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QUESTIONS CONCERNING THE CONTROL OF A CITY
MILK SUPPLY ANSWERED.

ROBERT S. BREED



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QUESTIONS CONCERNING THE CONTROL OF A CITY MILK SUPPLY ANSWERED.

ROBERT S. BREED.

It is not the purpose of the present bulletin to enter into a discussion of the many and varied economic and public health questions concerning public milk supplies that are attracting the attention of all citizens in the State; but rather to give answers to certain definite questions that have arisen in connection with an attempt to establish an adequate control over the milk supply of Geneva.

As early as 1907, members of the Station staff realized the desirability of undertaking the control of a city milk supply as an experiment, and in that year began a cooperative effort with the city of Geneva. The earlier part of the experiment was continued from 1907 to 1911 when cooperative effort was discontinued for a time only to be renewed again in 1915, and continued until the present. The results secured from these studies have been published in Bulletins Nos. 337, 363, 398, 439 and 443.

Experiments of a nature similar to the one undertaken by the Station are being carried on by others at the present time showing the general appreciation of their value. Among the more noteworthy of these are:

(a) One started in 1917 which is supported by funds given by the Metropolitan Life Insurance Company, and carried out under the control of the National Association for the Control and Prevention of Tuberculosis. This experiment has for its object not only the control of the milk supply of a small city but also all sources of tuberculosis. The field of work selected by the Association is Framingham, Mass. A preliminary report of this experiment has already been published¹; (b) one started by Dr. H. A. Harding of the Illinois Agricultural Experiment Station in 1918 where the field

¹Armstrong, D. B. Framingham Monograph No. 1, General Series, I The Program. Community Health Station, Framingham, Mass. 1918.

of work is Champaign, Ill.²; (c) one started in 1918 under the direction of Mr. K. E. Miller of the U. S. Public Health Service, Acting Health Officer for Edgecombe Co., N. C., which is important in that it is one of the earliest instances in which a town or city has undertaken the pasteurization and distribution of its milk supply. The field of the experiment in this case is Tarboro, N. C., and a preliminary account of the work has just been published.³

These experiments are noteworthy in that they indicate an increasing realization of the need of working out the problems involved in establishing a satisfactory, and yet not financially burdensome control of city milk supplies by the experimental method. The experiments are, in each case, under the direction of men specially trained for the work, accustomed to controlling experimental work and to analyzing results in a critical way, and the men are furnished with facilities and funds sufficient for the work. In all cases the field chosen for work is a town or small city where conditions can be more satisfactorily controlled than in larger communities. From them and from similar efforts, the public has a right to expect information of value in working out the economic and public health questions that are under discussion at the present time.

THE MILK SUPPLY OF GENEVA.

Geneva is a city of approximately 14,000 inhabitants, and is fairly typical of the smaller cities of the State. Before the experimental studies of the milk supply were started in 1907, the milk supply for the city came from 40 farms in the neighborhood on which about 550 cows were kept. The milk was delivered largely by the individual producers, and none was pasteurized before delivery. Since April 1, 1909, however, the larger part of the milk has been delivered by two milk companies both of which have maintained central pasteurizing and distributing plants within the city limits. Pasteurization was at first accomplished by the flash process, but since 1914 this has been by the holding process in conformity with the State Sanitary Code. At no time within the past four years has the amount of pasteurized milk sold been less than 95 per ct. of

²Harding, H. A. Simplified City Milk Inspection. Report of International Association Dairy and Milk Inspectors for Chicago (1918) meeting.

³Miller, K. E. Safe Milk for the Small Town. Public Health Reports, 33:2213-2217. 1918.

the entire supply, and during periods of several months at a time the only unpasteurized milk sold in the city has been a few quarts a day sold by the companies at the request of individual physicians.

With the gradual increase in the population since 1907, the number of farms supplying milk has increased from 40 to 55, while the number of cows on these farms has increased to approximately 820 animals. The sale outright of six of the largest herds during the past two years and the reduction in size of other herds due largely to opportunities of engaging in other more profitable lines of agriculture, has caused the milk companies continually to expand their field of supply until now milk from 13 of these farms is shipped to the city by rail from points not more than 25 miles distant. Supplies necessary to meet temporary shortages have been obtained from several different milk stations located within a radius of 50 miles of the city.

A QUESTIONNAIRE CONCERNING THE GENEVA MILK SUPPLY.

1. *Is the milk supply watered or skimmed by either of the milk companies?* No. Under present conditions of inspection and of modern business conditions as they exist in Geneva, no dairy company could afford to run the risk of losing its business reputation by such practices even if the men in charge were willing to countenance dishonest practices.

2. *Is the milk ever watered or skimmed before it reaches the pasteurizing plants?* Occasionally, yes.

3. *What is being done to protect the city against these fraudulent practices?* Before the city undertook the maintenance of laboratory inspection in July, 1917, the only protection was that given thru the occasional visit of an inspector from the State Department of Agriculture, this Department being entrusted with the enforcement of the State law. Since a city analyst has been appointed, chemical analyses have been made, and, wherever watering or skimming has been indicated, the attention of the State inspector has been called to the matter, and this inspector has visited the farms in order to secure the evidence necessary for legal prosecution.

4. *Do farmers generally approve skimming and watering of milk?* No. The officers of the local Dairymen's League approached the city officials as soon as they learned that watered milk had been detected

and wished to expel the offenders from the League. Thus far, it has not been felt necessary publicly to disgrace the two or three men involved.

5. *If these things are true, why do bottles of milk as delivered in the city frequently fail to show a distinct cream line or any marked amount of cream?* There are two reasons for this:

(a) The contracts between the dairy companies and the farmers have been so worded that the milk was bought (and this still holds true) on a per-quart or a per-100-pounds basis with little regard to the food value of the milk. Naturally all dairymen who run their farms on a business basis have introduced cattle giving low test milk, as these animals ordinarily give the largest number of quarts at a minimum cost of production. As a result, all of the large herds in the vicinity of Geneva give milk which is low in fat and other milk solids. On the other hand, the companies have been able to buy enough milk from small herds where the milk had previously been used for butter making or where, for other reasons, low test animals have not been introduced to bring the average quality of the city supply above 3.8 per ct. fat. Since, however, it is not possible to mix the milk thoroly at the receiving plant, some customers receive thinner milk than do others.

(b) However, the more common reason why the pasteurized milk delivered in Geneva shows an indistinct cream line or even little cream at all is because the milk is at times unintentionally or even purposely heated above the 142° to 145° F. for 30 minutes required by the State Sanitary Code.⁴ The milk is thereby more certainly freed from all living disease germs without being injured in food value. However, the creaming ability of the milk is impaired when over-heating occurs, and it may even possess a detectable cooked flavor. Not very long ago a rather widespread complaint was made to the health officer that the milk as delivered had very little cream on it. An analysis, however, showed that the milk contained 4 per ct. fat. Without question the chief reason for the lessened cream and indistinct cream line was faulty pasteurization.

6. *Would it not be fairer to the dairyman, and tend to secure richer milk if the companies bought the milk according to its food value, paying a premium for rich milk?* Yes, and the purchase of milk on this basis would also lessen the temptation for the dairyman to water or skim his milk.

⁴Chap. III. Milk and cream. N. Y. State Department of Health. 1915.

7. *Why is this method of payment not followed?* Largely because under present conditions it is cheaper for the companies to buy the milk at a flat rate. They buy as cheaply as possible with little regard to the food value of the milk because they know from experience that the public is more sensitive over a rise in the price of milk than over a reduction in food value. In other words, the popular demand at the present time is for cheap milk.

8. *How much more should the consumer expect to pay for a milk testing 4.5 per ct. fat than for a milk testing 3.5 per ct. fat?* Under prevailing prices the former milk is worth about $1\frac{1}{4}$ cents per quart more than the latter.

9. *How can the housewife tell whether she is obtaining as rich a milk as she is entitled to for the price paid?* There is no simple way in which to determine this, as it requires a chemical analysis.

10. *What protection does the State give its citizens at this point?* The only law is one which makes 3 per ct. fat and 11.5 per ct. total solids the minimum for normal milk. The general effect of this law in New York, as elsewhere, has been to put a premium upon cows producing low test milk causing a general reduction in the quality of the milk produced in the State. Many students of the milk question believe that this situation would be much improved if the milk distributors were required by law to place a guarantee upon their labels, stating the minimum amount of fat present in the milk. Pure food laws based on this principle have been found both workable and effective in the case of other food products. Customers must, however, be prepared to pay more per quart for rich milk than for thin milk.

11. *Is the milk supply of Geneva safe to use for baby feeding?* Milk is subject to so many possible sources of infection and may be so misused after delivery at the homes that no one could safely guarantee the quality of an entire city milk supply. So far as it is possible to judge from the records of inspection, it appears that the Geneva supply compares in quality with that sold elsewhere in the State under the label "Grade A pasteurized."

12. *Is pasteurized milk as good for babies as unpasteurized milk?* Babies differ and doctors disagree. Unpasteurized milk, of a quality permitting it to be sold as Grade A raw can be obtained on physicians' request to either milk company or from the one dairyman licensed to sell Grade A raw.

13. *Why is the milk sold under a Grade B label if of Grade A quality?* Briefly, this is because the dairymen would need to expend both money and labor in order to bring their barns up to the standard required, and they would in return demand the price asked for Grade A milk. It is doubtful whether the changes would produce any measurable improvement in the quality of the milk.

14. *Is the inspection of the Geneva supply carried out efficiently and economically?* More than 6,000 samples of milk have been collected by the sanitary inspector during the past year, and these have been examined by the city bacteriologist. Wherever milk has been detected which was not up to the standard in quality of Grade A milk, inspections and special analyses have been made in order to find the exact cause or causes of the difficulty. The matter has then been explained to the person or persons at fault, with the result that the trouble has usually been corrected. In one case the milk was excluded from sale in the city. The correction of these troubles has necessitated the making of many special visits to the dairy farms in addition to the annual inspection visit required by the State Sanitary Code. Only part of the expense of this work has been borne by the city, as the Station has supervised the work and has given the city the free use of its laboratory in return for the use of the data collected.

15. *How does the dairy inspection work of Geneva compare with that of other cities in the State?* According to the records published⁵ by the State Department of Health, only two cities in the State, New York and Buffalo, report having examined more than 6,000 samples of milk during 1916 or 1917 (the latest years for which figures are obtainable). Syracuse and Jamestown both report having examined approximately 3,000 samples yearly. Other cities either make no report or have examined fewer than this number of samples. It should, however, be explained that the chief reason why two persons in Geneva giving only part time to the work of milk inspection have examined so large a number of samples in comparison with other laboratories with a larger working force is because the

⁵Wadsworth, A. B. The Laboratory Service of the State of New York. Health News, N. S., 11:159-169. 1916.

Lawrence, J. S. The Laboratory Service of the State of New York. Health News, N. S., 12:249-257. 1917. Issued by the New York State Department of Health.

majority of the samples have been examined microscopically and not by the more commonly used plate method.

16. *Are the records secured by microscopic examination of milk as valuable as are the records secured by the more generally used method?* The records secured by microscopic examination of fresh milk samples taken from individual cans as received at the pasteurizing plants, when accompanied by age and temperature records, show not only the amount of bacterial contamination of the milk, but also give a surprisingly accurate idea of the cause or causes of excessively high counts. The records obtained from examining this type of samples are not only more easily obtainable, but are also more valuable than the records which would have been obtained if the officially recognized method had been used. On the other hand, it is impossible to determine the efficiency of pasteurization by microscopic examination of the milk, so that samples taken from the pasteurizers have been examined by the plate method.

17. *Why is the price of milk in Geneva, two, three or even more cents per quart higher than in some of the neighboring towns and cities?* As explained, all of the milk sold in Geneva is in reality of Grade A quality. There is no city in this part of the State, and probably none in the State, where the entire supply is of so high a quality. Only three cities in the immediate neighborhood, Rochester, Syracuse and Ithaca, maintain a laboratory inspection of their milk supply and in these cities the price of milk, of a quality equal to that sold in Geneva, has been about the same as, or more than, that in Geneva. During the month of December the price of Grade B pasteurized milk in New York city has been two cents and the price of Grade A pasteurized milk four cents more per quart than in Geneva.

In the smaller cities and towns about Geneva where the price has been less than in Geneva, the larger part of the milk is, or should be, sold under the labels "Grade B raw" or "Grade C raw." These labels signify to a person familiar with the conditions that the milk is practically unprotected from the danger of transmitting disease germs. New York City has not permitted the sale of these grades of milk for a number of years, and several other cities of the State, including Geneva, have the same regulation.

Other considerations also affect the price difference, one being that the basal price for milk in the Geneva district is 16 cents per 100 pounds more than in the New York City district. It has been neces-

sary to pay this price in order to secure a supply, as farming lands in the vicinity of the city are readily utilized for other more profitable lines of farming. Even at this price, the companies have found it difficult to maintain their supply, and during November and December the city practically faced a milk famine. At times the companies have paid as high as an equivalent of 12 cents per quart for an emergency supply which would otherwise have gone to the city of Baltimore.

18. *Does it pay to protect our milk supply in such a way as to eliminate the danger of carrying tuberculosis, typhoid, septic sore throat and other milk-borne diseases?* Exact statistics cannot be presented for Geneva at this time; but there is every reason to believe that a study of the vital statistics for the city would show the same saving in lives and sickness that has been obtained in other cities where similar control measures are in force. Life insurance companies have learned that it pays in dollars and cents to them to support the efforts made to control our milk supplies.