A Survey of the Direct Microscopic Method of Examining Milk and Cream Samples in Approved and Registered Laboratories of Connecticut*

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SINCE October 1, 1945, a state law, Section 601h of the 1945 Supplement to the General Statutes, has provided for the registration and approval of dairy laboratories, both public health laboratories and those maintaining plant control, and for inspection by the State Department of Health. This law applies to all examinations, determinations or tests on milk, milk products, cream, and frozen desserts, and to the containers or packages in which these products are sold. All such laboratories must register with the Department, but a laboratory need not be approved so long as the results secured are used solely by the person, firm, or corporation operating it. A laboratory which reports results for use by any person, firm, or corporation other than the one maintaining the laboratory must hold an unexpired certificate of approval issued by the Department. Certain specific exemptions are provided in the statute to prevent conflict with other laws.

During the last quarter of 1945 and the first quarter of 1946, inspection visits were made to eighteen approved and registered laboratories which include the direct microscopic method of examining milk and cream samples in their control program. The purpose of this series of visits was to determine the degree of uniformity, or lack of it, with which this microscopic procedure is being carried on statewide in Connecticut laboratories. The laboratories visited were of three general types:

(1) Two registered laboratories and six approved laboratories operated by dairy plants for the control of their own products. Seven were using this method.

(2) Seven approved municipal and state laboratories, only five of which were using the direct microscopic method.

(3) Three privately operated approved laboratories only two of which were using the direct microscopic technic.

A report was made to the director of each laboratory visited giving in detail the findings for the laboratory and suggestions for improvement in performing the microscopic technic. A copy of the report was furnished in each instance to the laboratory or to the person in charge of the department of which the laboratory was a part, and a copy of each report was submitted to the State Dairy and Food Commissioner.

The reported number of examinations made in the 14 laboratories visited was 5,000 per month with a range for the individual laboratories of from 15 to 1,600 per month. These figures, as shown in Table 1, would seem to indicate that far greater use of this technic is desirable in local laboratories in Connecticut.

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TABLE 1

CONNECTICUT STATE DEPARTMENT OF HEALTH, BUREAU OF LABORATORIES

NUMBER OF DIRECT MICROSCOPIC EXAMINATIONS MADE AND DEVIATIONS FROM STANDARD PROCEDURES IN 18 CONNECTICUT LABORATORIES

		1	2	3	4	5	6	7	8	9
Class and Name of Laboratory and Identification	*Number of Examinations per Month*	*Unsterile Sampling*	*Unnecessary Sterile Technic*	*Storage of Pipette*	*Drying Smear More Than 5 Minutes*	*Slides Etched*	*Unapproved Stain*	*Unstandardized Microscope*	*Filing Slides*	*Reports Assuming Accuracy*
Municipal and State Laboratories	1,985									
A	80									
B	90	x	x			x	x	x	x	x
C	15		x	x		x			x	x
I	*									
J	*									
M	1,600							x		
P	200		x	x	x					
Dairy Plant Laboratories	1,780									
D	30		x	x		x				
E	550		x	x			x			x
F	100	x	x	x			x			x
G	50	x	x	x		x	x		x	
H	780				x		x	x	x	
N	150		x	x			x			
Q	*									
R	120		x	x	x		x			x
Private Laboratories	1,260									
K	740				x	x			x	
L	520					x	x			
O	*									
Totals	5,025	3	9	8	4	6	8	3	5	5

* Technic not in use at time of visit.

Standard Methods for the Examination of Dairy Products, 8th edition, published by the American Public Health Association, and Approved Method MK4 of the Bureau of Laboratories, Connecticut State Department of Health, have been used as the basis for determining compliance of the laboratories with standard procedure. The Approved Method MK4 does not deviate from the standard method but was designed to be more explicit in respect to the procedure to be followed. For example, although more than one staining technic is allowable in "Standard Methods" only one method is approved in order to encourage uniformity among these Connecticut laboratories.

The survey showed some deviation from standard procedure in every laboratory but one.

The deviations that were noted most commonly in this survey of laboratories are listed below, and are shown in Table 1:

1. Sampling by unsterile methods.
2. Unnecessary use of sterile technics in preparation of smears.
3. Pipette not stored in cleaning solution.
4. Drying period of milk smear longer than 5 minutes.
5. Slides not etched for permanent identification.
6. Use of an approved stain.
7. Microscope not standardized to workable field diameter.
8. Slides not filed for future reference.
9. Reports assume accuracy not inherent in method.

While it is a difficult matter to secure general agreement as to which deviations from a standardized technic are important and which play a minor role in the determination of the final results, those listed as numbers 1, 6, and 7 have been considered of primary importance in the determinations of the results. These major faults in technic were noted in 14 instances and relatively minor deviations from the recommended procedures accounted for the remaining 37 deviations.

Some of the minor variations in technic, though not adversely affecting results, do tend to make the work more burdensome and so may result in less extensive use of the method. An example of this is the tendency to use unnecessarily sterile practices in handling the pipette, loop, and milk smear spreader. Some of the persons carrying out the technic in the laboratories visited were even found to use sterile cloths for wiping the excess milk off the pipette.

The deviation listed as number 6 was one of those most commonly found in the survey. The *Standard Methods for the Examination of Dairy Products*, 8th edition, gives three formulas which may be used for preparing the stain. However, in Approved Method MK4 of the Connecticut State Department of Health only one of these is approved for use in the laboratories of this state and therefore the use of other than carbolated methylene blue stain in the laboratories that were surveyed is considered a deviation. This stain [1] is described on page 53 of "Standard Methods". Another of the stains permitted in the 8th Edition, the single dip type of stain, is described in "Standard Methods" as "producing neither as clear nor as satisfactory preparations as when the steps are employed separately" and therefore its use is not acceptable in laboratories which are approved or registered by the Connecticut State Department of Health. The third stain, a modified Loeffler's formula, deteriorates rapidly and has not proved to be satisfactory.

The necessity for obtaining representative samples is considered a very essential step in the correct evaluation of a milk preparation and the use of unapproved sampling technics should not be tolerated. However, three laboratories were neglecting to see that the samples they were examining were collected in an approved manner. In some instances a Babcock milk sampling dipper was being used to collect samples for bacteriological analysis without even "practical" sterilization of the sampling device.

In three laboratories the microscopes used for examining the milk smears were not standardized to a known factor. In a few instances the deviation of the diameter of the microscopic field from one of the recommended diameters was so slight as to have little practical bearing on the results secured and these cases were disregarded.

The remaining six deviations from standard procedures, though of minor importance insofar as affecting the results obtained, should be eliminated from the technic of the laboratories in which they were found to occur, if

[1] Buck, T. C. Phenol Methylene Blue Stain. *Amer. J. Pub. Health*, **16**, 1049 (1926).

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Here again we find a condition that has long existed and one that is prevalent today. Here is a method, like many of our new and modern methods that being adopted by industry and various new units will be placed into operation as rapidly as they can be manufactured.

Many health officials will be called upon to pass judgment on this and other new equipment. Often these officials have had no experience with the equipment in question. Forced to make a decision without satisfactory information and with no place to turn for factual data, the sanitarian must base his recommendations upon opinions. We all know that opinions, however honest, are still opinions, and not altogether trustworthy.

So here again, as in other research that the National Sanitation Foundation is sponsoring, an effort is being made to determine the facts upon which to base recommendations that will be acceptable and usable by health officers and a guide to industry throughout the nation.

The purpose, the method and the organization of the Foundation are intended to increase and extend knowledge. But equally important, the Foundation serves as a common meeting ground where public health, industry, and business meet to define and solve common issues in the interests of the public welfare.

The health worker in the field on environmental sanitation has in the Foundation a definite source to turn for the much needed answers to some of his many problems; also here is an organization that he can recommend to industry in their search for the answers to mutual questions.

The application of the available knowledge and sound public health practices have done much to aid the health worker toward his goal. In the National Sanitation Foundation health men have an additional tool to aid them in their endeavors.

Much progress has been made since the forming of the organization. The active enthusiastic support of the sanitation personnel of the nation and the continued participation of industries and business in sanitation will make far-reaching advances toward a mutual goal, a goal that in accordance with the articles of incorporation, is the first obligation of the Foundation, namely: "The educational, scientific and charitable purpose of promoting progress and betterment in environmental sanitation, health, and education of and for mankind."

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those laboratories are to follow the recommended procedure.

SUMMARY

This survey of the work of the 14 approved and registered laboratories in Connecticut that make use of the direct microscopic method of examining milk indicates that this procedure is not followed uniformly in this state to the extent desirable. The results of this study indicate that more effective use of this method would be attained if provisions were made for prompt following up of laboratory examinations by inspectors. This is particularly important since this method when properly used permits more rapid and more specifically directed follow up of undesirable conditions and practices than do other bacteriological methods of control.