co., No. S816 of Kleiner-Williams Co., Sky Tests Cream City Strainer of Geuder-Paeschke & Frey Co., New Style-Creamery Package Mfg. Co., Dome Type—Buhl Manufacturing Co., and Open-face Baffle—Atlantic Stamping Company. Single Service Cotton Discs used were 6½ inch Rapid-Flo.

THE FIFTEENTH ANNUAL STATE COLLEGE OF WASHINGTON INSTITUTE OF DAIRYING

March 4–8, 1946

After 3 years of interruption by World War II, the State College of Washington is planning for its Fifteenth Annual Institute of Dairying, which in former years has attracted over 200 outside visitors.

Post-war problems of the industry will be discussed from all angles by industry leaders and research authorities in the fields of production, processing, quality control and merchandising. Time will be set aside during the week for discussion of problems of the dairy producer and of the cheese, butter, market milk, ice cream, and concentrated milk industries, of marketing, laboratory, field, and inspection work and, in short, every phase of industry activity.

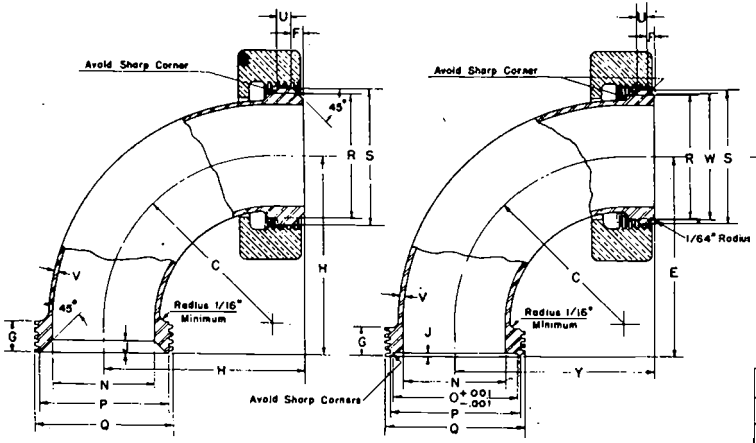
Quality production will be the keynote of the institute, and to help promote quality, scoring and judging contests for various dairy products along with dairy products clinics will be held with competent judges and production experts in charge.

Anyone interested in any phase of the dairy industry is welcome to attend the lectures and demonstrations and participate in the discussions and contests. A tuition of $5.00 for the week or $2.50 per day will be charged to help defray the expenses of the institute. Address all inquiries to H. A. Bendixen, Acting Head, Department of Dairy Husbandry, Pullman, Washington.

REPORT OF COMMITTEE ON SANITARY PROCEDURE

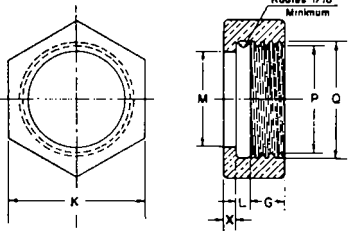
The Committee on Sanitary Procedure of the International Association of Milk Sanitarians has considered the planograph drawings of twenty-seven sanitary milk-piping fittings submitted to it by the chairman of the Sanitary Standards Subcommittee of the Dairy Industry Committee, on July 30, 1945. These designs have now been approved by the Committee and are submitted herewith.

Fittings	*Drawings*
No. 2F Bend (Ground Seat Type)	Ex 13190
No. 2FG Bend (Gasket Type)	"
No. 13-H Hex Nut	"
No. 32-15G Reducer	Ex 13191
No. 32-15 Reducer	"
No. 15RG Ferrule	Ex 13192
No. 15R Ferrule	"
No. 14R Ferrule	"
No. 14RG Ferrule	"
No. 16A Cap	"
No. 16AG Cap	"
No. 7BG Tee	Ex 13233
No. 7AG Tee	"
No. 7B Tee	Ex 13234
No. 7A Tee	"
10-BF Valve	Ex 13235
30-F Angle Valve	"
33-F Can Filler	"
10-BFG Valve	Ex 13236
30-FG Angle Valve	"
33-FG Can Filler	"
No. 31-15G Reducer	Ex 13237
No. 31-15 Reducer	"
No. 2P Bend (Ground Seat Type)	Ex 13238
No. 2PG Bend (Gasket Seat Type)	"
No. 2K Bend (Ground Seat Type)	"
No. 2KG Bend (Gasket Seat Type)	"



#2F BEND
. GROUND SEAT TYPE

#2FG BEND
GASKET TYPE



#13-H HEX NUT

SIZE	Acme Thds Per In	G	K	L	M	P	Q	X
1"	8	1/2"	1.812"	1/4"	1.192"	1.352"	1.497"	9/32"
1 1/2"	8	1/2"	2.407"	1/4"	1.708"	1.884"	2.029"	7/32"
2"	8	19/32"	3.001"	1/4"	2.224"	2.416"	2.561"	7/32"
2 1/2"	8	23/32"	3.595"	1/4"	2.740"	2.948"	3.093"	7/32"
3"	8	27/32"	4.191"	1/4"	3.256"	3.480"	3.625"	1/4"
4"	8	1"	5.420"	1/4"	4.288"	4.544"	4.730"	1/4"

Revised - 4-14-45

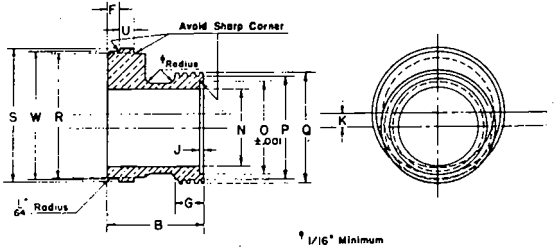
SIZE	Acme Thds Per In	C	E	Ground Seat Type F	Ground Seat Type G	Ground Seat Type J	Gasket Type F	Gasket Type G	Gasket Type J	H	N	O	P	Q	R	S	Ground Seat U	Gasket Type U	V Min.	W	Y
1"	8	1 1/2"	1 7/8"	1/8"	3/8"	3/16"	3/32"	1/2"	.062"	2"	.902"	1.219"	1.317"	1.462"	1.160"	1.316"	1/8"	3/32"	3/64"	1.187"	1 15/16"
1 1/2"	8	2 1/4"	2 3/4"	2/32"	3/8"	3/16"	1/32"	1/2"	.062"	2 7/8"	1.402"	1.750"	1.849"	1.994"	1.676"	1.848"	1/8"	3/32"	7/64"	1.718"	2 25/32"
2"	8	3"	3 9/16"	8/32"	29/32"	7/32"	3/32"	9/16"	.062"	3 13/32"	1.870"	2.250"	2.381"	2.526"	2.192"	2.380"	1/8"	3/32"	1/8"	2.218"	3 5/8"
2 1/2"	8	4"	4 5/16"	3/16"	31/32"	1/4"	4/32"	11/16"	.062"	4 27/32"	2.370"	2.750"	2.913"	3.058"	2.708"	2.912"	1/8"	1/8"	9/64"	2.718"	4 3/4"
3"	8	5"	5 23/32"	1/8"	1 5/32"	1/4"	5/32"	13/16"	.062"	5 29/32"	2.870"	3.312"	3.445"	3.590"	3.224"	3.444"	1/8"	1/8"	5/32"	3.280"	5 13/16"
4"	6	7"	7 7/8"	1/4"	1 1/16"	1/4"	7/64"	7/8"	.062"	8 1/16"	3.834"	4.312"	4.509"	4.695"	4.256"	4.508"	1/8"	1/8"	7/16"	4.280"	7 25/64"

SUPERSEDES DRWG. EX-11180

STANDARD DIMENSIONS
BEVEL AND GASKET JOINT
SANITARY FITTINGS

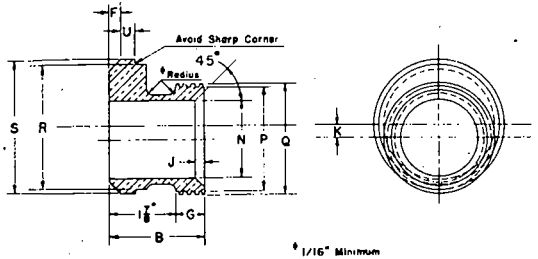
DAIRY INDUSTRY COMMITTEE

DRAWN BY L.M.M. DATE 11-5-44
NO. EX 13190



Size	Acme Thds. Per In.	B	F	G	J	K	N	O	P	Q	R	S	U	W
1½"x1"	8	2 29/32"	3/32"	1/2"	.062"	.250"	.902"	1.219"	1.317"	1.462"	1.676"	1.848"	3/32"	1.718"
2"x1"	8	2 29/32"	3/32"	1/2"	.062"	.484"	.902"	1.219"	1.317"	1.462"	2.192"	2.380"	3/32"	2.218"
2"x1 1/2"	8	2 29/32"	3/32"	1/2"	.062"	.234"	1.402"	1.750"	1.849"	1.994"	2.192"	2.380"	3/32"	2.218"
* 2½"x1"	8	2 29/32"	3/32"	1/2"	.062"	.734"	.902"	1.219"	1.317"	1.462"	2.708"	2.912"	1/8"	2.718"
2½"x1½"	8	2 29/32"	3/32"	1/2"	.062"	.484"	1.402"	1.750"	1.849"	1.994"	2.708"	2.912"	1/8"	2.718"
2½"x2"	8	2 11/32"	3/32"	5/16"	.062"	.250"	1.870"	2.250"	2.381"	2.526"	2.708"	2.912"	1/8"	2.718"
* 3"x1"	8	2 3/32"	3/32"	1/2"	.062"	.964"	.902"	1.219"	1.317"	1.462"	3.224"	3.444"	1/8"	3.280"
3"x1½"	8	2 3/32"	3/32"	1/2"	.062"	.734"	1.402"	1.750"	1.849"	1.994"	3.224"	3.444"	1/8"	3.280"
3"x2"	8	2 11/32"	3/32"	5/16"	.062"	.500"	1.870"	2.250"	2.381"	2.526"	3.224"	3.444"	1/8"	3.280"
3½"x2½"	8	2 7/16"	3/32"	21/32"	.062"	.250"	2.370"	2.750"	2.913"	3.058"	3.224"	3.444"	1/8"	3.280"
* 4"x1"	8	2 25/64"	7/64"	1/2"	.062"	1.466"	.902"	1.219"	1.317"	1.462"	4.256"	4.508"	1/8"	4.280"
* 4"x1½"	8	2 25/64"	7/64"	1/2"	.062"	1.216"	1.402"	1.750"	1.849"	1.994"	4.256"	4.508"	1/8"	4.280"
4"x2"	8	2 19/64"	7/64"	5/16"	.062"	.982"	1.870"	2.250"	2.381"	2.526"	4.256"	4.508"	1/8"	4.280"
4"x2½"	8	2 25/64"	7/64"	21/32"	.062"	.732"	2.370"	2.750"	2.913"	3.058"	4.256"	4.508"	1/8"	4.280"
4"x3"	8	2 29/64"	7/64"	23/32"	.062"	.482"	2.870"	3.312"	3.445"	3.590"	4.256"	4.508"	1/8"	4.280"

* 32-15G REDUCER



SIZE	Acme Thds. Per In.	B	F	G	J	K	N	P	Q	R	S	U
1½"x1"	8	2½"	3/32"	9/16"	3/16"	.250"	.902"	1.317"	1.462"	1.676"	1.848"	1/8"
2"x1"	8	2½"	3/32"	9/16"	3/16"	.484"	.902"	1.317"	1.462"	2.192"	2.380"	1/8"
2"x1½"	8	2½"	3/32"	9/16"	3/16"	.234"	1.402"	1.849"	1.994"	2.192"	2.380"	1/8"
* 2½"x1"	8	2½"	3/16"	9/16"	3/16"	.734"	.902"	1.317"	1.462"	2.708"	2.912"	1/8"
2½"x1½"	8	2½"	3/16"	9/16"	3/16"	.484"	1.402"	1.849"	1.994"	2.708"	2.912"	1/8"
2½"x2"	8	2 19/32"	3/16"	23/32"	1/16"	.250"	1.870"	2.381"	2.526"	2.708"	2.912"	1/8"
* 3"x1"	8	2½"	3/16"	9/16"	3/16"	.984"	.902"	1.317"	1.462"	3.224"	3.444"	1/8"
3"x1½"	8	2½"	3/16"	9/16"	3/16"	.734"	1.402"	1.849"	1.994"	3.224"	3.444"	1/8"
3"x2"	8	2 19/32"	3/16"	23/32"	7/32"	.500"	1.870"	2.381"	2.526"	3.224"	3.444"	1/8"
3½"x2½"	8	2 23/32"	3/16"	27/32"	1/4"	.250"	2.370"	2.913"	3.058"	3.224"	3.444"	1/8"
* 4"x1"	8	2½"	1/4"	9/16"	3/16"	1.466"	.902"	1.317"	1.462"	4.256"	4.508"	1/8"
* 4"x1½"	8	2½"	1/4"	9/16"	3/16"	1.216"	1.402"	1.849"	1.994"	4.256"	4.508"	1/8"
4"x2"	8	2 23/32"	1/4"	23/32"	7/32"	.982"	1.870"	2.381"	2.526"	4.256"	4.508"	1/8"
4"x2½"	8	2 23/32"	1/4"	27/32"	1/4"	.732"	2.370"	2.913"	3.058"	4.256"	4.508"	1/8"
4"x3"	8	2 23/32"	1/4"	27/32"	1/4"	.482"	2.870"	3.445"	3.590"	4.256"	4.508"	1/8"

** 32-15 REDUCER

Revised 4-14-45

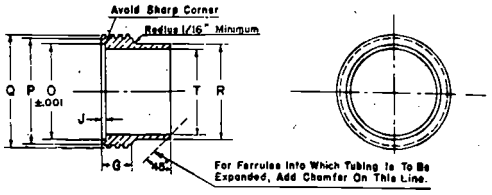
STANDARD DIMENSIONS
BEVEL AND GASKET JOINT
SANITARY FITTINGS

DAIRY INDUSTRY COMMITTEE

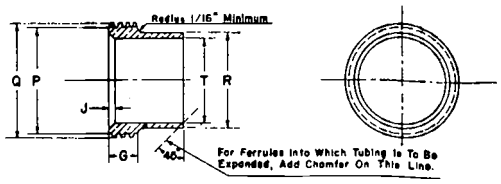
DRAWN BY L.M.M. DATE 10-2-44
APPROVED

* Special Order Only

SUPERSEDES DRWG. EX-1178



#15RG-FERRULE



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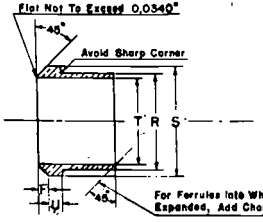

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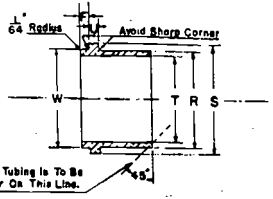

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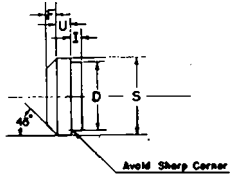
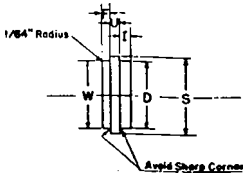


#16A-CAP



#16AG-CAP

Revised- 4-14-45

SIZE	Acme Thds Per In.	D	I	Ground Seat Type F	Ground Seat Type G	Ground Seat Type J	Gasket Type F	Gasket Type G	Gasket Type J	O	P	Q	R	S	T	Ground Seat Type U	Gasket Type U	W
1"	8	1.160"	5/32"	1/8"	5/8"	9/64"	3/32"	1/2"	.062"	1.219"	1.317"	1.462"	1.160"	1.316"	1.006"	1/8"	3/32"	1.187"
1 1/2"	8	1.676"	7/32"	5/32"	15/16"	9/64"	3/32"	1/2"	.062"	1.750"	1.849"	1.994"	1.676"	1.848"	1.505"	1/8"	3/32"	1.718"
2"	8	2.192"	7/32"	5/32"	63/64"	9/64"	3/32"	9/16"	.062"	2.250"	2.381"	2.526"	2.192"	2.380"	2.005"	1/8"	3/32"	2.218"
2 1/2"	8	2.708"	9/32"	3/16"	63/64"	3/16"	3/32"	63/64"	.062"	2.760"	2.913"	3.058"	2.708"	2.912"	2.606"	1/8"	1/8"	2.718"
3"	8	3.224"	1/4"	3/16"	63/64"	3/16"	3/32"	63/64"	.062"	3.312"	3.445"	3.580"	3.224"	3.444"	3.008"	1/8"	1/8"	3.280"
4"	8	4.258"	1/4"	1/4"	1 1/16"	11/64"	1/64"	1/8"	.062"	4.312"	4.508"	4.695"	4.256"	4.506"	4.005"	1/8"	1/8"	4.280"

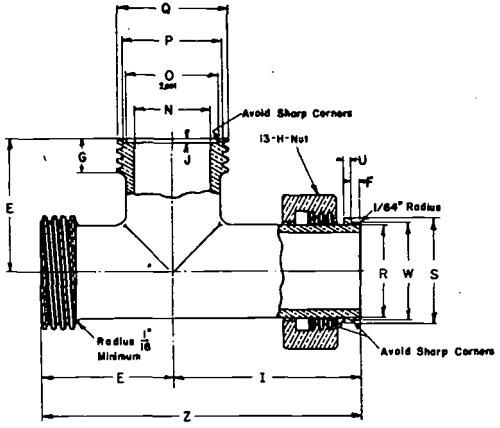
Dimensions Not Specified Are Not Standardized Since They Bear No Relation To Interchangeability.

SUPERSEDES DRWG.EX1181

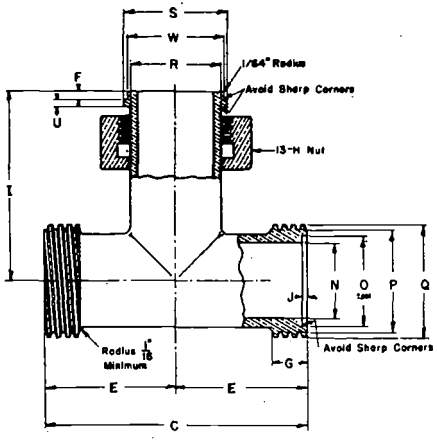
STANDARD DIMENSIONS
BEVEL AND GASKET JOINT
SANITARY FITTINGS

DAIRY INDUSTRY COMMITTEE

DRAWN BY L.M.M. DATE 10-29-44
DWG. EX 13192 F



No. 7BG-TEE



No. 7AG-TEE

Revised 4-14-45
8-27-45

SIZE	Acme Thds. Per In.	C	E	F	G	I	J	N	O	P	Q	R	S	U	W	Z
1	8	$3\frac{3}{32}$	$1\frac{11}{16}$	$\frac{3}{32}$	$\frac{1}{2}$	$2\frac{5}{32}$	.062	902	1.219	1.317	1.462	1.160	1.316	$\frac{3}{32}$	1.187	$4\frac{3}{16}$
$1\frac{1}{2}$	8	$4\frac{1}{2}$	$2\frac{1}{4}$	$\frac{3}{32}$	$\frac{1}{2}$	$3\frac{3}{16}$	.062	1.402	1.750	1.869	1.994	1.676	1.846	$\frac{3}{32}$	1.718	$5\frac{9}{16}$
2	8	$5\frac{1}{4}$	$2\frac{5}{8}$	$\frac{3}{32}$	$\frac{3}{16}$	$3\frac{23}{32}$	.062	1.670	2.250	2.381	2.526	2.192	2.380	$\frac{3}{32}$	2.218	$6\frac{11}{32}$
$2\frac{1}{2}$	8	6	3	$\frac{3}{32}$	$\frac{1}{4}$	$4\frac{5}{32}$	.062	2.370	2.750	2.913	3.058	2.708	2.912	$\frac{1}{8}$	2.718	$7\frac{5}{32}$
3	8	$6\frac{3}{8}$	$3\frac{3}{8}$	$\frac{3}{32}$	$\frac{1}{4}$	$4\frac{27}{32}$	.062	2.870	3.312	3.445	3.590	3.224	3.444	$\frac{1}{8}$	3.280	$7\frac{27}{32}$
4	6	$8\frac{15}{16}$	$4\frac{15}{32}$	$\frac{7}{64}$	$\frac{7}{8}$	$5\frac{63}{64}$	.062	3.834	4.312	4.509	4.695	4.256	4.508	$\frac{1}{8}$	4280	$10\frac{29}{64}$

Dimensions in Above Table are Shown in Inches.

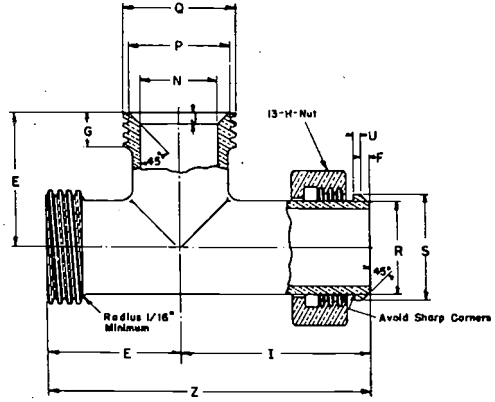
Dimensions Not Specified Are Not Standardized Since They Bear No Relation To Interchangeability.

STANDARD DIMENSIONS
FOR GASKET JOINT
--SANITARY FITTINGS

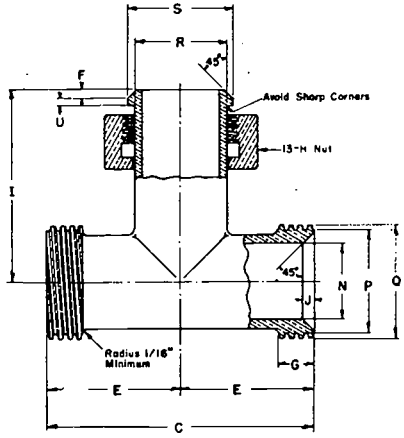
DAIRY INDUSTRY COMMITTEE

Drawn by - G.A.F. Date - 3-(3-45

Drawing No. E.P-13233



No. 7-B TEE



No. 7-A TEE

Revised 4-14-48

SIZE	Acme Thds. Per In.	C	E	F	G	I	J	N	P	Q	R	S	U	Z
1	8	$3\frac{5}{8}$	$1\frac{13}{16}$	$\frac{1}{4}$	$\frac{5}{8}$	$2\frac{11}{16}$	$\frac{3}{16}$	.902	1.317	1.482	1.160	1.316	$\frac{1}{8}$	$4\frac{1}{2}$
$1\frac{1}{2}$	8	$4\frac{3}{4}$	$2\frac{3}{8}$	$\frac{5}{16}$	$\frac{5}{8}$	$3\frac{5}{16}$	$\frac{3}{16}$	1.402	1.849	1.994	1.676	1.848	$\frac{1}{8}$	$5\frac{23}{32}$
2	8	$5\frac{5}{16}$	$2\frac{15}{16}$	$\frac{5}{16}$	$\frac{25}{32}$	$3\frac{13}{16}$	$\frac{7}{32}$	1.870	2.381	2.526	2.192	2.380	$\frac{1}{8}$	$6\frac{29}{32}$
$2\frac{1}{2}$	8	$6\frac{3}{16}$	$3\frac{3}{16}$	$\frac{5}{16}$	$\frac{27}{32}$	$4\frac{1}{4}$	$\frac{1}{4}$	2.370	2.913	3.058	2.708	2.912	$\frac{1}{8}$	$7\frac{7}{16}$
3	8	7	$3\frac{1}{2}$	$\frac{5}{16}$	$\frac{29}{32}$	$4\frac{5}{8}$	$\frac{1}{4}$	2.870	5.445	3.590	3.224	3.444	$\frac{1}{8}$	$8\frac{1}{8}$
4	6	$9\frac{1}{16}$	$4\frac{21}{32}$	$\frac{1}{4}$	$1\frac{1}{16}$	$6\frac{1}{8}$	$\frac{1}{4}$	3.834	4.509	4.695	4.256	4.508	$\frac{1}{8}$	$10\frac{23}{32}$

Dimensions in Above Table are Shown in Inches.

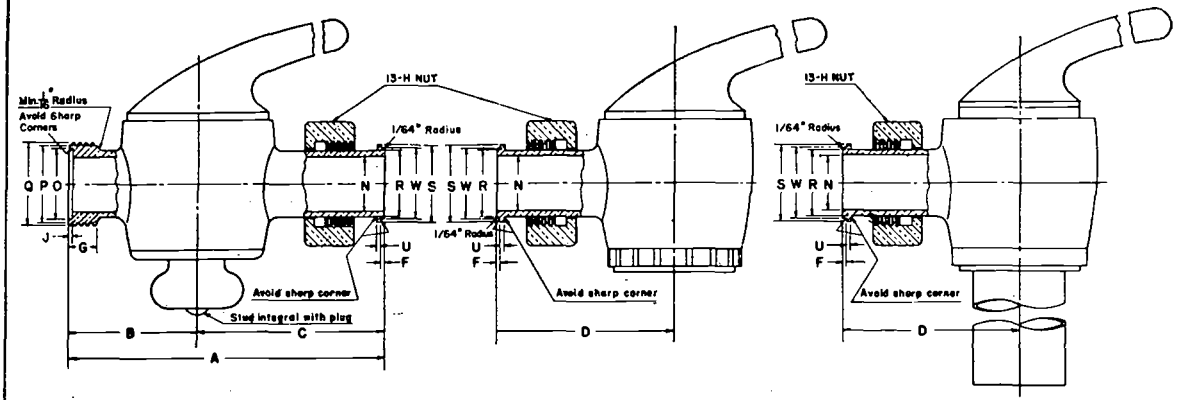
Dimensions Not Specified Are Not Standardized Since They Bear No Relation To Interchangeability.

STANDARD DIMENSIONS
FOR BEVEL JOINT
SANITARY FITTINGS

DAIRY INDUSTRY COMMITTEE

Drawn by – G.A.F. Date – 3-2-45

Drawing No. E-13234



10-BFG VALVE

30-FG - ANGLE VALVE
(1"-1½"-2"&3" SIZES ONLY)

33-FG CAN FILLER
(1½" & 2" SIZE ONLY)

SIZE	Acme Thd. Per In.	A	B	C	D	F	G	J	N	O*	P	Q	R	S	U	W
1	8	5 7/16	2 5/32	3 3/32	3 1/32	3/32	1/2	.062	.902	1.219	1.317	1.462	1.160	1.316	3/32	1.187
1½	8	6 3/4	2 23/32	3 11/32	3 27/32	3/32	1/2	.062	1.402	1.750	1.849	1.994	1.678	1.848	3/32	1.718
2	8	7 29/32	3 1/4	4 21/32	4 13/16	3/32	5/8	.062	1.870	2.250	2.381	2.526	2.192	2.380	3/32	2.218
2½	8	9 13/32	3 15/16	5 23/32	—	3/32	21/32	.062	2.370	2.750	2.913	3.058	2.708	2.912	1/8	2.718
3	8	10 15/16	4 17/32	6 13/32	5 3/4	1/32	23/32	.062	2.870	3.312	3.445	3.590	3.224	3.444	1/8	3.280
4	8	14 5/64	6 11/32	7 47/64	—	7/64	7/8	.062	3.834	4.312	4.508	4.686	4.256	4.508	1/8	4.280

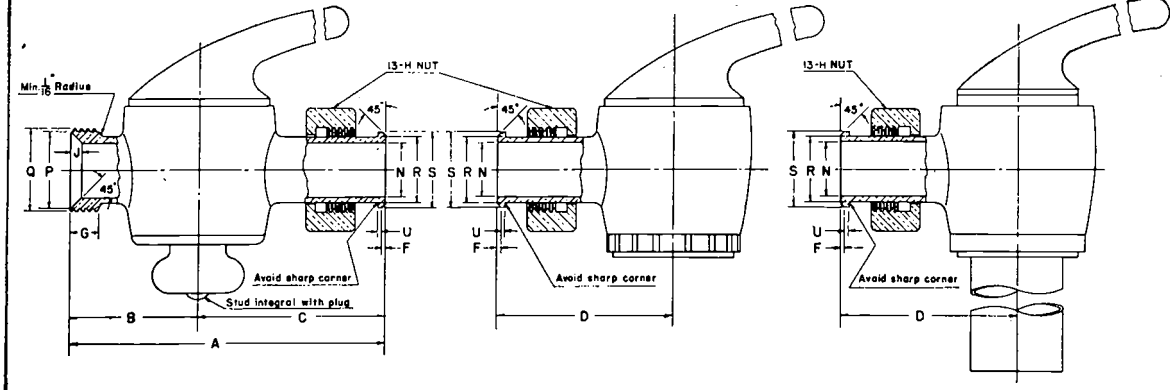
* ± .001"

Revised-4-14-45

STANDARD DIMENSIONS
GASKET JOINT
SANITARY FITTINGS

DAIRY INDUSTRY COMMITTEE

Drawn by L.M.M Date 3-12-45
No. Ex.-13236



10-BF VALVE

30-F ANGLE VALVE
(1"-1½"-2"&3" SIZES ONLY)

33-F CAN FILLER
(1½"&2" SIZE ONLY)

SIZE	Acme Thd Per In.	A	B	C	D	F	G	J	N	P	Q	R	S	U
1	8	5 5/8	2 9/32	3 11/32	3 5/32	1/8	5/8	3/16	.902	1.317	1.462	1.160	1.316	1/8
1½	8	6 31/32	2 29/32	4 1/16	3 13/16	5/32	5/8	3/16	1.402	1.849	1.994	1.678	1.848	1/8
2	8	8 5/32	3 13/32	4 3/4	4 1/2	5/32	23/32	7/32	1.870	2.581	2.026	2.192	2.380	1/8
2½	8	10	4 1/8	5 7/8	—	3/16	27/32	1/4	2.370	2.913	3.058	2.708	2.912	1/8
3	8	11 7/32	4 29/32	6 1/2	5 27/32	3/16	29/32	1/4	2.870	3.445	3.590	3.224	3.444	1/8
4	6	14 13/32	6 17/32	7 7/8	—	1/4	1 1/16	1/4	3.834	4.609	4.696	4.256	4.608	1/8

Revised 4-14-48

STANDARD DIMENSIONS
BEVEL JOINT
SANITARY FITTINGS

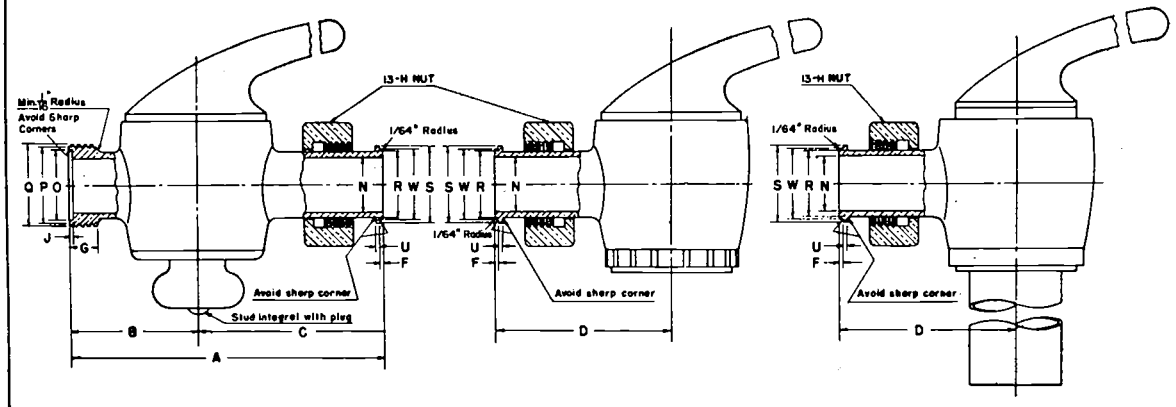
DAIRY INDUSTRY COMMITTEE

Drawn by L.M.M

Date 3-12-48

No. Ex.-13236

The following cut replaces drawing No. Ex-13236 on page 18 of the January–February issue of this JOURNAL:



10-BFG VALVE

30-FG ANGLE VALVE
(1"-1½"-2"&3" SIZES ONLY)

33-FG CAN FILLER
(1½"&2" SIZE ONLY)

SIZE	Acme Thd. per in.	A	B	C	D	F	G	J	N	O*	P	Q	R	S	U	W
1	8	5 7/16	2 5/8	3 3/32	3 3/32	3/32	1/4	.062	.902	1.219	1.317	1.462	1.160	1.316	3/32	1.187
1½	8	6 3/4	2 29/32	3 11/32	3 27/32	3/32	1/2	.062	1.402	1.750	1.849	1.994	1.678	1.848	3/32	1.718
2	8	7 29/32	3 1/4	4 21/32	4 13/32	3/32	9/16	.062	1.870	2.250	2.381	2.526	2.198	2.380	3/32	2.218
2½	8	9 23/32	3 15/16	5 29/32	—	3/32	31/32	.062	2.370	2.750	2.913	3.058	2.708	2.912	1/8	2.718
3	8	10 15/16	4 17/32	6 13/32	6 3/4	3/32	39/32	.062	2.870	3.312	3.448	3.590	3.224	3.444	1/8	3.280
4	8	14 5/64	6 11/32	7 27/64	—	7/64	7/8	.062	3.834	4.312	4.508	4.696	4.256	4.508	1/8	4.280

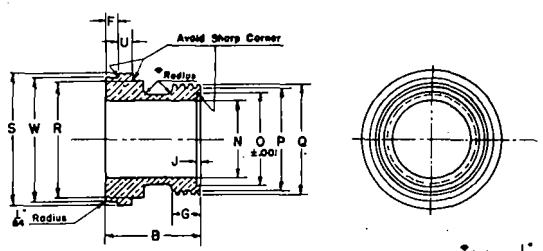
* ±.001"

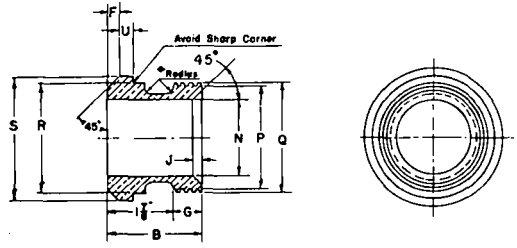
Revised-4-14-48

STANDARD DIMENSIONS
GASKET JOINT
SANITARY FITTINGS

DAIRY INDUSTRY COMMITTEE

Drawn by L.M.M. Date 3-12-48
No. Ex-13236





*Minimum 1/16 Radius

SIZE	Asme Thds. Per In.	B	F	G	J	N	O	P	Q	R	S	U	W
1½"x1"	8	2 5/32"	5/64"	1/2"	.062"	.902"	1.219"	1.317"	1.462"	1.676"	1.846"	3/32"	1.718"
2"x1"	8	2 5/32"	5/64"	1/2"	.062"	.902"	1.219"	1.317"	1.462"	2.192"	2.360"	3/32"	2.218"
2"x1½"	8	2 5/32"	5/64"	1/2"	.062"	1.402"	1.750"	1.849"	1.994"	2.192"	2.360"	3/32"	2.218"
* 2½"x1"	8	2 5/32"	5/64"	1/2"	.062"	.902"	1.219"	1.317"	1.462"	2.705"	2.912"	1/8"	2.718"
2½"x1½"	8	2 5/32"	5/64"	1/2"	.062"	1.402"	1.750"	1.849"	1.994"	2.705"	2.912"	1/8"	2.718"
2½"x2"	8	2 5/32"	5/64"	1/2"	.062"	1.870"	2.250"	2.381"	2.526"	2.705"	2.912"	1/8"	2.718"
* 3"x1"	8	2 5/32"	3/32"	1/2"	.062"	.902"	1.219"	1.317"	1.462"	3.224"	3.444"	1/8"	3.280"
3"x1½"	8	2 5/32"	3/32"	1/2"	.062"	1.402"	1.750"	1.849"	1.994"	3.224"	3.444"	1/8"	3.280"
3"x2"	8	2 5/32"	3/32"	5/8"	.062"	1.870"	2.250"	2.381"	2.526"	3.224"	3.444"	1/8"	3.280"
3½"x1½"	8	2 7/16"	3/32"	21/32"	.062"	2.370"	2.750"	2.913"	3.058"	3.224"	3.444"	1/8"	3.280"
* 4"x1"	8	2 5/32"	1/64"	1/2"	.062"	.902"	1.219"	1.317"	1.462"	4.256"	4.506"	1/8"	4.290"
* 4"x1½"	8	2 5/32"	1/64"	1/2"	.062"	1.402"	1.750"	1.849"	1.994"	4.256"	4.506"	1/8"	4.290"
4"x2"	8	2 13/64"	7/64"	5/8"	.062"	1.870"	2.250"	2.381"	2.526"	4.256"	4.506"	1/8"	4.290"
4"x2½"	8	2 13/64"	7/64"	21/32"	.062"	2.370"	2.750"	2.913"	3.058"	4.256"	4.506"	1/8"	4.290"
4"x3"	8	2 29/64"	7/64"	23/32"	.062"	2.870"	3.312"	3.445"	3.590"	4.256"	4.506"	1/8"	4.290"

* 31-15G REDUCER

SIZE	Asme Thds. Per In.	B	F	G	J	N	P	Q	R	S	U
1½"x1"	8	2½"	5/32"	5/64"	7/16"	.902"	1.317"	1.462"	1.676"	1.846"	1/8"
2"x1"	8	2½"	5/32"	5/64"	7/16"	.902"	1.317"	1.462"	2.192"	2.360"	1/8"
2"x1½"	8	2½"	5/32"	5/64"	7/16"	1.402"	1.849"	1.994"	2.192"	2.360"	1/8"
* 2½"x1"	8	2½"	3/16"	5/64"	7/16"	.902"	1.317"	1.462"	2.705"	2.912"	1/8"
2½"x1½"	8	2½"	3/16"	5/64"	7/16"	1.402"	1.849"	1.994"	2.705"	2.912"	1/8"
2½"x2"	8	2 5/32"	3/16"	23/32"	7/16"	1.870"	2.381"	2.526"	2.705"	2.912"	1/8"
* 3"x1"	8	2½"	3/16"	5/64"	7/16"	.902"	1.317"	1.462"	3.224"	3.444"	1/8"
3"x1½"	8	2½"	3/16"	5/64"	7/16"	1.402"	1.849"	1.994"	3.224"	3.444"	1/8"
3"x2"	8	2 5/32"	3/16"	23/32"	7/16"	1.870"	2.381"	2.526"	3.224"	3.444"	1/8"
3½"x2½"	8	2 7/16"	3/16"	25/32"	1/4"	2.370"	2.913"	3.058"	3.224"	3.444"	1/8"
* 4"x1"	8	2½"	1/4"	5/64"	7/16"	.902"	1.317"	1.462"	4.256"	4.506"	1/8"
* 4"x1½"	8	2½"	1/4"	5/64"	7/16"	1.402"	1.849"	1.994"	4.256"	4.506"	1/8"
4"x2"	8	2 5/32"	1/4"	23/32"	5/16"	1.870"	2.381"	2.526"	4.256"	4.506"	1/8"
4"x2½"	8	2 7/16"	1/4"	25/32"	1/4"	2.370"	2.913"	3.058"	4.256"	4.506"	1/8"
4"x3"	8	2 5/32"	1/4"	23/32"	1/4"	2.870"	3.445"	3.590"	4.256"	4.506"	1/8"

* 31-15 REDUCER

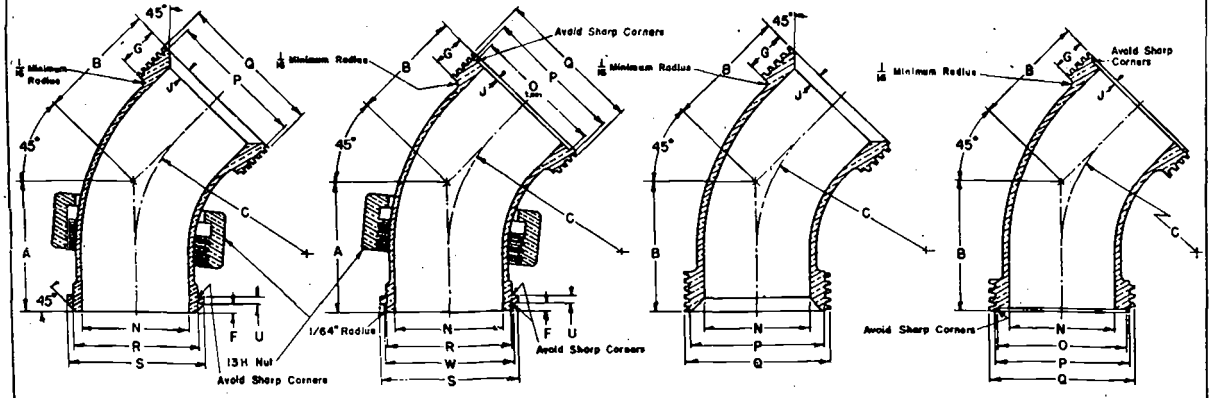
Revised-4-10-45

*Special Order Only

STANDARD DIMENSIONS
BEVEL AND GASKET JOINT
SANITARY FITTINGS

DAIRY INDUSTRY COMMITTEE

DRAWN BY G.A.F DATE 3-10-45
No. FX-13237



No. 2P BEND
Ground Seat Type

No. 2PG BEND
Gasket Seat Type

No. 2K BEND
Ground Seat Type

No. 2KG BEND
Gasket Seat Type

SIZE	Acme Thds. Per Inch	Ground Seat A	Ground Seat B	Gasket Seat A	Gasket Seat B	C	Ground Seat F	Ground Seat G	Ground Seat J	Gasket Seat F	Gasket Seat Q	Gasket Seat J	N	O	P	Q	R	S	Ground Seat U	Gasket Seat U	W
1	8	2 1/8	1 25/32	2 1/16	1 25/32	1 1/2	1/8	3/16	25/32	3/32	1/2	.062	.902	1.218	1.317	1.462	1.180	1.318	1/8	3/32	1.187
1 1/2	8	2 1/8	1 29/32	2 1/16	1 29/32	2 1/4	1/8	3/16	29/32	3/32	1/2	.062	1.402	1.750	1.849	1.994	1.676	1.848	1/8	3/32	1.718
2	8	2 3/16	2 1/8	2 5/32	1 31/32	3	5/32	23/32	7/32	5/32	9/16	.062	1.870	2.250	2.381	2.526	2.192	2.380	1/8	3/32	2.218
2 1/2	8	2 3/16	2 5/8	2 5/32	2 7/16	4	3/16	27/32	1/4	3/32	21/32	.062	2.370	2.750	2.913	3.058	2.708	2.912	1/8	1/8	2.718
3	8	2 23/32	3 1/8	2 13/16	2 13/16	5	3/16	29/32	1/4	1/8	23/32	.062	2.870	3.312	3.445	3.580	3.224	3.444	1/8	1/8	3.280
4	6	3 7/8	4 1/4	3 47/64	4 1/8	7	1/4	1 1/16	1/2	7/64	7/8	.062	3.834	4.312	4.509	4.695	4.256	4.508	1/8	1/8	4.280

Dimensions in Above Table are Shown in Inches

Dimensions Not Specified Are Not Standardized Since They Bear No Relation To Interchangeable

STANDARD DIMENSIONS
FOR GROUND & GASKET JOINT
SANITARY FITTING

DAIRY INDUSTRY COMMITTEE

Drawn by - L.M.M. Date - 4-16-45

Drawing No. Ex-13238

Milk Plant Waste

A. J. HAHN

Production Supervisor, General Ice Cream Corporation, Rochester, N. Y.

THE term "waste" as defined by Webster means "a product allowed to escape without being utilized." I believe this describes very well our waste or losses in milk plants.

Primarily our wastes in dairy plant operations are the result, in the most part, of the inability in plant operations to account fully for the milk and the fat in that milk which is processed in the plant. This failure to show usage of all the milk or fat which we receive is due either to carelessness on the part of plant employees or to the failure of supervision to set up operations properly and recognize sources of loss, or a combination of both. True, there is a certain amount of product which is lost because of adherence to equipment and through foam, but this loss is relatively small.

In the past year our Company has conducted a thorough study of our milk plant operations with the primary purpose of determining the most accurate methods of weighing, measuring, and testing milk. With the determination of these methods, our operations were then set up so that we were able to live within the 2 percent fat loss allowable established by various market milk administrations.

I am not going into the details of our experimental work, but as a result of our studies I can suggest an outline of procedure for studying milk plant operations with the purpose in mind of eliminating excessive losses or wastes.

1. Draw a flow diagram of your entire operation, milk, by-products, etc.
2. Study this flow diagram thoroughly until you know *definitely* where all the milk goes in your plant.
3. Establish points in this diagram wherein samples *should* be taken for fat analysis.
4. Check your methods of taking samples thoroughly and make sure they are correct.
5. Check your methods of weighing and measuring milk throughout the plant.
6. Check the scales you use.
7. Make certain that the laboratory is testing the samples correctly.
8. Check your operations for leaks.
   a. Valves.
   b. Fittings.
9. Check the accuracy of bottle and can filling.
10. Check the causes of "spilled milk".
11. Check the handling of rinses.
12. Determine whether or not the plant is obtaining accurate figures and reporting all important information to maintain an accounting of your operations.

RECEIVING WEIGH VATS

Our studies indicated definitely the inability of certain types of shallow weigh vats to give us a thorough job of mixing, so that an accurate sample for fat test could be taken. We found on every shallow vat which we studied that the sample taken in the usual way tested higher in fat than when the sample was taken after the milk was thoroughly mixed. These differences varied from 0.02 percent to 0.08 percent fat, or on 100,000 pounds of milk, from 20 to 80 pounds of fat. This would then be a loss in fat in our operation before the milk really got into the plant operations.

To correct this condition we had to install baffles in the weigh vat to increase the mixing action as the milk was dumped. The principle involved in the use of these baffles was to direct the flow of the milk in several directions. As the milk is dumped into the vat the flow of the milk is directed towards the back end of the vat. A baffle plate was installed which would reverse the flow of the milk towards the front end of the vat. The milk would hit the front end of the vat and again be reversed to the back end of the vat. As a result of this reversing the flow of the milk a better and more thorough mixing action resulted. The baffle consisted of a tray made of stainless steel which was hung, by means of four stainless steel clips on the four corners of the tray, to the strainer. The back end of the tray had a collar high enough to meet the bottom side of the strainer. This collar tapered down towards the front so that the front of the tray facing the front or dumping end of the vat had no collar at all. This tray could be easily removed at the end of the operation for cleaning.

Also in the strainer itself was placed a set of baffles consisting of strips of stainless steel about 2 inches wide and as long as the width of the strainer. These baffles aid in breaking up the milk, particularly the cream as the product was dumped into the vat.

After we had installed these baffles we found a good mixing action resulted and we were able to secure a good representative sample of the milk in the weigh vat.

There is one additional point which was brought out in these studies. While the baffles worked well it was noted that when the amount of milk dumped into the vat at any one time exceeded the level of the baffle, the beneficial action of the baffle was lost. While this does not occur too frequently, it was necessary in these cases to dump only half of the milk at one time and make a double weighing and sampling. The significant point is that while a good mixing may result when 500 lbs. of milk is dumped into the vat, the mixing may not be too good at 800 lbs. The maximum amount of milk which can be dumped into the weigh vat must then be determined by actual trial and error.

Our studies on well designed deep weigh vats indicated that we had no problem insofar as good mixing was concerned. Although in this case too we found that large quantities of milk in the vat at any one time decreased the thoroughness of mixing and made it necessary to split the weighing and sampling operation.

COMPOSITE SAMPLES

We have a fifteen-day test period on composite samples with the exception of one or two plants that have ten-day test periods. During the 10 or 15 days, whichever it may be, the samples of milk are collected and prevented from spoilage by bichloride of mercury, about 0.15 percent per bottle.

There is, however, during storage a certain effect on the fat in the form of a breakdown of the emulsion which will result in a lower test on this composite than on a weighted average test of the same milk tested daily. In samples not properly handled during or after storage, this can amount to as much as 0.1 percent. However, if certain factors are checked, this difference is appreciably reduced. These factors are:

a. Temperature of holding.
b. Testing of composites.

In regard to storage temperature, so many dairies, and we ourselves did up until recently, use a tray, holding from 20 to 40 composite bottles, which is stored in a locked cabinet in a 40-degree room overnight and brought out into the warm receiving room during the day. This fluctuation of temperature did not do our composite samples any

good. We designed and have now in operation an electrically refrigerated storage cabinet holding from 75 to 500 composite bottles. This cabinet is on wheels and can be rolled to the operation during use and against a wall out of the way when the operation is over. This cabinet maintains the temperature of the composite samples at approximately 40 degrees F. at all times. As a result, we are able to obtain a composite sample, the test of which compares well with the test on a fresh, daily sample.

In testing composites, we find it helpful to put as many people as are holders of a testing license on the job. This usually is about three persons in each plant. By dividing the number of samples equally, we are able to complete the job much more rapidly and with greater accuracy. While speaking of testing, I want to emphasize the importance of properly tempering samples prior to testing. In too many cases a laboratory operator will rush this job through, using abnormally high temperatures and obtain an oiling off of the fat in the sample, which will result in either too high a fat test or too low, depending upon the mixing of the sample.

All these factors of course, will distort the fat test of the composite sample and result in either a loss or gain in fat as a result of the testing of producer's composites.

WEIGHING MILK AND MILK PRODUCTS

A great deal of benefit is derived in setting up a schedule whereby all scales used for weighing milk and milk products are checked frequently. For example, I believe the weight scale in the receiving room should be checked weekly with a set of your own weights and by the Sealer of Weights and Measures several times a year or more often.

One of the greatest points of loss is the matter of filling cans. With the varying volume capacities of 40-quart cans, especially after they have been retinned, it becomes increasingly important to give consideration to weighing all products going into these cans. We have been able to set up a scale and conveyor system whereby all products going into 40-quart cans are weighed. This is not only important for all products but becomes increasingly so in the case of cream. This is something that can be done at relatively little cost, and surprisingly enough involves no extra labor in the operation.

As far as milk bottles are concerned, we have found few discrepancies in volume capacities and in our studies did not reveal any source of loss or gain.

ESTABLISHING POINTS AT WHICH TO TAKE SAMPLES FOR FAT TESTS

This certainly is important not only in studying losses but for a routine check on operations. The points at which samples are taken will of course vary with each operation. It is important, however, to know where the samples should be taken and that they are taken properly and tested properly.

We should know each day the fat test of each grade of milk which we bottle. This is important not only from the standpoint of uniformity of product but also operating costs. This is not always so easily determined. If it would be possible to run all the milk for any one grade into a vat before the milk is processed, this would be a simple job. However, such a case rarely occurs and more often the milk is being processed as it is received. To determine the fat test of this milk we use the following procedures.

In High-Temperature Short-Time operations the pasteurized, cooled milk is run into 20 can tanks which act as surge tanks for the bottle fillers. These tanks have been calibrated and a mark noted on the tank at the 20 can level. When the tank is filled a sterilized metal pipette is used to take a sample of this milk. By proportionately com-

bining the samples taken for each grade of milk an accurate fat test can be secured. In the batch method of pasteurization the milk samples were taken at the bottle filler. For a series of four pasteurizing vats the taking of samples were so timed that a pint sample was secured each time one-half of the contents of each pasteurizing vat had been pumped over the cooler. By combining these samples for each grade a representative fat test was obtained.

This may seem to be a great deal of unnecessary work but by obtaining an accurate fat test of each grade of milk you will be in a better position to select milk, not only to obtain a more uniform product, but to insure a more economic operation.

Similar procedures were established for the sampling of cream, skim milk, buttermilk, chocolate milk, etc.

The second point, that is, the actual taking of the sample is important. The significant point is that when a sample is taken it should be representative of the whole, whether it be a weigh vat, storage tank, bottle, etc.

Some interesting observations were made in securing samples from storage tanks. The newer type storage vats are all equipped with good agitation. However, some of the older types are not, and in many cases with the old style vats a period of not less than 10 minutes of agitation was required before samples taken at the top and bottom of the vats would check. The best place to take a sample from a storage tank is near the bottom either through the outlet valve or the sampler in the manhole cover. Attempts to take a sample through the top surface of the product more often than not are failures entirely because of foam.

In taking samples from surge tanks, pasteurizing vats, etc., we use a stainless steel milk thief about 20 to 28 inches long and 3/8 inch in diameter, taking samples at three to five points in the vat and combining into one sample.

The third point, that of properly testing samples, is important. Our laboratory technicians are testing all samples with the same degree of thoroughness that they would in carrying on a research problem. But in the hustle of things, they are liable to lose tract of the importance of doing each test properly, step by step. In order to make certain we are getting the right tests from our laboratories, we have a trained laboratory technician with years of experience and who is thorough and a good teacher, traveling continually to all our laboratories for the purpose of checking laboratory testing, making our laboratory operations more efficient, and helping our technician, whenever possible.

LEAKS IN VALVES AND FITTINGS

This is something that can waste a great deal of milk, particularly if not corrected immediately after occurrence. We have set up a maintenance schedule whereby all leaky fittings are repaired immediately. Leaky valves are reground if possible or sent back to the factory for rebuilding, or new valves are purchased. Most of the faulty valves and fittings are due to careless handling by the plant employees. Such practices as dropping valves or fittings on the floor or tossing together in a wash sink, forcing valves or hammering fittings, all lead to leaks and of course, waste of product.

RINSES

Most plant operations utilize skim milk or water for rinsing out vats or lines and use these rinses either in their separating or by-products operation. This certainly cuts down waste but is time-consuming, and if a plant does not separate or manufacture by-products, they cannot utilize these rinses. The most practical method of freeing milk in lines and vats is to:

1. Make certain all vats are pitched properly for complete drainage.
2. Use compressed air to blow out

lines. Compressed air at low pressures, 40 pounds per square inch, and in sufficient volume, can be used satisfactorily.

3. In a cream operation, it probably will be necessary to rinse with skim milk.

SPILLED MILK

The greatest amount of spilled milk occurs when vats are overfilled. This is not entirely due to carelessness on the part of the operator. Often his job requires him to be somewhere else when a particular vat is being filled. In circumstances such as this, we have installed electric controls which consist of one or two electrodes which establish contact with the milk at predetermined levels, setting off a bell or light bulb warning or if necessary, can activate a control mechanism stopping the operation of pumping the milk into the vat. When we stopped this overfilling of vats, we corrected almost 100 percent of our spilled milk troubles.

ACCURATE FACTORY RECORDS

The purpose of factory records in our operations is to provide the plant operator with a detailed report on the efficiency of his operations. These factory records are kept daily and show an accounting of pounds of product and the fat in that product received in the plant and its utilization. The accuracy of these records will depend entirely on how accurate and complete is the information collected in the plant and laboratory during each day's operation.

Without factory records a plant operator cannot possibly determine, where, why, and how much are the losses in his plant.

CONCLUSION

Milk plant wastes or losses are not mysterious fantasies for which a perspiring plant operator reaches, but never seems to find. They are real things that can be seen and corrected. To do this, however, you must first establish a system of factory records which will show you each day how much product you receive and what you do with it. Secondly, you must study your operation so that you will know that the data you collect for these factory records are accurate. And third, when your factory records tell you that in a certain point in your operation you are not utilizing all of your product, in other words you are wasting it, then you have got to provide the means for correcting this waste.

The Sanitary Program of Abbotts Dairies, Inc., Cameron, Wisconsin*

R. W. CARNES

Field Supervisor, Abbotts Dairies, Inc., Cameron, Wisconsin

JUST by way of introduction, we started our program nearly twenty years ago on an almost wholly trial and error basis with only a very little of the simplest instruction to work from. While we have tried to keep in step with the progress of scientific experiments, our work is based mostly on our own experience. I make this statement so that if I say things in contradiction to any report you may have seen of any scientific experiment you will know that I am not quoting any authority but simply stating the results of our own experience.

We believe that the quality milk program is mainly one of education. Few farmers are deliberately dirty though it is true that some are very careless and some have so much work that they find it difficult to keep up to standard; mostly it is a lack of understanding. We have also found that nothing can take the place of direct contact with the producer in carrying on this work. Printed releases and circulars help some but two things make it necessary to contact the dairyman personally: first, the frequent reaction to printed matter is to consign it to the waste basket, and second, it is difficult to make written directions so clear that all will understand them—as we have found to our sorrow.

As to the program itself: We have built it around three things: First, plant control, that is, bacteria counts, sediment tests and examining each can of milk at the receiving room for acidity, off odor or color; second, by regular farm inspections, and third, by annual examination of all dairy cows in our producer's herds by a competent veterinarian, to eliminate cases of mastitis, lump jaw, etc.

We started this program on a voluntary basis, offering as an inducement for cooperation, a premium or bonus of 5 cents per pound of butter fat for those whose dairy construction met certain requirements and who delivered milk with a bacteria count of not over 25,000 per c.c. by the petri plate method and whose sediment disc was Number 3 or better. Later when the Wisconsin regulations made it compulsory to return Number 4 milk to the producer, we discontinued using the sediment test as a basis for the premium.

As I stated above, this was on a voluntary basis so that we continued to accept milk from farms that did not meet our Grade "A" requirements, paying the base price for it. This voluntary plan worked out very well for the time being and enabled us to build a good volume of quality milk before we reached the place where compliance became compulsory. When that time came we set a deadline for compliance and quit accepting milk from those farms that failed to qualify. I do not mean to imply that we had 100 percent standard farms then or that we have that now, but we did set minimum requirements and discontinued all farms that failed to meet those. As conditions improved we raised these requirements in line with the increased knowledge of milk sanitation and stricter market standards.

While our market requirements are for semi-annual farm inspections we

* Presented before the University of Wisconsin Fieldmen's Conference, Chippewa Falls, Wisconsin, February, 1945.

have found that three or four inspections a year produce better results. These calls are not so much on the basis of being policemen, though we must do some of that kind of checking also, but we have worked more from the standpoint of a friend or helper. We believe that it is important to keep this relationship with our producers so that they will feel free to talk over any problems with us rather than trying to hide everything they can from us.

Originally, a larger part of the inspection work was checking on construction but now about all of the construction checking we have to do is to see that things are kept in good repair. Our work now is largely in maintaining proper methods. While constant inspection checks on methods are necessary, the weaknesses of inspection emphasize the value of our bacteria counts. While we, as inspectors, cannot call on all farms each week, the bacteria bring in their own report that often. While we may overlook many little cases of carelessness the bacteria do not. When bacteria counts start climbing regularly we know that something is developing on the farm. A single high count may only indicate some accidental happening such as a broken pump, a failure of the electric current, etc., but when the counts go steadily high there is something more seriously wrong than that.

The annual physical examination of all producing cows on our patron's farms has been another big help in improving quality by keeping at a minimum the number of unhealthy cows. While it has been of much value here it has also been of equal value to our dairymen by helping them to detect and eliminate potential disease spreaders before they have contaminated a large part of the herd. Here again bacteria counts become of real value. While it is true that some cases of mastitis do not seem to show on the plates, most of them do sooner or later.

The sediment test is another important part of quality control, for milk that consistently shows a dirty sediment certainly cannot be high in quality. It is true that we do not attach as much importance to the sediment test as we do to some other of our tests. Milk might be produced under filthy conditions and yet after careful straining be delivered to the creamery as clean milk. The worst filth is in the liquid and so cannot be strained out and neither will it show on the sediment disc. This is especially true in the case of wet hand milking. Of course, there are many different sources of sediment and the real filth varies accordingly, such as from barnyards, swamps, ordinary dust, dust from threshing and silo filling, and even clean sand from the well where the patron has been breaking regulations by hauling water in a milk can.

The examination of each can of milk at the receiving room for off odor is also important. While some of these odors are volatile and disappear in a short time, others are very slowly disseminated and still others become stronger. One interesting thing that has shown up from our experience is that extremely low count milk seems to have a tendency to develop off odors that do not show up in higher count milk. It would seem that some types of bacteria which produce off odors are checked by the lactic acid type. This does not mean that low count milk is not desirable but rather that the lower the lactic acid type count, the greater the care that must be exercised in every step of the handling.

While the above tvpes of work are necessary and important for their results, we believe that the bacteria counts themselves are the most important single item in the program. The rapid growth of bacteria under favorable conditions usually soon brings the plate counts up, whenever carelessness or improper conditions develop on the farm. These counts are not only valuable as an indication of improper conditions on the farm but with a little

study and experimenting one can learn to tell with surprising accuracy what condition is the cause. There is a great difference in the appearance of colonies of the different types and in their rate of growth and even in their color. Then if we need to trace it further, we usually ask the dairyman to number his cans for one night and the next morning, consecutively as milked. For example, if he gets four cans at a milking, then he would number the cans from one to eight in the order as milked. Then by running a separate test on each can we can generally find the source, for instance, if the first can at night and the first can in the morning, Numbers 1 and 5 are high, it is quite sure to be caused by improperly cleaned utensils. If all of the night's milk is high and the morning's milk is low, then we can be pretty sure of poor cooling. If the cause should be a diseased udder then the can containing this cow's milk both at night and in the morning will show a high count.

These are the three most common causes of bacteria trouble and are comparatively easy to locate. The difficult ones are those that are not common and combinations of two or more causes but these, too, can be found with a little persistence. If the above methods fail to produce results, we have recourse to the more complicated method of a trip to the farm with sterile vials and bottles of sterile water. By taking a separate sample direct from each cow and then using a bottle of sterile water to rinse each utensil we can find which cow or which one of the utensils is the principal offender.

A few words about our experience with milking machines. We have never found anything that would take the place of boiling water in cleaning a milking machine. There is a real advantage in storing the rubbers in a lve solution. In the first place, the rubbers will last longer if kept moist and, secondly, the lye will dissolve any milk products that have been missed in washing.

Quite a few things in our experience have not agreed with preconceived ideas. Some of these unorthodox views have since been accepted by the industry, some have not. Our first break came at the very start of our quality program when we requested our producers to quit stirring their milk and instead, cover the cans tightly as soon as full and cool as fast as possible by circulating water around the cans. I believe that most of the industry has discarded the stirring rod now though some may still stick to it. There are times when the cows are feeding on certain types of feed that there is an advantage in leaving the covers up for a time to allow the feed odors to escape but even then the stirring rod is apt to be a detriment rather than a help. Under ordinary conditions, the best results are obtained by covering the cans at once and leaving them covered until delivered to the creamery.

Our next departure from the beaten path was when we began to doubt the correctness of the old belief regarding the source of odors in milk. We have been convinced for some time that off odors were from the feed eaten rather than being picked up from the air. I could give you illustrations that I am sure would leave no doubt on this point but I believe this is quite generally accepted as a fact.

Another thing that is still demanded by health departments but that we have long been convinced is an entirely false standard, is the receiving door temperature test. After many years of comparing temperature charts with quality control records, we can find little or no correlation. Often the warmest milk received is the best for it is apt to be warm because of late milking and is in the creamery a short time after being drawn from the cows, and our records verify this statement.

We believe that chlorine has been over-played many times in quality control. Not that we do not believe chlorine has any value. We believe it has a great value if properly used but it has

too often been played up as a cure-all and clean-all for the dairyman. Where it has been improperly used, we have found a considerable increase in the deposit of milkstone in the utensils.

In our work in improving quality I'm afraid we have been too negligent of external appearances of our farms. We still have considerable work yet to do in that line. Even if we, as fieldmen, do concentrate more on that work, our mainstay in quality control, the petri plate count, will remain just as effective as ever.

In closing I would like to make two suggestions somewhat aside from my topic. First, one of the greatest needs in the quality program, I believe, is uniform regulations for all of the markets. It goes without saying that what produces sanitation in one market area will produce the same results in other areas.

Second, I believe that we should work together to try to eliminate the non-essentials from our regulations, those things that are mostly someone's brain storm, or which do not add to the quality of the milk produced but do add to the difficulty of carrying out a program of sanitation, both for the creameries and for the producers.

MILK DELIVERY SCHEDULE

Milk drivers' unions, on one side, and state milk boards and milk distributors on the other, are heading for a showdown over the question of whether alternate day delivery shall be maintained or whether the industry will go back to the pre-war system of daily deliveries.

Recently Daniel Tobin, head of the International Teamsters' Union, stated flatly, in a Cincinnati interview, that the union would oppose every-other-day delivery, and on the west coast, Dave Beck, czar of the teamsters' union in that section, made known that he is prepared to battle the issue.

Meanwhile, milk control boards in New Jersey, Oregon, and Pennsylvania had ordered alternate day delivery continued, and 21 metropolitan New York distributors have advised customers that the skip-day plan would be continued.

In Chicago, the drivers' union repudiated its first agreement and demanded the return of daily delivery. Distributors immediately countered by demanding an increase in milk prices to offset the cost.—*Daily Record.*

Proposed Pattern for Poultry-Meat Marketing*

Concept of a Needful Sanitary Reform

EDWARD M. LYNN, D.V.M.

Chicago, Illinois

THE killing, dressing, and drawing of live poultry for immediate use is, by and large, a thing of the past in the United States. The bulk of market poultry comes to the consumer through the retailer in the form of so-called dressed poultry, that is to say, bled and plucked, but otherwise entire. The head, the legs, and the internal organs are left with the carcass, unmolested in order to frustrate putrefaction while in the lanes of distribution between the dressing plant and final destination. According to the interval between dressing and cooking, which may vary from hours to months, the defeathered carcass has to be chilled, refrigerated, or frozen for its journey through the vicissitudes of transportation, cold storage, and final disposal to hotel, restaurant, or home by the jobber or retailer.

IMMEDIATE EVISCERATING IMPERATIVE

Granted that prompt evisceration of the slaughtered animal is the prime sanitary essential of the meat trade, the critical hygienist, and especially the meat-food expert, looks askance at the mounting use of uneviscerated fowl by the American people, yet, for long, no steps were taken to solve the problems involved in changing the established custom. Preventing the deterioration of flavor and taste, of wholesomeness, and of the nutritive value of these many tons of needful food is the objective.

Customarily, the poultry industry leaves the unpleasant job of eviscerating to the chef or housewife, or to the retail butcher whose otherwise clean hands get soiled with the latent bacteria of the carcass while filling orders for other meats. Summed up, if meat hygiene continues to be an issue of this period, dressed poultry is out of step with human progress. In the long run, there can be no evasion of the reform since, unmistakably, the public has become keenly aware of the difference in safety and nutritive value between pure and tasty food and the spoiled and tainted kind, even though the latter may not be actually disease-producing. On the economic side is the prospect of increasing consumer demand for poultry by selling it ready-to-use—raw, cooked, whole or cut. In short, a sharp upsurge in consumption is a reasonable prediction for quality poultry launched into the market with the internal organs removed.

ANTEMORTEM INSPECTION INADEQUATE

Although over-all antemortem inspection of abattoir animals has its place in food hygiene, postmortem examination is paramount in removing unfit meat from the market—a step beneficial to stockman, dealer, and consumer, since it builds up confidence and security in the product marked "inspected and passed." No segments of the poultry industry can well afford to discount the generally known fact that the condition of the viscera at the time of slaughter furnishes the clue for the apprehension of noxious agencies in the rest of the carcass, nor that retained viscera impregnate the carcass with objectionable flavors. The growth of

* Reprinted from *Journal of the American Veterinary Medical Association*, March, 1945.

the meat and dairy interests in recent years are examples of augmenting confidence and increasing demand for meat and milk through scrupulous inspection and sanitary handling, without altering taste and nutritive value.

The far-cry of the nutritionist and health officer is to help the poultry industry put its products on the same sanitary and economic level as other foods of animal origin by removing nonevisceratcd poultry from the market. The handling of poultry on a large-scale basis is relatively new, yet none would deny that the difference between freshly killed poultry and dressed poultry, marketed with viscera intact, is outstanding and the reason is quite generally known to be the prompt evisceration of the one and the nonevisceration of the other. As a matter of fact, were it economically feasible to remove the viscera of poultry at the time of slaughter, as in other meat animals, there would not be much, if any, dressed poultry on the market because taste and appearance govern demand for food more than nutritive value. In the food trade, it is wise to associate looks with appetite. Dressed poultry is a nuisance in other ways. It is wasteful and messy for the housewife and chef to thaw out and eviscerate frozen dressed poultry, and the critical canner of poultry has to maintain a trained staff to reject carcasses capable of tainting the finished product. Moreover, the housewife is startled at pathological organs; and the brands of the careless canner lack the popularity of the one who maintains a meat-inspection service.

CHANGE AN OBLIGATION

It is, therefore, an obligation of hygienists to aid the poultry industry in its dressed poultry dilemma by outlining an economical means of eviscerating poultry at the time of slaughter. May it not, then, be the task of this committee to plan a veritable renaissance touching every facet of poultry marketing from the dressing plant, where live poultry is delivered, to the consumer's kitchen—a plan which admittedly includes continuous preservation of an extremely perishable carcass? Drawn poultry remains edible only a few hours unless promptly frozen and kept frozen until cooking time. The only exception would be the poultry that is cooked immediately for canning or that freshly killed for home use.

It is clear that sooner or later poultrymen, health officers, hygienists, and dietitians will take steps to abolish dressed poultry in the interest of all concerned. That veterinary science, standing as it does in the role of referee, will be brought into the scene is inevitable.

Figure 1 outlines a pattern based upon a casual but quite general survey of the situation.

COOPERATING INTERESTS

The first obstacle to surmount, and the greatest but least developed, is providing dressing plants all over the country with economical equipment for killing, dressing, eviscerating, inspecting, packing, and quick freezing of the poultry received alive. The blue print for this purpose (fig. 2) shows equipment that dressing plants will need to install in order to supply demands for this type of product. None, we are assured, will be slow in entering into competition with the big plants when the cost of equipping permits. The former belief that only the larger plants can afford equipment to start eviscerated poultry on its way through the markets is no longer true.

Next in importance are the manufacturers of freezing cabinets of variable sizes and costs, who are already planning the required production schedule and producing a limited number of trial units. The models illustrated herewith are being widely acclaimed. Quoting one manufacturer: "Everybody will have a home freezer as soon as the war is over." The rapid installation of freezers at retail stores leaves nothing undone to completely

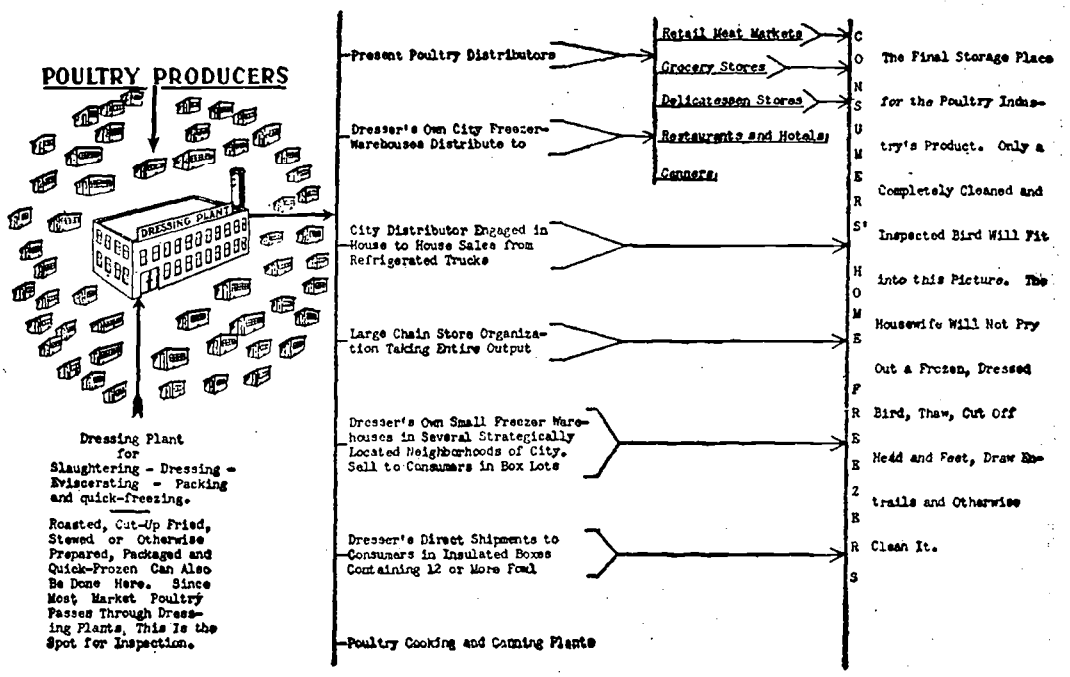


FIGURE 1

Illustrating in a general way the future trend in the marketing of dressed poultry

—Courtesy of E. J. Albright Co.

revolutionize the marketing of ready-to-use poultry, except the more general ownership of home freezers, and this should be no deterrent in the face of the refrigerator consciousness now so widely developed through experiences with community locker plants. The objective and manifest trend is to see that the housewife can bring home (for example) a package of frozen eviscerated broilers for use as needed from her own freezer.

It should be obvious to the poultry and meat industry that this home freezer be large enough to store sizable amounts of their products in standard, trade-size boxes, otherwise the utility of the home freezer is lost as the housewife with a too-small unit will still be compelled to run for replacements in hand-to-mouth fashion. The difference in cost of operation is nil. In fact, a large unit with contents frozen maintains a low temperature that is more even.

Meanwhile, minds must be turned toward the matter of inspection by capable technologists at the time of slaughter. Whether the veterinary profession will follow the trend and prepare to render that service is a reasonable question to ask. Obviously, someone familiar with the relation of disease to the wholesomeness and safety of meat will be employed. In addition to their basic training, the veterinarians of the future should be provided the opportunity to specialize in food hygiene, in view of the revolutionary change predicted in the marketing of poultry meat.

HANDLING

This move is timely, as full information to the housewife in handling and cooking frozen meats and poultry will

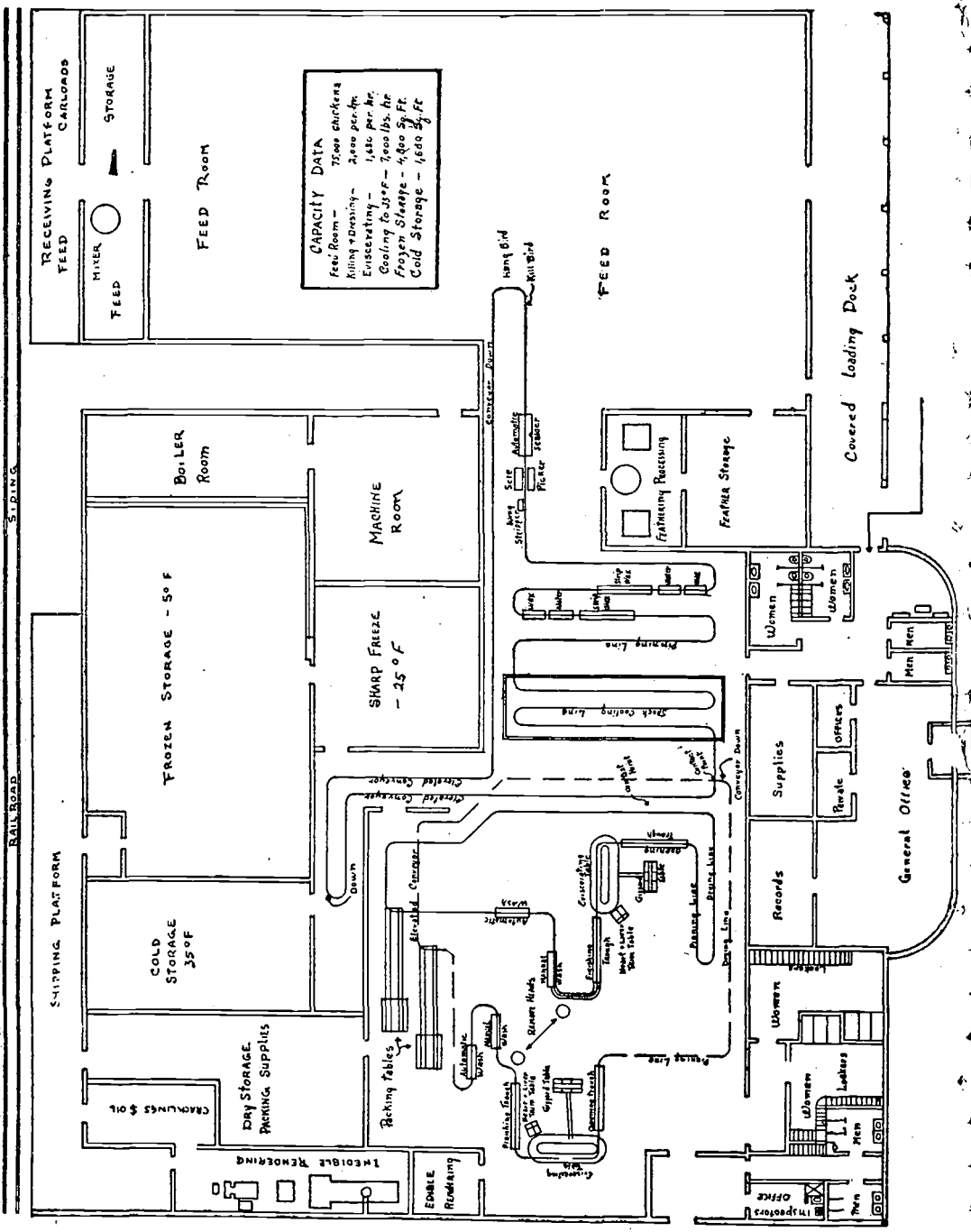


FIGURE 2

Plans for poultry plant—slaughtering, dressing, eviscerating, packing, and quick freezing, one continuous operation

—Courtesy of Quick Frozen Foods and the Locker Plant

dispel any timidness and greatly speed the general acceptance of frozen foods. On this point, my experience has been that frozen meats and eviscerated frozen poultry should go directly to the skillet or roasting pan in the hard-frozen state and thaw out there. Thawing in water soaks out flavor and much nutritive value, and also brings about a considerable increase in the bacterial count. This bacterial increase also occurs when frozen meat or poultry is set out in room temperature to thaw slowly and although this method of thawing is much preferred to the water-soaking method, it too is faulty. Placing frozen meat or poultry directly in pot or pan not only avoids an increase in bacteria but also seals in the natural juices.

LOCKER EQUIPMENT

Large freezers and compartments for the home and apartment buildings are essential to encourage the purchase of larger amounts of ready-to-use poultry for the home commissary, including those for apartment buildings. It is reported that such lockers have been installed in an apartment building in Cleveland, Ohio, as a test of frozen food deliveries to city dwellers. The promotion of frozen meats to the public, it is said, will not require as much of a selling job as to the meat retailer and the unions, and will develop the installation of the self-service, low-temperature dispensing units rapidly coming into use by the retail stores—grocery and delicatessen.

From American Egg and Poultry Review.—Speaking before the Poultry Industry Educational Exhibition at Montreal, November 22, 1944, Howard C. Pierce of the Great Atlantic and Pacific Tea Company, after reviewing the whole poultry situation of the United States and Canada, had this to say about dressed poultry: "For many years, the bulk of poultry has been sold undrawn. Heads and feet are left on. Only the blood and feathers have been removed by the producer or packer. The final dressing is done by the retail store or by the consumer. Even when poultry is well drawn, with head, feet, and entrails removed, the consumer generally has to pick pin feathers, singe and wash the bird in the home kitchen. Recent developments have brought forth quick-frozen evisceration methods of preparation and sale of chickens in parts. By these methods, whole birds are offered, or a consumer planning a party can obtain frozen breasts, or a family of two liking dark meat can purchase thighs and legs only. . . . Development of the fully eviscerated, quick-frozen bird, so thoroughly cleaned that the consumer has no finishing to do in the kitchen at home, has been a remarkable contribution to increasing consumption of poultry. The modern poultry and eviscerating plant is an outstanding food production establishment. In these plants, poultry is fed for fatness and flavor, carefully slaughtered, graded to standards and specifications, pinned, singed, washed under high pressure streams of water, eviscerated, carefully wrapped, rapidly frozen, and cleanly handled at all times until it reaches the consumer. . . . To make a marketing program successful, the retailer must carry out his part by keeping adequate stocks of the highest grade and finest quality of poultry products. . . ."

In view of the high source of this quotation and the character of the listening audience, it may be taken as the true portrayal of the coming situation. Other ramifications might be mentioned, such as the new enterprise of delivering frozen froods from warehouse to home, as a certain iceman is doing in a large city (Rochester, N. Y.), gradually transforming his business from ice to food in a manifestly successful fashion. Then the community locker plant, with its facilities for slaughtering animals, is wide open for the development of poultry

evisceration for the consumer or local trade.

Since these data were assembled, information arrives to the effect that one of New York City's largest department stores, after sponsoring research on frozen meat at Massachusetts State College, is installing equipment for the retail sale of frozen, cooked meats.

FROM THE PUBLIC HEALTH FIELD

Except for the rejection of manifestly unfit market poultry in some cities, it cannot be claimed that poultry has aroused much interest in public health circles. While the federal regulations on the inspection of quick-frozen, eviscerated poultry are comparable to those enforced for large animals by the U. S. Department of Agriculture, special regulations formulated for fowl under state laws in a few states apply specifically to dressed uneviscerated poultry. The State Board of Health of Delaware [1] (taken as an example) defines a "poultry dressing plant" as a place where "chickens, ducks, geese, and turkeys are slaughtered, defeathered, cleaned, and chilled for commercial shipment." Applicants for license to operate such a plant in Delaware must comply with sanitary specifications of the Board regarding buildings and grounds, floors and ceilings, wall construction, toilet and washing facilities, sinks and water supply, cleanliness and habits of employees, fly and rodent control, elimination of unhealthy birds and cadavers, evacuation of crop and vent, technical inspection (casual), refrigeration, and all-around hygienic measures and conditions. In general, however, poultry has the green light in its journey to the retail store or kitchen.

[1] Personal communication from Dr. J. F. Cherry, State Board of Health, Dover, Del.

SUMMARY

(1) A pattern for the marketing of eviscerated poultry is suggested and recommended for the attention of the veterinary profession.

(2) The killing, dressing, eviscerating, inspecting, packing, and quick freezing at the smaller dressing plants located throughout the country are recommended as an outstanding sanitary reform.

(3) Manufacturers of poultry dressing-plant appliances have worked out specifications for economical eviscerating equipment, and the makers of freezing units and cabinets of all sizes are prepared to fill their part of the program.

(4) The installation of dispensing cabinets in retail stores, and the establishment of strategically located warehouses, are among the recommendations made.

(5) The background of the program is meat inspection at one end and the home freezer at the other. Intermediate installations will follow.

(6) The stage is set for the most revolutionary change in the handling of poultry ever made. The health factor and the prospect of increasing the demand for poultry are self-evident.

(7) The veterinary profession is urged to keep in touch with the transformation in the interest of public health and the poultry industry.

The Eastern Shore Broiler Industry and Its Problems

J. L. CHERRY, V.M.D.

Dover, Delaware

THE Eastern Shore of Delaware is about 300 miles long, but the broiler industry is centered around the lower section, the adjoining four counties in Maryland, and the northern county of Virginia.

The broiler industry on the shore originated in the early twenties when farmers in the neighborhood of the beach resorts made special efforts to have cockerels of broiler size before the regular season because they brought premium prices.

In 1921, Homer Pepper of Selbyville, having business in Philadelphia with his Model T truck, took eight coops of chickens along which sold to such good advantage that he started that branch of industry known as the "live shipper."

In 1924, Mrs. Wilmer Steele, the wife of a Coast Guardsman, living at Ocean View, sold her entire flock of 1,000 broilers for 57 cents live weight at the house. This good news, coupled with the building of a new canal that practically ruined the oyster, crab, and fishing business conducted on Indian River, turned more attention to chickens. About this time, brachial or range paralysis spread among chickens over 12 weeks of age, which made the broiler, which is sold at 10 to 12 weeks of age, the type of chicken to raise.

More of the heavy or meat type chickens made their appearance. A large percentage of day-old chicks were shipped from the New England states.

The chicken houses evolved from small huts to long houses heated by hot water, which changed to coal brooders with 300 capacity. Most of the houses today are long houses with coal or oil brooders in each room, with capacity up to 600 birds per unit, and with outside runs for each in nice weather. The feed room is located in the center with living quarters over it. One attendant cares for 12,000 birds.

In 1925, the Delaware State Board of Agriculture established the poultry pathology laboratory for pullorum testing and laboratory diagnosis of sick birds. Maryland also has a laboratory at. Salisbury and one at Centerville. The early control of pullorum disease has been one of the greatest factors in making this industry possible.

In 1932, Hall Bros., of Dallingford, Conn., introduced a hybrid that has become the most popular type for hot house or year round broilers.

The "live shipper", desiring a heavier bird, caused the feeding period to extend to fourteen weeks or longer, depending on market demands.

Production increased from 1,000 in 1923 to 19,000,000 in 1938 in Delaware.

In 1938, Jacob Udell of Frankford started the first large poultry dressing plant on the peninsula in a building formerly used for tomato canning. This set an example as most of the ten dressing plants are in old tomato canneries.

After the dressing plants opened, the number of birds raised increased rapidly from 32 million in 1939 to 92 million in 1943. The dressing plants could utilize a smaller bird than the live shipper demanded. The shipper,

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Dr. Cherry is on the staff of the Delaware State Board of Health.

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to meet the dresser's competition, had to accept smaller birds which helped the grower to turn his investment more quickly.

The dressing plants absorb about 60 percent of the available birds in normal times. These birds are fed three days in the feeder station of the plant before they are killed and city dressed, that is, blood and feathers removed, chilled in ice water for three hours which brings the internal temperature to near 40° F. They are then sorted for size and quality, ice packed in small barrels about 135 to 145 lb. to the barrel, and sent to New York. The Army, having trained personnel at each plant, is taking about 2¼ million pounds a month from plants on the shore. This is voluntary on the dresser's part.

This industry grew like Topsy with the various dressing plants reflecting their owner's characteristics to such an extent that in 1941 the Delaware legislature passed a law reading in part:

Section 1.—That on and after the approval of this Act, no person whomsoever shall dump or otherwise deposit any blood, garbage, carion, offal, filth, or other refuse derived or resulting from the dressing of fowl and poultry of all kinds in an obnoxious or noisome state upon any land or in any stream or other body of water within this State.

In November 1943, the Delaware State Board of Health passed a regulation governing the construction and operation of poultry dressing plants. All branches of the industry—hatchery men, growers, live buyers, dressers, and egg producers impute sinister motives to each other which stimulates competition.

The problems of the poultry industry are divided into permanent and transitory. We may class those caused by the present emergency under the latter.

A lack of high-quality disease-free hatching eggs is a good place to start. When hatching eggs are in big demand, some of the producers will house their hens and feed for forced egg production. Eggs produced under these conditions cause unthrifty chicks. Some unscrupulous producers sell eggs from flocks not pullorum-free.

The death rate of baby chicks runs from 2 to 100 percent with an average of about 10 percent. Chilling in shipping, improper preparation of houses, disease, and improper feeding are the main causes.

The major problem which concerns this particular group is that of sanitation and covers the field from the producer to the actual consumer.

The "live shipper," dressing plants, brokerage houses, and retailers have learned by trial and error the methods best suited to their finances, but, sorry to say, the pioneers in these endeavors set a poor precedent for sanitation.

Conditions in dressed poultry were far from ideal from the health official's viewpoint. The federal Pure Food and Drug inspectors started surveys of the Eastern Shore in 1939 and most of the plants were court visitors at least up until the spring of 1943. There are only three dressing plants that have not been indicted for interstate movement of diseased dressed poultry. Live poultry moves interstate unchecked. In 1942, Mr. Beckett, state sanitary engineer, along with the aid of some of the men in the industry, endeavored to have legislation passed in Delaware that would bring all shipments of live poultry under inspection by some responsible state agency, but their efforts have not been successful.

The problem of hatchery wastes involves infertile eggs. The vigilance of the Pure Food and Drug inspectors, combined with the passing of egg regulations by Maryland and Delaware, have apparently solved this problem. The unhatched egg and shells from careless or unprogressive hatchery men still cause unpleasantries on occasion.

Chickens that die in large numbers in growing flocks are thrown in woods or ditches by some. These are prob-

lems for further education on the part of state agencies and the producers themselves.

The manure from the dropping pans in the dressing plant feeder stations is a very good soil dressing but at present farm demand in summer will not use half the output of about 5,000 tons per month. There are some experiments being run with this manure in mushroom growing, which looks promising.

The dressed chicken that is of questionable health or mutilated causes the loss of approximately 6,000 lbs. of edible poultry a week. Two dressing plants have eviscerating plans under federal inspection. Five more are cooperating in the construction and equipping of a plant to be under federal inspection that will take care of all questionable birds on the Eastern Shore, resulting in only grade A poultry being shipped. This type of broiler would show less than one-half of one percent diseased or unwholesomeness.

The poultry industry is young and the above are growing pains which education, cooperation, and regulations should cure in the near future.

Eastern Shore fresh ice-packed broilers make a scientifically raised, succulent-meated chicken available to one-third of the consuming public of the United States within twenty-four hours from slaughter.

The main problems yet facing the industry are: (1) The resolving of the remaining abuses due to the quick unregulated growth of the industry, and (2) The need of similar regulations in the several adjoining states involved in the poultry industry.

CHART SHOWS HOW BRUCELLOSIS GERMS ATTACK CATTLE

The way in which germs of brucellosis (Bang's Disease) attack cattle, is shown in a simple chart prepared by the Bureau of Animal Industry, U. S. Department of Agriculture. A limited number of 8 by 10 inch reproductions of the chart is available to persons having need of such information.

The chart, with accompanying text, portrays a cow with vital organs exposed. Arrows indicate the usual course of the germs as they go from one organ to another. The invasion begins when the animal consumes feed or water contaminated with brucellosis germs. Though infection may occur in other ways, the consumption of contaminated feed and water is by far the main cause.

After reaching the digestive tract, they are picked up by the blood stream and carried to the heart. From there the germs, still in the blood, go through blood vessels to various parts of the body, including the cow's reproductive organs. The presence of many of the germs in those organs commonly result in the death or premature birth of the calf. The germs multiply rapidly and millions of them pass from the cow with the aborted calf and subsequent discharges. The udders of a large percentage of infected cows also harbor brucellosis germs and discharge them more or less continuously with the milk.

Manufactured Dairy Products *

The Sanitary Aspects Viewed from Infant and Invalid Use

WENDELL VINCENT

Chief, Denver Station, Food and Drug Administration

Fellow Food and Drug Officials:

It is unnecessary that I inform you that I am delighted to be here today renewing some old acquaintances. I am sorry that J. O. Clarke could not be present. He, no doubt, would handle the subject assigned me in a much abler and more forceful fashion than I can. He possesses a broader concept of the problem. I trust, however, that I may leave you with some thoughts of definite value on the subject.

We in the Food and Drug Administration are finding ourselves in a rather difficult situation. We lack adequate manpower to properly carry out the mandates Congress has placed upon us through the enactment of the Federal Food, Drug and Cosmetic Act. We have entered the dairy products field—the largest industrial branch of agricultural production. Since 1933, we have been exploring its ramifications. By July 1934, the Food and Drug Administration had learned enough about conditions to feel impelled to issue a public warning to the dairy and butter industry indicating a change was going to be necessary. It was pointed out that the Food and Drug Administration had encountered numerous adulterated shipments of butter in interstate commerce. Warning was given that criminal prosecution would result where adulterated dairy products were found in interstate commerce. In 1938 a new Federal Food, Drug and Cosmetic Act became operative, and meanwhile the nation has fought a war. This new statute broadened the field of enforcement activity. It has moved the Federal Food and Drug Inspector into the producing plant, since the law provides that food and drug products manufactured under insanitary conditions whereby they may have become contaminated with filth or whereby they may have been rendered injurious to health, are adulterated. For each interstate shipment of an adulterated product, penalties are provided. The maximum fine possible can be sizable by merely multiplying counts. Jail sentences can be imposed on individuals, even officers of corporations, upon whom the responsibility for the offense can be placed. There is a provision made for enjoining manufacturers from interstate operations.

Before June, 1938, plant sanitation of food and drug factories was a matter of State or Municipal control only. But Congress, in the interest of public welfare, determined that a broadening of Federal power with respect to sanitation was necessary to maintain the integrity of products shipped from one state to another.

Today I want to discuss from a public health standpoint those dairy products, the integrity of which should be above reproach—those commodities which advertising has served to implant in the public mind as extremely important and beneficial wherever infant feeding, the growing child, or adult sickness is involved.

Let us start with the children.

* Delivered before the Mid-Continent Association of Food and Drug Control Officials at Topeka, Kansas, September 24, 1945.

Fresh milk, evaporated milk, prepared baby food and ice cream are daily extolled as necessary to the child's well being and proper development. Hospital dietitians have lent their hand to further increased consumption. Weekly, if not almost daily, you will find dietitians giving menu space to ice cream and cottage cheese in the institutions they serve. Advertising of cottage cheese leads the overly stout person to an inclusion of that item at frequent intervals in his dietary. Your home meals may even contain salads of which cottage cheese is a frequent component, due to the wife's effort to maintain either for you or for herself that sylph-like figure. In the economic scheme of things, consumption of cottage cheese and ice cream by children, invalids and others has reached enormous proportions. Perhaps the fact that butter manufacture has offered less in the way of profit has contributed in part to this. I think most of us agree that with the increased manufacturing profit in ice cream there has been a corresponding lowering of quality, especially as is reflected through its milk fat content.

How has the public benefited from all of this? I speak now as a food official with specific knowledge of what is occurring at certain points in but seven to ten of our Western States. Let's start our discussion with cottage cheese. For that item there has been provided a legal standard of identity. Among other things the standard provides that cottage cheese, likewise creamed cottage cheese, shall be made from pasteurized skim milk, or if creamed, with pasteurized cream, or a mixture of both. The product shall not contain more than 80 percent of moisture. No provision is made for the addition of artificial color or preservative. I will mention that the law also provides that it be manufactured from unadulterated materials, that is, any product containing filth or a product manufactured under insanitary conditions is precluded from use.

Our explorations in the cottage cheese field have not been too broad, but I think I am safe in concluding that if careful check were made of all cottage cheese now produced in the United States, there would be found a considerable number of manufacturers who were adding color to the product. It would not all be found of 20 percent solids content. I feel certain that were manufacturing plants carefully checked, the surreptitious use of mycoban or other preservatives would be discovered at a number of points. I am further certain that proper pasteurization is not always accorded the milk and cream entering such products. In some plants, even though adequate pasteurization is being accorded, there is later serious contamination of the article by such things as flies, cockroaches, the use of dirty equipment and in some places rodents. Cottage cheese should not be prepared or handled by people with sores upon their hands or fore arms. Entirely too much dirty milk enters cottage cheese and when the product is not properly pasteurized, or it is otherwise contaminated, it falls far short of being the ideal food for hospital use or as a delicacy at home. I have reviewed factory inspection reports dealing with cottage cheese manufacture, where I believe the product made therein was an actual instrumentality for harm. Think a moment—how many factories do you know of that add pepper to their cottage cheese—recall any? What then do you suppose black particles to be that you all too frequently observe when cottage cheese is placed before you? I'll tell you what it can be. It may be dust particles that have been sucked into the manufacturing plant by an intake fan—it might be dust particles that on a windy day have blown into the plant through open doors or windows. They are more apt to be barnyard dirt or other filth from the cow or barn that has entered the product through the milk used. Those specks may be insect parts or frag-

ments left after passing through the separator. They may well be contamination from the use of dirty equipment. They can even be the exudate from the fly's stomach after he feasted upon the product during the draining operation. They can be particles of rodent, cockroach, or other insect excreta. That is enough—we know that they shouldn't be there. How can their presence be avoided? Is it asking too much of a manufacturer supplying the over-stout and the sick with an important food element, to provide a proper building and equipment in which to produce a clean product of this character? I believe all milk that goes to provide for the sick will some day be sediment tested and the dirty product eliminated. I think your cottage cheese factory of the future will need become air-conditioned with no open windows or doors. The air entering will be filtered—all dust particles removed, and ventilation insured by means of exhaust fans. Adequate record of pasteurization of each vat of milk used will be required and such record will be supplied daily to proper health officials. Proper storage space for the few raw materials, other than milk, that enter this product will need be provided. Cottage cheese manufacture in some sections will become a big plant operation if the article is properly fabricated from clean materials. With the transportation now available, cottage cheese will cease to be a product intended but for local distribution. The small manufacturer that is careless, incompetent and dirty will cease to be a factor in this business.

I shall take but a moment to discuss the desirability of pasteurizing all milk or cream that enters cheese and ice cream. Let us omit the ordinary serious milk-borne diseases with which most of you are familiar. Let us deal only with the sick cattle. I believe I know several areas where the incidence of mastitis among cattle approaches 25 percent. Every fall and winter you hear of people suffering with strep throats or other strep infections. Mastitis is a strep infection —perhaps improperly pasteurized milk or its products contribute to these illnesses. You hear less regarding those who suffer from undulant fever. Perhaps this is because diagnosis of this disease is difficult and too expensive a job. I question if the average doctor is capable of recognizing undulant fever except in aggravated cases. As for the prevalence of Bang's disease, a contributing factor to the spread of human brucellosis or undulant fever, I am going to quote you some figures as released by the U. S. Department of Agriculture on Bang's Disease in cattle in the Fiscal Year of 1945. I give you only those herds tested in states where many of you work or which are closely adjacent thereto. Here is the record.

	Herds Tested	*Cattle Tested*	*Percentage Reactors*	*Reactors Held*
Arkansas	4,413	55,777	5.1	327
Colorado	2,855	25,014	5.4	1,333
Illinois	47,698	497,052	5.4	23,131
Iowa	13,598	166,314	9.6	....
Kansas	11,154	104,339	7.3	....
Nebraska	1,639	24,303	3.6	....
Oklahoma	2,425	53,555	4.3	436
So. Dakota	1,637	25,182	7.8	818
Texas	1,012	32,572	2.4	....

The percentage of reactors found for the country as a whole was 4.7 percent on 5,213,458 cattle tested. If you know the cattle population of the United States, you can from these figures approximate the number of sick cattle contributing to the food supply. Let me add, as far as Colorado is concerned, the best informed opinion holds approximately 8 percent

of the total cattle in the state are reactors to the Bang's test. You will note that only 5.4 per cent appear as reactors in the percentage quoted. There are numerous farmers with sick animals that do not have their herds examined because it is not compulsory. Perhaps this is a field in which health officials should interest themselves to a greater degree than heretofore.

If I understand the tabulation correctly, the "Reactors Held" column reveals that in Iowa, Kansas, Nebraska and Texas those sick cattle were eliminated from the herds after testing. Whether they were slaughtered for human consumption, I do not know. In Colorado such sick cattle are frequently sold to other dairymen. The tabulation reveals in Arkansas, Colorado, Illinois, Oklahoma and South Dakota, many sick cattle still remain. I believe we can safely assume most of them are contributing to somebody's milk supply.

When you review the August 31, 1945, report of the U. S. Public Health Service, you find that for the 32 weeks of 1945, there were reported 3,029 cases of undulant fever amongst humans, as against 2,252 reported in the corresponding period of 1944. This is quite a percentage increase of reported cases.

Now, for ice cream. There is no Federal standard for this article. Today its composition is a variable according to where and how produced. I believe it is still characterized by some dairy product ingredient. In some western cities no fresh cream enters the article. It is sometimes made of condensed milk or cream received from as far as Wisconsin. Dried skim milk from any and everywhere is utilized—butter (either salted or unsalted) comes from wherever it is possible to get it—condensed skim milk likewise. I will not bother to attempt to enumerate the imitation flavors, or colors, smoothers, anti-oxidants or fillers in general usage. At present the fat content varies according to the various requirements of State Law and effective enforcement operations. Its ingredients are limited only by the vision of its maker. Since milk, cream and butter are recognized ingredients of ice cream, let me say that reports passing my desk reveal certain manufacturers to be using only second grade cream or low quality butter in its manufacture. By second grade cream is generally meant a product of off flavor, odor or even slightly decomposed material. I ignore the filth in much of the cream at this moment. Plants that use such material, the flavor and odor of which is masked by artificial flavor, generally use their first grade milk or cream in the bottle trade.

Our work of this season has clearly revealed that entirely too many manufacturing plants are receiving and utilizing excessive amounts of filthy or dirty milk and cream in their frozen products. I will also add that the infant food, evaporated milk, is all too frequently made from excessively dirty and filthy milk, and this includes the product of some of the largest manufacturers—all nation wide advertisers. I know certain plants whose products, at least up until 45 days ago, I would not consume or allow in my home even though they were sterilized.

I wonder if the ordinary consumer does not consider ice cream something of a luxury, perhaps manufactured from superior quality milk components. Evidently hospital dietitians hold this view, as do some mothers of growing children, who supply it almost daily. Gentlemen, food and health officials are presented a serious challenge in the ice cream field. Too much filthy cream enters butter that subsequently finds it way into ice cream manufacture. We must recognize our obligation and duty to the public. We can no longer ignore the independent cream buyer and the cream station. We must clean up the insanitary ice cream plant. You will find sympa-

thetic consideration by the courts. Our first conviction at Denver brought a $3,000 fine two years ago.

As for the independent buyer, I do not see where in the economic picture he contributes anything to the welfare of the dairy industry. He will buy anything, with price the only consideration. He sells to the highest bidder wherever found. He is interested only in the monetary angle. Such an operator frequently profits more from poor quality merchandise than from dealing in good quality wares. Naturally his outlet most frequently is with those firms to which volume of production is the prime consideration and quality is incidental. In an effort to regulate the independent buyer or cream station operator, some states have promulgated regulations or enacted statutes providing for the purchase of cream by grade. Such grade requirements do not call for sediment testing of the product. Accordingly, the filth in the product is ignored in grade purchasing. In the enforcement of our Federal law we are called upon but for a few decisions—is the product good or bad—is it filthy or clean—is it potentially dangerous or not? I mention this last item because of Section 402(a)(5) in the Federal Food, Drug and Cosmetic Act. That clause provides that a food is adulterated "if it is in whole or in part, the product of a diseased animal. . . ." We have some work to do under this section.

State officials are finding that handlers of No. 2 cream frequently get a No. 1 price for it when they ship to non-discriminating buyers in adjacent states. They sometimes seek Federal help to the end of securing assistance in their effort to control or stop this practice. It is unfortunate that we cannot always render the help desired because we lack legislation to proceed against the product where only high acidity, poor odor or flavor, is involved. Unless the product is decomposed or contaminated with filth we have no basis to seize or prosecute. We cannot act merely because of its second grade character. I sometimes wonder who benefits the most—the producer, the manufacturer, or the consumer—where grade buying of cream is insisted upon. I am afraid it is the manufacturer in too many instances. Of course, if you penalize the cream producer sufficiently, it causes him to attempt better handling practices. Some, however, merely seek other more profitable outlets, which, until this time have always been existent. Some of these larger independent buyers and cream station operators are finding these outlets reduced because the Food and Drug Administration has been giving some attention to the sanitary factors of cream station operation. We have been examining their shipments with a view to prosecution. Some seizures of cream, because of filth, have been effected. I anticipate certain Federal judges may place some cream station operators in jail when they learn that cream containing more than 16,000 rodent hairs to the 10-gal. can have been shipped in interstate commerce for butter manufacture. They will doubtless consider this a serious offense. Some such rodent contaminated cream has got into butter that was shipped to Los Angeles and several churnings recently placed under seizure have revealed the rodent hair content in excess of 180,000 for the churning. I anticipate the corporation attorneys and responsible officials of the corporation will have difficulty in explaining to a Federal Court how such a thing could happen. I feel the Federal Government is now obligated to extend its regulatory program to the product of the majority of cream stations. Something is decidedly wrong when filthy churning cream ranging from 20 to 100 percent of all cans handled is characterized by such filth as to preclude the manufacture of a legal product therefrom.

Give consideration to the cream station and its location in many areas.

Too frequently it is a part of a feed merchandising establishment—again it is a combined poultry, egg and cream operation, perhaps housed in one room. Sometimes it is attached to a merchandising institution, either groceries, a hide-buying or selling organization, or again farm implements are handled. Our investigations reveal that "there ought to be a law" regulating this business. You cannot expect a poultry buyer, hide buyer, a man with a tractor to sell, or a man with the prospective sale of a week's grocery supply, to reject the frequently small delivery of poor quality cream which his potential customer brings him each Saturday. You know that in some sections of the United States approximately 30 percent of the cream purchased by cream stations is acquired on Saturday. The cream station operator is a very busy man—he hasn't much time to spend on quality that day. Too many farmers are in town. Perhaps it would help if a program were inaugurated that would bring the farmers to town on days other than Saturday.

I understand that sediment testing of creams moving in interstate commerce from the State of New Mexico has gotten under way in a big fashion since last September 1st when influential factors in the butter business decided that profit was no longer the only motive to be considered. A Federal seizure of a good many thousands of dollars worth of butter, with its subsequent use for soap grease, upon Federal court order, produced this change of procedure.

You may be interested in some of my views on the sanitary features of cream station operation. In the first place, I think the public is entitled to demand that cream buying be conducted in a separate room or building from poultry buying and killing operations; also, away from the gas and oil selling business, such business contributes odors that can adversely affect the cream. Needless to say, the station should be properly screened, rodent proof, and insect free. Good sanitation demands: (1) Adequate space and proper ventilation. Surroundings should be such that aesthetically minded individuals will not be offended. There should be no hog pens, hide warehouses, chicken yards, or other offensive conditions adjacent which by their very presence could contribute to insanitation within the room. Perhaps a cream station should be required to be at least 50 to 100 feet distance from any fly or other insect breeding ground. I think a few states so require.

(2) Walls of buildings should be designed of a smooth, hard, impervious surface that is washable. Floors should be of concrete with a smooth finish, properly sloped to a drain which has a trap beneath. That drain should lead to a sewer outlet, covered cesspool, or otherwise discharge through a closed pipe at a comfortable distance from the station building; otherwise, flies traveling back and forth impair plant sanitation.

(3) Inside toilets with open doors into the cream buying and dumping rooms should be eliminated. All too frequently we find those toilet doors open, and flies engaged in their sundry occupations to the detriment of cream quality.

(4) Many small cream stations lack adequate boiler facilities; likewise adequate water supply and they, therefore, return the producer a dirty and frequently vile-smelling container. I think the producer should be required to deliver cream in a seamless receptacle. This would eliminate completely the lard can, the oil can and jelly pail, even the old style milk can with seams along the side. If you ever bothered to smell many of those containers you would, I am certain, find they are all too frequently of vile odor. Bacteria counts on the corruption dug from the seams of many cans used to deliver cream are astronomical.

(5) A cream station should have a

hot water supply adequate to its volume of business and ample can racks provided to permit of proper draining and drying. Too many milk cans are returned to the producer in a filthy condition and likewise too many large factories in the dairy business are now returning dirty and filthy cans to their stations. Certainly, someone needs to build a better can washer or the factories need to give more attention to their cleaning, retinning, etc. The exhibit material that has passed my office the past few months taken from cream cans returned to cream stations would bring chagrin to the high officials of some large corporations.

(6) The cream station needs an adequate supply of cold water or else special equipment to properly cool and hold its product. So much for the basic requirements of cream station sanitation.

If the station manager does not test for sediment, he knows nothing of the filth condition in the cream he is buying. He can do his principal, or buyer of his merchandise, a serious financial injury. If he tests, he may find all too frequently that a producer has removed a rodent from the material he is delivering. That cream which contained the rodent can contaminate a good many other deliveries according to the procedure practiced at the station. Most cream recovered from can rinsings and steamings in the stations with which I am familiar is a pretty poor product. Unless better handling of this phase of cream station operation is provided, you can expect to find this product contains considerable filth. Any butter manufacturer who has utilized rodent contaminated cream, can expect the Federal Government to prosecute him each and every time such butter is encountered in interstate commerce. The cream station operator can expect to be prosecuted when we find him shipping cream with numerous rodent hairs therein.

As food officials, what do you gentlemen think is the proper tolerance for rodent hairs in milk and cream, some of which finds its way into cottage cheese or ice cream? Remember in our cream work, we take for sediment examination what is termed an "average sample," the can is stirred thoroughly before the pint is drawn. Assuming we have an average sample, then 1 rodent hair per pt. means there are 80 in the 10-gallon can. Were the average consumer called upon to determine what tolerance health and food officials should apply, where do you think the figure would be placed?

Gentlemen, I have taken a lot of your time. There is just one more matter that comes to mind. We are all striving to the same end, better protection for the consumer. It is our duty and under our oath of office we are called upon to insure at least the dairy products for infant and invalid use are fit and safe to eat. If we haven't the personnel with which to do the job properly, I believe it is time that we acquaint the public or the lawmakers with the facts as they exist. The general public will support the food and health official to the end that the consumer be protected. There are certain large factors in the dairy industry contributing large sums of tax money in the various states and to the Federal Government. Even some of those concerns which might be quality minded may not survive unless their competition be forced to handle clean merchandise, in clean factories and with clean equipment. It costs money to keep a dairy plant clean and the excuse of labor shortage will no longer satisfy a consumer who is particular as to what goes into his and his family's stomachs. This problem of sick animals daily contributing to the milk supply should no longer be ignored by health officials because we all know that too much cheese and ice cream and milk reach the consuming public without any or adequate pasteurization. How many dairy plants in the

course of your experience failed to make you a daily milk delivery even though they had boiler or other pasterization equipment difficulties which precluded proper treatment of that day's milk? I believe all milk bottling and other dairy plants should have auxiliary boiler capacity in the case of accident or other untoward incident.

Gentlemen, all Federal, State and Municipal Food, drug and health control officials now stand at the crossroads. We are not giving the consuming public the service and the protection which law demands. We are not properly policing the dairy industry. I leave you with this statement: At no time in the canning business, in fact in any business, have I seen such a general disregard of common decency in the handling and preparation of food products as daily presents itself at various points in the dairy picture. Long observation of improper practices by responsible officers, managers and owners of dairy establishments has made them callous.

Can we awaken anyone, at any place, to a greater recognition of their responsibilities in behalf of public welfare, then our efforts have not been in vain.

NEW RESEARCH SHEETS TELL HOW SCIENCE SERVES AGRICULTURE

The Agricultural Research Administration of the U. S. Department of Agriculture announces four new additions to its series of 2-page reports, known as research achievement sheets. The reports, written in nontechnical style, summarize the results of research having beneficial applications to agriculture, industry, and public welfare. The subjects described in two of the four research sheets relate primarily to plants, and the others concern animals, including man. The titles and serial numbers of the sheets are:

40(P) Apple scald controlled by use of oiled wraps

41(P) Self-boiled lime-sulfur spray, first successful fungicide for peach brown rot and scab

42(A) Effective drug treatment for hookworms

43(A) Catalogue of animal parasites of the world

In each case, the text of the research sheet describes the nature of the problem, how it was solved, and practical current applications. There are also references to sources of more detailed information. Copies of the sheets are available on application to the Coordinator of Research Publication, U. S. Department of Agriculture, Washington 25, D. C.

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Associations Which Have Designated the
JOURNAL OF MILK TECHNOLOGY
As Their Official Organ

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Chairman, Donald K. Summers, Charleston 1, W. Va.
Secretary-Treasurer, J. B. Baker, Department of Health, Charleston, W. Va.

Association News

Massachusetts Milk Inspectors' Association

On January 8 and 9, 1946, the annual meeting was held at Worcester, Hotel Sheraton, with the following program:

"Practical Suggestions in the Control of Coliforms and Thermophilic Bacteria in Pasteurized Milk", C. W. Weber, New York State Health Department.

"Post-War Developments in the Control of Milk Supplies", A Panel Discussion by: Leonard M. Higgins, Boston Health Department; Lester T. Tompkins, State Department of Agriculture; and A. A. Robertson, Health Department, Newton.

"Fundamental Training of Milk Inspectors for the Post-War Period—A Challenge to Dairy Colleges", Professor L. H. Burgwald, Department of Dairy Technology, Ohio State University, Columbus, Ohio.

"Quaternary Ammonium Compounds—A New Approach to Dairy Sanitation", Dr. C. A. Lawrence, Head of Department of Bacteriology, Winthrop Chemical Company, Rensselaer, New York.

"Some New Developments in the Retail Delivery of Milk", Professor L. H. Burgwald, Department of Dairy Technology, Ohio State University, Columbus, Ohio.

A committee is working on revision of the dairy laws and plans to report later to the Recess Commission.

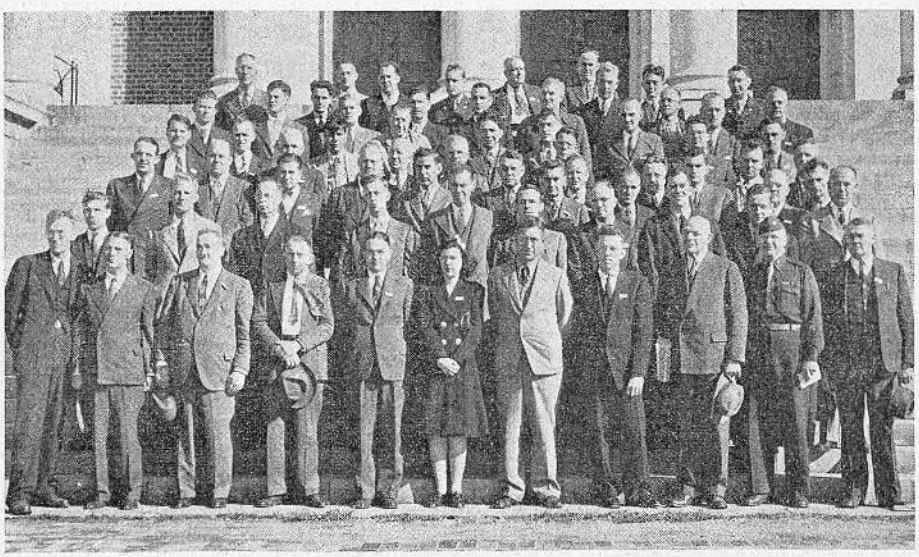
ROBERT E. BEMIS,
Secretary-Treasurer.

DAIRY INSPECTORS' AND TECHNOLOGISTS' CONFERENCE AT UNIVERSITY OF MARYLAND

A three-day conference for dairy inspectors and technologists was held October 24 to 26, inclusive, at the University of Maryland, College Park, Maryland. This conference, sponsored by the Technology Section of the Dairy Department of the University in cooperation with the Maryland State Health Department and the U. S. Public Health Service, is now planned as an annual affair at the University. One hundred and thirty-five inspectors, sanitarians, dairy plant technicians and field men, and dairy equipment company representatives were present from fifteen health departments, twenty-six dairy concerns, and seven dairy equipment and supply companies. Nineteen speakers were on the varied program—presenting topics pertaining to all phases of the dairy industry. I. A. Gould, Professor of Dairy Technology, University of Maryland, was program chairman. The highlights of the program were as follows:

First day: "Milk Sanitation Problems," W. W. Burdette, Assistant Director Food Inspection, District of Columbia, and Ivan Marty, Director of Milk Control, City of Baltimore; "Epidemiological Aspects of Milk Sanitation," Dr. R. H. Riley, Director Maryland State Health Department; "The Use of DDT in Dairy Plants and Dairy Barns," Dr. E. N. Cory, Head, Entomology Department, University of Maryland; "New Developments in Plant Construction and Design," Major M. M. Miller, U. S. Public Health Service; "Meeting Public Health Requirements with Modern Dairy Plant Equipment," D. C. Lightner, Sales Manager, Creamery Package Manufacturing Company, Chicago.

Second Day: "Present Status of Short-Time High-Temperature Pasteurization," Dr. A. H. Rishoi, Cherry Burrell Corporation, Chicago; "Practical Problems in Controlling Vat Pasteurization," Dr. C. W. England, Director of Research, C. Y. Stephens Dairy Industries, Washington, D. C.;



Picture of group present at afternoon session of third and final day of the Dairy Inspectors' and Technologists' Conference at the University of Maryland

"The Place of the Laboratory in a Milk Sanitation Program," Dr. C. A. Perry, Director of Laboratories, Maryland State Health Department; "Controlling Heat-Resisting Bacteria in a Pasteurization Plant," P. E. LeFevre, Director of Laboratories, Chestnut Farms-Chevy Chase Dairy, Washington, D. C.; "The Coliform Tests and Their Interpretation," F. J. Gregarek, Assistant Professor Dairy Technology, University of Maryland.

Third day: "The Dairy Production Extension Program and Its Relation to Quality Milk," George Hyatt, Jr., Dairy Specialist, University of Maryland; "Improved Methods and Materials for Cleaning Dairy Equipment," C. W. Rink, Technical Director, Diamond Alkali Company, Pittsburgh; "Some Educational Problems," Dr. T. B. Symons, Dean of Agriculture, University of Maryland; "Practical Considerations of Dairy Farm Layout and Milk House Construction," Wm. H. Kahl, Field Engineer, Portland Cement Company, Baltimore; "Minimum Milk House Requirements," C. S. Brinsfield, Sanitary Inspector, Maryland State Health Department.

Massachusetts Dairy Industry Short Courses, 1946

Professor J. H. Frandsen of the Department of Dairy Industry of the Massachusetts State College announces that the department will offer four special and practical short courses of interest to dairy people. These courses are especially intended to satisfy the needs of those interested in certain phases of the work and who do not feel that they can be away for an extended period.

The *first* course will be in *Milk and Cream Testing; How to Take Samples; Analyzing and Inspecting of Milk Products,* and problems pertaining thereto. This course will run from January 21–26, 1946.

The *second* course is planned for those interested in *Milk Plant Operation and the Manufacture of Milk Products from the Surplus Milk.* This course will run from January 28–February 2, 1946.

The *third* course is a *Review of the History and Development of the Ice Cream Industry, together with the Application of Desirable Practices in the Ice Cream Field.* This course is especially planned for those with limited experience in ice cream work, and will run from February 4–February 9, 1946.

The *fourth* course is a *Week of Intensive Training for the Experienced Ice Cream Maker.* This course is especially planned for those who have had some experience in ice cream making or who have taken the *third* course. It will run from February 11–16, 1946.

The two ice cream courses are so well coordinated that many plan to take both courses.

These courses are arranged so that even the busy man should be able to get away for the length of time required.

Full information regarding these short courses may be secured from the Department of Dairy Industry, or from the Director of Short Courses, M. S. C., Amherst, Mass.

Food-Handler's School

A Food Handler's School, the first of its kind held in Washington County, was conducted October 23, 24 and 25 in Johnson City. The purpose of the school was for the training of fountain, cafe, and restaurant employees as a means of contributing community service to tourists and to provide courteous and efficient service to shoppers and others frequenting public eating places.

The school was sponsored by the Johnson City Chamber of Commerce in cooperating with the Washington County-Johnson City Health Department, State Health Department, and the United States Public Health Service.

Plans were discussed and made for carrying on the school by J. Lashley Johnson, senior sanitation consultant of the State Health Department; G. W. Kilday, junior consultant of Sullivan County; Bernie C. Hall, sanitarian of Johnson City; Glen Fulkerson, sanitarian of Sullivan County Health Department; T. B. Link, junior sanitation consultant, and E. C. Seaton, sanitarian, both of the Washington County-Johnson City Health Department; Fred Yearout, Chamber of Commerce President; William P. Pence, Secretary; E. R. Baylor, Chairman of the Chamber's health and sanitation committee.

Major L. H. Male of the New Orleans Office of the U. S. Public Health Service led the instruction classes. He was assisted by Captain E. K. Day of the U. S. Public Health Service, assigned to the Tennessee Public Health Department.

Fred Yearout, Chamber President, addressed the opening session, emphasizing the importance of such training in Johnson City. Mr. M. U. Snodderly, City Manager, also addressed the opening of the classes.

The school had a total enrollment of 288 persons, representing 44 eating establishments or more than half the number in Johnson City. Twelve city schools were included in the establishments which participated. Of the total number registered, 98 completed the course—attending all three classes. Fifty-seven of the total number attended two classes, and 133 attended only one class.

Individual certificates were awarded to all persons who attended the classes, and each food establishment represented was given a display certificate.

Visitors from six other communities observed the school program with an eye to inaugurating similar movements in their cities. Represented were Bristol, Kingsport, Elizabethton, Jonesboro, Knoxville, and Bluefield, West Virginia.

The following subjects were covered: Preventing the spread of communicable disease; bacteriology and its relation to food handlers; communicable diseases which may be spread in food establishments; proper and improper methods of handling food utensils; the house fly; food poison; refrigeration and food storage; personal hygiene; household pests, such as flies, roaches, rats, etc.; utensil washing and sterilization.

Mrs. Katiee Ledwell, Distributive Education Coordinator for Science Hill High School, presented these additional subjects which will be covered at future schools: Food service; personnel and customer relations; carbonated drinks, profitable service techniques; nutrition and meal planning, and food handling as a sales person.

There is no doubt as to the benefits accomplished in the three-day school as evidenced by the following: one operator of a restaurant has already purchased a mechanical dishwasher, also a sanitary sugar dispenser to replace the open sugar bowls that were in use; two other restaurant owners have been seeking information on the price and type of mechanical dishwashing machines. A number of requests have been made for information on approved equipment for public eating places.

Tentative plans are now being made to continue holding schools for food handlers on a quarterly basis, beginning in January, 1946. The Johnson City Chamber of Commerce will continue to sponsor the schools. If plans materialize, even greater interest on the part of food handlers is anticipated. It is hoped eventually, to make it possible for only those holding food handlers permits to be able to secure employment in food handling establishments.

Rose M. Robinson
Health Education Coordinator
Washington Co. Health Dept.
Jonesboro, Tennessee

Dr. Brooks Retires

Time passes rapidly. It seems such a short time since the *International Association of Milk Sanitarians* faced a difficult problem of replacing their spark plug, dynamo, and, in fact, the guiding spirit, when Secretary Weld passed away. Fortunately, at this time our membership included Dr. Brooks of the New York State Health Department, an extremely active and busy public health official, who was vitally interested in milk problems. In true American style Dr. Brooks volunteered to assume temporarily Weld's work as Secretary, and he not only carried on the secretarial work but fostered, kept alive, and further developed the spirit that Weld had implanted into our organization.

Dr. Brooks continued his work as Secretary of our Association for several years, even in the face of additional duties assigned to him in the State Health Department. He engineered our annual meetings, prepared our programs, edited the minutes, performed untold other tasks that benefited our Association. Through his untiring work and spirit our Association was advanced, and developed. After relinquishing the secretarial duties Dr. Brooks' interest in our Association did not lag. He seemed to work harder on committees and become more active in the conduct of annual meetings; being always a steadying, helpful, and guiding influence.

The time has come for Dr. Brooks to retire from his position with the New York State Health Department, and on behalf of our Association we wish him well, and trust that he may find new pleasures in the added leisure. At the same time, we are hopeful and feel sure that he will continue to be active in our Association, as it is only by the help and support of such true milk sanitarians as Dr. Brooks that our Association will retain its leadership in the field of milk sanitation.

We will long remember Dr. Brooks for his fine work in the milk field, but longer will we remember and cherish the privilege of knowing him and having come under his influence and counting him as a real friend.

Again, we salute Dr. Brooks and attempt to thank him for his wonderful contributions to our organization, and request him to continue the good work.

R. R. P.

Paul B. Brooks, M.D., an associate editor of this journal, author of the "'Dr. Jones' Says—" articles that have appeared in the JOURNAL for the past five years, and contributor of scientific articlts, retired on January 1 as Deputy State Commissioner of Health of New York State. Dr. Brooks has been active in the work of the *International Association of Milk Sanitarians* having served as secretary-treasurer from 1929 to 1936. He was one of the prime movers in having the name of the association changed from *International Association of Dairy and Milk Inspectors* to INTERNATIONAL ASSOCIATION OF MILK SANITARIANS which he held was more descriptive of the work in which the majority of members were engaged since many did

investigational work and others were administrators. He also held that the new name was a more dignified one for the men actually making inspections.

Dr. Brooks is the son of a practicing physician. Following in his father's footsteps, he attended University and Bellevue Hospital Medical College, now New York University Medical College, from which he was graduated in 1903, then as an interne on the Third Division of Bellevue Hospital and for seven years in the practice of medicine in his native village of Norwich, N. Y. After serving as a member of the board of health of Norwich, he entered the service of the State Department of Health in 1915. He has served on the staff of that department for the past thirty years, first as district sanitary supervisor, then as Director of the Division of Communicable Diseases, as Assistant Director of the Division of Laboratories and Research and for the past twenty-two years as Deputy Commissioner under three commissioners.

Dr. Brooks has written many articles on the subject of milkborne communicable disease in which he has stressed the importance of the spread of disease from udders infected with pathogenic streptococci of human origin.

It is not necessary to describe Dr. Brooks' fine personality to members of this association, many of whom know him as a personal friend. He has retired early in life and although we wish him to enjoy his retirement, we are looking forward not only to continuing to receive his counsel but to see him at meetings, and peprhaps to get an occasional pearl of wisdom for publication.

W. D. T.

Emerson once said that a great institution is the lengthening shadow of a single man. Our association has grown into a great institution in which the imprint of Paul Brooks is everywhere evident.

The first of his papers appeared in 1927 in the Annual Report of the Association. Thereafter they appeared with increasing frequency. They are always interesting and timely, and show advanced thinking on milk sanitation. When Paul Brooks presents a paper, the sleepers arouse, the talkers desist and everyone takes notice for he commands the respect of his associates. He is always the master of any situation. Many times we have seen his sly humor break the tension, and turn what might have been an awkward moment into a humorous one. His rare sense of humor, combined with good common sense, is well illustrated in his "syndicated" articles, "Dr. Jones Says," running in the country's two leading health journals, *The New York State "Health News"* and the *Journal of Milk Technology.*

A year after the death of Ivan C. Weld, the first Secretary-Treasurer of the Association, Brooks was elected and served in this capacity until 1937, when he was succeeded by Sidney Leete, the present incumbent. When one considers with what respect and honor Mr. Weld was held by the old timers, then one begins to appreciate the high regard they had for Dr. Brooks, when they made him Mr. Weld's successor.

In 1940 the Association honored him with its highest office, the presidency. To this office he brought his capable administrative abilities and served the Association with distinction.

However, important as the foregoing capacities may be, I do not believe they are the true measure of Dr. Brooks' value to our association. In first value should be placed his quiet but vigilant attention to the speakers on the pro-

(Continued on page 62)

Industrial Notes

CREAMERY PACKAGE ACQUIRES SOUTHERN DAIRY SUPPLY CO. AT HOUSTON

The Creamery Package Mfg. Company has acquired the property of the Southern Dairy Supply Co. at Houston, Tex., formerly owned and operated by V. T. Mahon.

According to the announcement, the newly acquired property will be operated as a Creamery Package sales branch and warehouse. The transaction with Southern Dairy Supply Co. was an outright purchase and included the company's entire stock of equipment, supplies and warehouse facilities.

The new move is in line with the policy of President and General Manager George E. Wallis to consolidate the company's position in key points throughout the south and southwest,

Left to right: V. T. Mahon, former proprietor of Southern Dairy Supply Co.; John B. Heumann, Creamery Package division manager; Ralph Nultemeier, manager of the new Houston branch

beginning with the opening recently of the company's branch in Nashville, Tenn.

Manager of the new Creamery Package branch will be Ralph Nultemeier, who has previously been attached to the Dallas branch as sales engineer. Prior to his connection with Creamery Package Mr. Nultemeier was a sales manager for Continental Baking Company. He joined Creamery Package in 1941, as representative in northwest Texas. In January of this year he was made sales supervisor of the Dallas branch.

Mr. Nultemeier has an enviable record as a refrigerating and dairy equipment engineer and is well qualified by 22 years' experience to serve the dairy industry in his new territory.

Overall supervision of the Houston branch will be under the direction of John B. Heumann. southwest division manager, whose headquarters are in Dallas.

Another important new member of the Creamery Package family at Houston will be V. T. Mahon, former proprietor of Southern Dairy Supply Co., who has joined the Creamery Package organization as special representative. Mr. Mahon will continue to maintain his headquarters at Houston where he will be glad to welcome the many friends he has made during his long service in this territory.

WORK IS PROGRESSING ON NEW CREAMERY PACKAGE ADDITION AT LAKE MILLS

Work is progressing rapidly on a modern daylight steel and concrete addition to the Lake Mills, Wis., plant of The Creamery Package Mfg. Company. According to engineers in charge of construction, the new building will be equipped and ready for operation by April of 1946.

According to George E. Wallis, president and general manager of the company, addition of the new building will greatly increase the production facilities of the Lake Mills plant. He further pointed out that the plans include the installation of the latest type of welding and fabricating machinery plus many other modern improvements of advanced design which will result in improved quality of workmanship as well as larger output.

Ground breaking ceremonies for the new addition, which took place Friday, October 26, were attended by two special guests from London, England, as well as the president and officials of the Chicago offices. President Wallis spaded the first shovel of dirt.

The special guests from London were D. C. North, Managing Director, The Creamery Package Mfg. Company, Ltd., London, England and G. M. Chantrey, a Director of the London affiliate.

All windows in the addition will contain a new type of frosted, hammered glass which will provide improved working conditions and eliminate a high percentage of heat absorption. Ventilation will be provided by an automatically controlled forced air supply and exhaust system of the latest type.

Among the products to be produced at the new Lake Mills plant are the CP Wizard Cold-Storage tanks, CP Cylindrical storage tanks, CP Model B and Pacemaker pasteurizers and Wizard Multi-Process pasteurizers. Other well known CP products which will be produced in greater capacity at the new plant are CP Bantam, CP Junior and CP Style "C" Soaker bottle washers, CP can washers, CP flavoring tanks and CP cheese vats.

All welding operations will be in the east bay. Fabrication and assembly of machines which are constructed

largely of stainless steel will be done in the west bay, while the center bay will house all of the heavy sheet metal working machinery and the large automatic welding machines. The fabrication and assembly of large storage tanks will also be done in the center bay.

There will be three traveling cranes in the building; one three-ton crane for each of the side bays, and one 10-ton crane will serve the center bay.

A superintendent's office, time study office, and a modern and fully-equipped first aid room, together with toilets, showers, and locker rooms, will be located in the east wing adjacent the present factory building. The entrance and personnel office will be on Fargo Street.

An addition to the present boiler house will also be built to house a new 250-horsepower water tube boiler. The present stack will be removed and will be replaced by a much larger and higher one to take care of the increased boiler capacity.

A modern lighting system which will give 30-foot candles of illumination at working levels is another of the numerous improvements planned for the new plant.

G. W. Putnam, vice president of Creamery Package Mfg. Company shakes hands with President G. E. Wallis at ground-breaking ceremonies for new Lake Mills, Wis., addition. Others, left to right, are O. E. Stone, D. C. North, managing director of the company's London affiliate; G. M. Chantrey, also a director of the London affiliate; R. V. Thomas and I. R. Hippenmeyer

New Members

ACTIVE

De Albergaria, Dr. Eduardo Ferreira Soares, Assistant for Technology and Inspection of Animal Products, I, 3º.-Dto., Praca Ilha do Fayal, Lisbon, Portugal

ASSOCIATE

Ackley, Robert R., Director, Industrial Division, Onyx Oil & Chemical Co., 15 Exchange Place, Jersey City 2, N. J.

Ambrose, Clayton G., Technical and Service Representative, Oakite Prod., Hotel Mark Twain, Elmira, N. Y.

Aradine, A. W., Supervisor, Babson Bros. Co., Churchville, N. Y.

Barnes, John Stetson, Chief Engineer, Borden Co., 350 Madison Ave., New York 17, N. Y.

Barnes, Roy M., Service Representative, Wyandotte Chem. Corp., 43 Fountain St., Clinton, N. Y.

Barrows, George Ernest, Chemist, Dairymen's League Co-op. Assn., Inc., R.D. #3, Baldwinsville, N. Y.

Beakes, Mahlon H., Salesman, Cherry-Burrell Corp., 330 W. 42nd St., New York, N. Y.

Bishop, L. L., Plant Supt. and Field Supervisor, Bowman Farm Dairy, Box 2035, Madison 5, Wis.

Blodgett, R. W., President, Mid-West Bottle Cap Co., Belvidere, Ill.

Borch, Oscar Vanden, Dairy Equipment, International Harvester Co., 109 Van Bergh Ave., Rochester, N. Y.

Brocker, Walter E., Dairy Inspector, State Department of Agriculture, 128 W. Spirit Ave., Tomahawk, Wis.

Brooks, H. E., Dairy Service and Manager, Dairymen's League, Accord, N. Y.

Buchanan, L. C., Dairy Serviceman, Dairymen's League, 251 So. Main St., Mansfield, Pa.

Butler, Ralph R., Mgr. Milk Filter Department, Kendal Mills, Walpole, Mass.

Campbell, Weldon E., General Supt., The Borden Co., 2126 N. Broadway, Oklahoma City, Okla.

Cobb, Frederick M., Dairy Sanitarian, Darymen's League, P. O. Box 108, Cobleskill, N. Y.

Colvin, Robert J., Tech. & Service, Oakite Prod. Inc., 1562 Westmoreland Ave., Syracuse, N. Y.

Davis, David A., Production Supervisor, Moores & Ross, 1227 Bryden Rd., Columbus 5, Ohio

Dreifke, Henry, Manager, Dairyland Co-op Assn., Waterloo, Wis.

Fischer, Dr. S. B., County Veterinarian, Suffolk County Dept. of Health, Horton's Lane, Southold, N. Y.

Flynn, Miss Jane M., Laboratory Technician, New York State Health Department, 121 Lincoln Blvd., Kenmore, N. Y.

Francis, Richard, Chief Sanitary Inspector, City of St. Augustine, 202 San Marco Ave., St. Augustine, Fla.

Frasier, Kenneth, Dairy Serviceman, Dairymen's League, Hillside Apts., Kingston, N. Y.

Galles, Leo T., Galles Dairy (Owner), 734 N. Wisconsin St., Port Washington, Wis.

Ganguli, Dr. D. N., Director, National Nutriments Ltd., 12, Chowringhee Sq., Calcutta, India

Garber, Jacob B., Plant Mgr., Lancaster Milk Co., Lititz, R.D. 3, Pa.

Grabo, John Douglas, Dairy Inspector, General Dairy Service Corp., 2140 Oaklawn Ave., Schenectady 6, N. Y.

Grauer, John Jacob, President, Frasea Farms Ltd., 225 Grauer Rd., Eburne, B. C., Canada

Hamilton, Reeve A., Inspector, Sussex Milk & Cream Co., 111 Baldwin St., Hackettstown, N. J.

Hanson, Mrs. Martha, Supervisor, State Co-operative Laboratory, Superior, Wis.

Harding, Harry G., Chem. Eng. Nat'l Dairy Products Corp., 5705 Chilham Rd., Baltimore 9, Md.

Harsh, Lynn W., Milk Sanitarian, Suffolk County Dept. of Health, 188 Church St., Northport, N. Y.

Herrick, A. E., Plant Manager, M. H. Renken Dairy Co., 60-32 Woodbine St., Brooklyn 27, N. Y.

Herrick, Sherlock A., Retail Sales Manager, R. G. Wright Co., Inc., 2933 Main St., Buffalo 14, N. Y.

Hill, James R., Dairy Inspector, 4 County Creameries, Inc., Whitney Point, N. Y.
Holland, Robert F., Prof. of Dairy Industry, State College of Agriculture, Dairy Dept., Cornell University, Ithaca, N. Y.
Howe, L. D., Plant Manager, Crowley's Milk Co., Nichols, N. Y.
Hoyer, Clifton W., Fieldman, La Crosse Milk Producers Co-operative Association, 1732 Madison St., La Crosse, Wis.
Irwin, George W., Dairy Inspector, Borden Farm Products Co., Box 42, Pine Plains, N. Y.
Jackson, U. L., Division Superintendent, De Laval Separator Co., 67 Bonnell St., Flemington, N. J.
Jeerings, Carl E., Mgr., Farm Service Dept., 89 East Ave., Rochester, N. Y.
Johnson, E. H., Senior Sanitary Officer, Seminole County Health Unit, P. O. Box 158, Sanford, Fla.
Johnson, Lloyd W., Laboratory Director, Bryant & Chapman, Div. General Ice Cream Corp., 255 Homestead Ave., Hartford 1, Conn.
Jones, Flint H., Galloway-West Co., 36 N. Park Ave., Fond du Lac, Wis.
Klosner, Laurence, Dairy Inspector, Hoffman & Dudo, Campbell St., Lowville, N. Y.
Kubit, Murray, Assistant to President, Consumer-Farmer Milk Coop., Inc., 406 E. 21 St., Brooklyn 26, N. Y.
Laeser, Walter G., Field Representative, The Diversey Corp., Spring Harbor, Madison 5, Wis.
Lake, G. Robert, Sanitarian, Sarasota Health Department, City Hall, Sarasota, Fla.
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"Dr. Jones" Says—*

You folks that like to read detective stories: did it ever occur to you that it takes considerable and, I might say, rather clever detective work to trace some of these communicable disease epidemics to their sources? Yes, sir, anybody that was handy at writing, as well as acquainted with the facts—some pretty good stories could be written about some of the jobs these epidemiologist fellows have done.

Of course they don't get shot at very often or anything like that, although I recall one of 'em—the place where he was investigating they threatened to shoot him if he came back. But apparently they changed their mind. But they've been "shot" before now, with the germs of the diseases they've been investigating. Of course that ain't quite so spectacular but it may be just as dangerous. And some of these detectives that'd walk in on an armed gangster—I doubt if they'd be half so ready to face a case of smallpox or epidemic meningitis.

Just an illustration: here a few years ago, they had an outbreak of scarlet fever among employees of a plant that was collecting milk to be made into cheese—employees and their families. Well, tracing it to the milk, that was comparatively simple. They all took home milk from the plant and there was nothing else in common that could've caused it. They knew (these health department boys) that the disease probably came from the udder of one cow that'd been infected by one milker. But this plant was getting milk from several thousand cows, scattered over better'n three hundred farms.

They found out that the men in the plant all got their milk about the same time every day and that milk from certain farmers usually came in around that time. So, the next day, as the milk came in, they got a sample from each farm. They examined it under the microscope and hadn't been at it long before they found one that had suspicious looking streptococci and so on in it. A veterinarian went to the farm and—well, to make a long story short, they found the cow and the milker that apparently had infected her.

Yes, sir. I've read detective stories all the way from "Nick Carter" and "Old Sleuth" to "Sherlock Holmes" and up. But I don't believe I ever got more kick out of one than I did from the story of that epidemic.

PAUL B. BROOKS, M.D.

* *Health News*, New York State Department of Health, Albany, Aug. 13, 1945.

DR. BROOKS RETIRES

(Continued from page 55)

gram. Pity the speaker who makes a slip or a statement not in accord with the established facts! His broad knowledge and keen interest in milk sanitation keeps him well posted on what is what in milk sanitation and he serves as a monitor in this field.

As one looks back over the roster of illustrious names in milk sanitation, he is impressed by the fact that few have stuck by the Association as has Paul Brooks. For this loyalty and interest we are most appreciative. We are sure that while his retirement as Deputy Commissioner of Health of New York State will be a great loss, we know that it will be our great gain because now he will have more time to devote to the Association.

F. W. F.