

SECOND ANNUAL REPORT  
OF THE  
**International Association of  
Dairy and Milk Inspectors**

INCLUDING PAPERS READ AT THE ANNUAL  
CONVENTION IN CHICAGO  
OCTOBER 24-25, 1913

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1116 CONNECTICUT AVENUE  
WASHINGTON, D. C.





Laboratory Size, De Laval  
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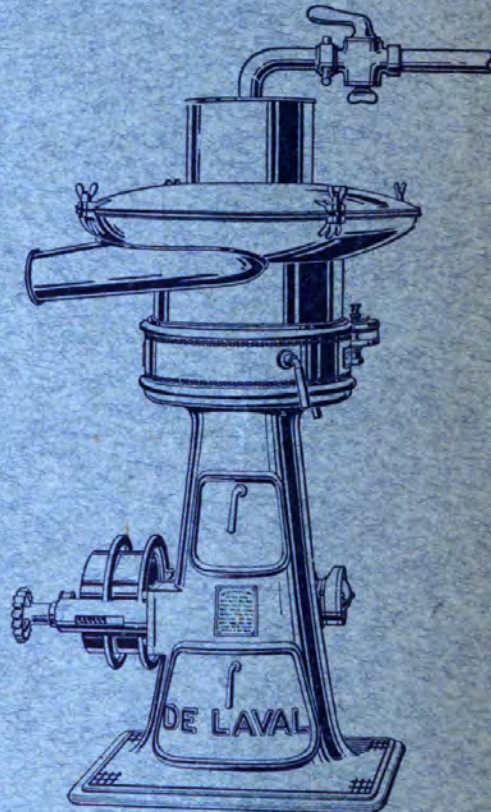
Needless to say that the milk dealer who is wise enough to anticipate the general consumer's demand for De Laval Clarified Milk will be the man who will reap the benefits.

An actual demonstration of what can be accomplished with a De Laval Milk Clarifier will be gladly accorded to any responsible milk dealer or producer.

The process is entirely mechanical and the course of the milk in the clarifier bowl is directly opposite to that in the bowl of a cream separator.

There is no separation between the butter-fat and the other parts of the milk.

There is no interference with the cream line.



Large Size De Laval Milk Clarifier for use  
in Large Milk Plants

Made in ten sizes and styles, from a capacity of 12,000 lbs. per hour down to a small hand machine with a capacity of 100 lbs. per hr. Larger sizes turbine or belt drive. Smaller machines can be run by gas engine, belt, electric motor or hand power.

**The DeLaval Separator Co.**

165 Broadway - 29 E. Madison St.  
New York - - - Chicago



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**IVAN C. WELD, Secretary-Treasurer**  
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*Price One Dollar*





# International Association of Dairy and Milk Inspectors.

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## CONSTITUTION AND BY-LAWS

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### CONSTITUTION.

ADOPTED OCTOBER 16, 1911.

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#### NAME.

This Association shall be known as the International Association of Dairy and Milk Inspectors.

#### OBJECT.

The object of this Association shall be to develop uniform and efficient inspection of dairy farms, milk establishments, milk and milk products, and to place the inspection of the same in the hands of men who have a thorough knowledge of dairy work.

#### MEMBERSHIP.

The membership of this Association shall be composed of men who now are or who have been actively engaged in dairy or milk inspection. Any person who now is or who has been so engaged may make application to the Secretary-Treasurer, and if application is accepted by the Membership Committee, said applicant may become a member of the Association upon payment of the annual dues of five dollars (\$5.00).

**OFFICERS.**

The officers of this Association shall be a President, three Vice-Presidents, a Secretary-Treasurer, and two Auditors, who shall be elected by a majority ballot at the Annual Meeting of the Association, and shall hold office for one year or until their successors are elected. An Executive Board, who shall direct the affairs of the Association when not in Annual Session, shall consist of the President, the three Vice-Presidents, and the Secretary-Treasurer.

**AMENDMENTS.**

This Constitution may be amended at any Annual Meeting by a two-thirds vote of the entire membership of the Association. Any member proposing amendments must submit the same in writing to the Secretary-Treasurer at least sixty days before the date of the Annual Meeting, and the Secretary-Treasurer shall at once notify all members of such proposed amendments. All members voting on such proposed amendments shall register their vote with the Secretary-Treasurer on blanks provided by the Association before the date of the Annual Meeting.

# BY-LAWS.

ADOPTED OCTOBER 25, 1913.

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## ORGANIZATION.

The Constitution shall be the basis of government of this Association.

## ARTICLE 1.

### MEMBERSHIP.

SECTION 1. Any person eligible for membership under the Constitution who shall file an official application, accompanied by the first annual membership dues of five dollars, and whose application for membership shall have the approval of the Membership Committee, may become a member of the Association for one year.

SECTION 2. Any person having once become a member may continue membership in the Association so long as the annual membership dues are paid. Any member who shall fail to pay annual dues within 30 days after having been notified by the Secretary that said dues are due and payable, shall be dropped from membership. Any member so dropped may, with 90 days, be reinstated by the Membership Committee, upon application filed in due form and accompanied by the annual membership dues for that year.

SECTION 3. A member of the Association may be expelled for due cause upon recommendation of the Membership Committee and a majority vote of the members at any annual meeting. Any member so expelled shall have refunded such *pro rata* part of his membership dues as may not be covered by his term of membership.



## ARTICLE 2.

## OFFICERS.

SECTION 1. The officers of this Association shall be a President, a First, Second, and Third Vice-President, a Secretary-Treasurer, and two Auditors, who shall be chosen by ballot at the annual meeting of the Association, and shall hold office for one year, or until their successors are duly elected.

SECTION 2. The Executive Board shall consist of the President, the three Vice-Presidents, and the Secretary-Treasurer.

SECTION 3. The Membership Committee shall consist of the President, the three Vice-Presidents, and the Secretary-Treasurer.

## ARTICLE 3.

## DUTIES OF OFFICERS.

SECTION 1. It shall be the duty of the President to preside at all meetings of the Association. He shall examine and approve all bills previous to their payment, appoint all committees unless otherwise directed by vote of the Association, and perform such other duties as usually devolve upon a presiding officer, or are required of him by the Association.

SECTION 2. The Vice-Presidents, in the order of their selection, shall perform the duties of the President in his absence.

SECTION 3. The Secretary-Treasurer shall record the proceedings of the Association. He shall keep a list of members, and collect all moneys due the Association, giving his receipt therefor. He shall record the amount of each payment, with the name and address of the person so paying. He shall faithfully care for all moneys entrusted to his keeping, paying out the same only with the approval of the President, and taking a receipt therefor. He shall, immediately after his election to office, file with the President of the Association a bond in the sum of five hundred dollars, the expense of which shall be borne by the Association. He shall, at the annual meeting,

make a detailed statement of the financial condition of the Association.

It shall also be the duty of the Secretary-Treasurer to assist in making arrangements and preparing a program for the annual meeting, and to compile and prepare for publication all papers, addresses, discussions, and other matter worthy of publication, as soon as possible after the annual meeting.

SECTION 4. The full management of the affairs of the Association when the Association is not in session shall be in the hands of the Executive Board, as provided in the Constitution.

SECTION 5. It shall be the duty of the Auditors to examine and audit the accounts of the Secretary-Treasurer, and all other financial accounts of the Association, and to make a full report of the condition of the same at the annual meeting.

#### ARTICLE 4.

##### MEETINGS.

SECTION 1. The annual meeting of the Association shall be held at such time and place during the month of October of each year or at such other time as shall be designated by the Executive Board.

SECTION 2. Special meetings of the Association may be called by the Executive Board, of which due notice shall be given to the members by the Secretary.

SECTION 3. Quorum. Twenty-five per cent of the membership shall constitute a quorum for transaction of business at any annual meeting. Voting by proxy shall not be permitted.

#### ARTICLE 5.

These By-Laws may be altered or amended at any annual meeting of the Association. Any member proposing amendments must seasonably submit the same in writing to the Secretary-Treasurer, who shall then give notice of the proposed amendments by mail to each member of the Association at least thirty days previous to the date of the annual meeting.

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# International Association of Dairy and Milk Inspectors.

## OFFICERS, 1913-1914.

*President*, C. J. STEFFEN . . . . . Milwaukee.  
*Vice-President*, A. N. HENDERSON . . . . . Seattle.  
*Vice-President*, WM. H. PRICE . . . . . Detroit.  
*Vice-President*, JAMES O. JORDAN . . . . . Boston.  
*Secretary-Treasurer*, IVAN C. WELD . . . . . Washington.  
*Auditors*—  
    CLAUDE F. BOSSIE . . . . . Omaha.  
    E. F. BURKE . . . . . Albany.

## COMMITTEES.

### BY-LAWS.

Dr. James O. Jordan, Boston, *Chairman*.  
Dr. Hulbert Young, Washington, Ivan C. Weld, Washington.

### DAIRY FARM INSPECTION.

Dr. Wm. H. Price, Detroit, *Chairman*.  
Mr. J. A. Gamble, Springfield, Mass., Mr. Claude F. Bossie,  
Omaha.

### CHEMICAL AND BACTERIOLOGICAL INSPECTION OF MILK.

Dr. James O. Jordan, Boston, *Chairman*.  
Prof. Horatio N. Parker, Urbana, Ill., Prof. C. B. Lane,  
Philadelphia.

### CONTROL OF BOVINE TUBERCULOSIS.

Dr. George W. Gillie, Ft. Wayne, Ind., *Chairman*.  
Dr. Wm. S. Gimper, Harrisburg, Pa., Dr. Hulbert Young,  
Washington, D. C.

LEGISLATION AND LEGAL LIMITS FOR THE CONTROL OF MILK  
AND CREAM.

Mr. A. N. Henderson, Seattle, *Chairman*.

Ivan C. Weld, Washington, D. C., Thos. A. Buckland, St.  
Louis, Mo.

CIVIL SERVICE.

Dr. O. P. Thompson, Waterloo, Iowa, *Chairman*.

E. F. Burke, Albany, N. Y., R. I. Gordon, Tampa, Fla.

DAIRY FARM SCORE CARD.

Prof. C. B. Lane, Philadelphia, *Chairman*.

Ivan C. Weld, Washington, D. C., A. N. Henderson,  
Seattle, Wash.

## MEMBERS.

---

Albert, Lorenz	Milk Inspector	Milwaukee, Wis.
Bossie, Claude F.	Dairy Inspector	Omaha, Neb.
Brown, Louis P.	State Food and Drug Com.	Nashville, Tenn.
Buckland, Thos. A.	City Chemist	St. Louis, Mo.
Burke, E. F.	Agent N. Y. State Dept. of Agriculture	Albany, N. Y.
Calkins, Fred P.	Milk Inspector	Tacoma, Wash.
Egan, Harold E.	Chief Food Inspector	Dayton, O.
Gamble, J. A.	Dairy and Milk Inspector	Springfield, Mass.
Gary, W. E.	Milk Inspector	Louisville, Ky.
Gillie, Geo. W.	Director of Milk Hygiene	Ft. Wayne, Ind.
Gimper, Wm. S.	Chief Food Dept.	Harrisburg, Pa.
Gordon, R. I.	Asst. Com. Agriculture, Div.	Tampa, Fla.
Graves, H. T.	Dairy Inspection	Olympia, Wash.
Haggerty, A. L.	Chief Food Inspector	Augusta, Ga.
Harding, H. A.	Head Dairy Dept., University of Illinois	Urbana, Ill.
Henderson, A. N.	Chief Milk Inspector	Seattle, Wash.
Heurich, V. N.	Milk Inspector	Milwaukee, Wis.
Hood, A. J. G.	Supt. Food Inspection	Montreal, Can.
Jordan, James O.	Inspector of Milk	Boston, Mass.
Keeley, Peter T.	Milk and Food Inspector	Waterbury, Conn.
Keihl, Harry	Dairy and Milk Inspector	Milwaukee, Wis.
Kennedy, F. J.	Meat and Milk Inspector	Dubuque, Iowa
Krehl, Edward C.	Milk Inspector	Detroit, Mich.
Lane, C. B.	In charge Scientific Dept., Supplee Alderney Dairy	Philadelphia, Pa.
Lyle, John H.	Milk and Bread Inspector	Minneapolis, Minn.
Mickle, J. D.	State Dairy and Food Com.	Portland, Ore.
Pape, E. C.	Milk and Food Inspector	Sioux City, Ia.
Parker, Horatio N.	Prof. Municipal Dairying, Uni- versity of Illinois	Urbana, Ill.
Potter, Geo. C.	Milk and Dairy Inspector	Detroit, Mich.
Price, Wm. H.	Health Officer	Detroit, Mich.
Rive, Henry	Dairy Instructor	Victoria, B. C.
Rowe, Peyton	State Dairy Inspector	Fredericksburg, Va.
Simpson, C. W.	Dairy and Milk Inspector	Vancouver, B. C.
Sharwell, Samuel G.	Chief Dairy and Food Insp.	Newark, N. J.
Smith, Russell S.	Dairy Inspector, State Dept. of Agriculture	Augusta, Me.
Stahel, P. J.	Chief Dairy Inspector	Toogoolawah, Queensland, Aus- tralia
Steffen, C. J.	Chief Dairy Inspector	Milwaukee, Wis.
Thompson, O. P.	State Dairy Inspector	Waterloo, Iowa
Weld, Ivan C.	Investigator for Chestnut Farms Dairy	Washington, D. C.
Widmayer, Fred J.	Food and Milk Inspector	Scranton, Pa.
Young, Hulbert	Chief Food Inspector	Washington, D. C.





## SECOND ANNUAL CONVENTION.

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The Second Annual Convention of the International Association of Dairy and Milk Inspectors was called to order on the morning of October 24 in the Record Building at the Stock Yards in Chicago by President C. J. Steffen.

Col. Wm. E. Skinner, General Manager of the Dairy Show Association, welcomed the Association to Chicago and to the Dairy Show. Prof. H. E. Van Norman, President of the Dairy Show Association, also welcomed the Association to the Dairy Show, and spoke briefly on the general development of the dairy industry. President Chas. J. Steffen, of Milwaukee, in responding to the addresses expressed the Association's appreciation for the words of welcome and the provision made for the entertainment and comfort of the members of the Association by the National Dairy Show Association. The annual address of the President followed.

The report of the Committee on Dairy Farm Inspection was made by the committee chairman, Dr. Wm. H. Price, Health Officer of Detroit. It was moved and voted that the report be adopted by the Association.

The Association then took a recess until 2 P. M., when Mr. A. J. Glover, Associate Editor of *Hoard's Dairyman*, presented a paper entitled "Dairy and Milk Inspection from the Standpoint of the Dairy Editor."

The report of the Committee on the Control of Bovine Tuberculosis was presented by its chairman, Dr. George W. Gilie, of Fort Wayne, and the report was accepted by the Association.

A brief verbal report was offered by Prof. H. N. Parker, of the Committee on the Chemical and Bacteriological Inspec-

tion of Milk, and a general discussion of various methods followed.

The President appointed the following gentlemen to be members of a Committee on Resolutions: Dr. Wm. H. Price, Detroit, Mr. A. N. Henderson, Seattle, Mr. Claude F. Bossie, Omaha, and suggested that any member should present to this committee any resolutions which he might desire to bring before the Association for its consideration.

"The Milk Supply of Champaign and Urbana, Ill.," was the subject of a paper presented by Prof. H. N. Parker, of the University of Illinois, after which adjournment was taken until 8 o'clock.

At the evening session, Dr. O. P. Thompson, State Dairy Inspector of Iowa, read a paper on the "Methods Employed and Results Obtained in Improving the Milk Supply of Iowa." Mr. A. N. Henderson, Chief Dairy and Milk Inspector of Seattle, read a paper on "What the Dairy Inspector Has Done, and What He Can Do, to Interest the Farmer in Producing Cleaner Milk." Dr. H. A. Harding, head of the Department of Dairy Husbandry, University of Illinois, discussed "The Relation and Responsibility of the Agricultural College and Experiment Station to Dairy and Milk Inspection."

On Saturday, October 25, the convention was called to order at 10 A. M., when Mr. Ernest Kelly, in Charge Market Milk Investigations, U. S. Department of Agriculture, Washington, D. C., read a paper on "The Sanitary Inspection of Retail Milk Stores." Dr. A. L. Haggerty, Chief Dairy and Milk Inspector of Augusta, Ga., discussed "Methods Employed and Results Obtained in Improving the Milk Supply of Augusta." Dr. J. J. Kinyoun, Bacteriologist of the Health Department of the District of Columbia, read a paper on "The Eradication of Bovine Tuberculosis from Herds from which the Milk Supply for the District of Columbia is Derived." Mr. Wm. F. Luick, Treasurer of the National Association of Ice Cream Manufacturers, presented a paper embodying his views

regarding legislation affecting the manufacture and sale of ice cream.

On Saturday afternoon at 2 o'clock, Prof. Oscar Erf, Head of Dairy Department, Ohio State University, Columbus, read a paper on "The Cost of Producing Clean Milk." Prof. Clarence B. Lane, of the Supplee Alderney Dairy, Philadelphia, discussed "Helps and Hindrances in the Work of the Dairy and Milk Inspector." Prof. Rasmussen, of the New Hampshire College of Agriculture, was unable to be present, and the place assigned him in the program was taken by Dr. J. J. Kinyoun, Bacteriologist of the Health Department of the District of Columbia, who read a paper on "A Bacterial Index for Dirt in Milk." Dr. Jordan, of Boston, was unable to be present, and his paper was read by President Steffen.

An interesting and instructive discussion followed the presentation of each paper. Among those who participated were Mr. Ed. H. Webster, formerly Chief of the United States Dairy Division, now Associate Editor of *Hoard's Dairyman*; Prof. Prucha, of the University of Illinois; Mr. Louis P. Brown, State Dairy and Food Commissioner, Tennessee; Prof. Fraser, of the University of Nebraska; Mr. C. F. Bossie, of Omaha, Neb.; Mr. E. F. Burke, of Albany, N. Y.; Dr. W. S. Gimper, Harrisburg, Pa.; Mr. Thomas A. Buckland, City Chemist, St. Louis; Mr. J. H. Lyle, Minneapolis; Mr. J. D. Mickle, State Dairy and Food Commissioner, Oregon; Mr. S. G. Sharwell, Chief Dairy and Food Inspector, Newark, N. J.; Mr. H. E. Egan, Dayton, Ohio; Dr. Chas. E. North, of New York City; Mr. Paul E. Taylor, New York; Dr. A. J. G. Hood, Superintendent Food Inspection, Montreal, Canada; Mr. R. I. Gordon, Chief Food Department, Tampa, Fla.; Mr. H. T. Graves, Assistant Commissioner of Agriculture, Washington; Mr. J. Howard Sasseen, Dairy and Milk Inspector, Des Moines, Iowa; Mr. E. C. Pape, Milk and Food Inspector, Sioux City, Iowa; Dr. W. E. Gary, Chief Milk Inspector, Louisville, Ky.; Dr. F. J. Kennedy, Meat and Milk Inspector,

Dubuque, Iowa; Mr. Friar, Chief Inspector, Flint, Mich.; Mr. Merrill, of the De Laval Separator Company; Mr. Harry Kiehl, Milwaukee; Mr. Geo. C. Potter, Detroit, Mich.; Mr. L. A. Albert, Milwaukee; Mr. V. N. Heurich, Milwaukee.

On Saturday evening the Association's second annual banquet was held at the Saddle and Sirloin Club, with Dr. W. A. Evans, formerly Commissioner of Health of Chicago, as the guest of honor. Following the banquet, Dr. Evans addressed the members of the Association upon the general subject of "Milk and the Public Health." The address was much appreciated by all who were fortunate enough to be present, and on motion of Dr. Wm. H. Price, of Detroit, a rising vote of thanks was given Dr. Evans as an expression of appreciation.

Later in the evening the business session of the Association was held at the Stock Yards Inn. The Secretary-Treasurer submitted a brief report showing the total receipts for the year to be \$331.74, and the total expenditures \$330.72, leaving a balance of \$1.02, cash on hand. Mr. Claude F. Bossie, of Omaha, reported for the auditors that the accounts of the Secretary-Treasurer had been examined, found correct, and were approved.

In the absence of the other members of the Committee on By-laws, Ivan C. Weld reported that the committee had drafted an outline for by-laws which he submitted for the consideration of the Association. After discussion, the by-laws suggested by the committee were adopted by the Association. It was moved and voted that the Committee on By-laws be continued for another year, and that they be asked to consider the advisability of adding to the present by-laws a section providing for honorary membership in the Association, and to report at the next annual meeting.

Upon the request of a member for a ruling from the President as to who may be eligible for membership in the Association, President Steffen ruled that only those who now are or who have been actively engaged in *official* dairy or milk in-



spection are, under the constitution, eligible to membership. No exceptions to this ruling were voiced by any member of the Association.

It was moved and voted that a sum of money (\$25.00) be appropriated for the entertainment of guests.

The Committee on Resolutions reported, and resolutions were adopted by the Association as follows:

RESOLVED, That the thanks of the Association be extended to all who have contributed to the program of this meeting, and especial thanks be extended to Mr. A. J. Glover, Prof. H. A. Harding, Mr. W. F. Luick, Mr. Ernest Kelly, Prof. Oscar Erf, Dr. W. A. Evans, and to Dr. J. J. Kinyoun.

WHEREAS, The success of the second annual meeting of the International Association of Dairy and Milk Inspectors and the form and substance of the First Annual Report is largely due to the knowledge and experience in milk and dairy inspection of our Secretary, Mr. Ivan C. Weld, and

WHEREAS, Mr. Weld's activity in promoting the interests of the Association is made possible through the courtesy and cooperation of Mr. Geo. M. Oyster, Jr., of Washington; therefore,

*Be it Resolved*, That the thanks of this Association be extended to Mr. Weld and to Mr. Oyster, and that these resolutions be spread upon the minutes and that a copy be presented to Mr. Oyster.

The Association proceeded to elect officers for the ensuing year, with the following results:

President, C. J. Steffen, Milwaukee.

1st Vice-President, A. N. Henderson, Seattle.

2d Vice-President, Wm. H. Price, Detroit.

3d Vice-President, Jas. O. Jordan, Boston.

Secretary-Treasurer, Ivan C. Weld, Washington.

Auditors, Claude F. Bossie, Omaha, E. F. Burke, Albany.

Invitations were received from the Panama-Pacific Exposition for the meeting to be held in 1915; from the Mayor and

Chamber of Commerce of Buffalo, and from the Merchants' Association of the City of New York for the next annual meeting. The Secretary was requested to express the thanks of the Association for the invitations extended, and to inform those who have extended the invitations that they would receive due consideration by the Executive Board.

It was moved and voted that C. B. Lane, Ivan C. Weld and A. N. Henderson represent the Association as a Committee on the Dairy Farm Score Card.

The President was directed to appoint committees to consider and report at the next annual meeting regarding various phases of the work as follows:

- (a) Dairy Farm Inspection.
- (b) Chemical and Bacteriological Inspection of Milk.
- (c) The Control of Bovine Tuberculosis.
- (d) Legislation and Legal Limits for the Control of Milk and Cream.
- (e) Civil Service; to Investigate Civil Service Conditions Relative to the Appointment of Dairy and Milk Inspectors.

## RESPONSE TO ADDRESS OF WELCOME AND PRESIDENT'S ANNUAL ADDRESS.

C. J. STEFFEN, Milwaukee.

In behalf of the International Association of Dairy and Milk Inspectors, I wish to express to General Manager Skinner and to President Van Norman, of the National Dairy Show, our appreciation of their kind words of welcome.

Some of us are not accustomed to receive such a cordial greeting from dairymen and milk dealers whom we meet in the performance of our duty. This convention of dairy and milk inspectors, held here on the invitation of the National Dairy Show Association, portends a change in the attitude of the dairy and milk interests toward inspection.

Milk and dairy inspection is an important factor in the great upward movement toward a higher standard for dairy products, a more wholesome food, and better living conditions in general. The extent to which inspection can influence this question of improved dairy products will depend largely upon instruction and educational methods.

The men chosen to do this work must be intelligent, competent, and practical; the more practical and better qualified they are the more potent will be their influence in bringing about the desired reform.

The object and purpose of our organization is to elevate the standard of dairy inspection and to lead the dairy and milk industry to a higher level. This greeting from the General Manager and from the President of this great show marks another milestone in this upward movement and exemplifies the proper spirit of the dairy interests toward inspection.

We have assembled here to discuss the best methods of elevating the standard of milk production and distribution. Should we gain a new idea or learn a better or a more practical

way of doing our work, our errand to your city will have been accomplished.

\* \* \* \* \*

Two years ago, seven men met in Milwaukee and laid the foundation of this organization. What they lacked in numbers they made up in enthusiasm. The incentive they had was the need which they could plainly see for such an organization. The spirit which animated them was the necessity of welding into one body the thought and the ability now possessed by men engaged in dairy and milk inspection, for the purpose of awakening in them a feeling of brotherly interest, for the purpose of elevating the standard of inspection by means of uniform methods, and to encourage inspection by men best qualified for the work.

Our membership now represents twenty-three States, Canada and Australia. This growth and the interest taken by our members in this organization speaks well for its future. Our efforts must be directed along lines long recognized. Educational and practical methods of dairy and milk inspection must be developed and established if the Association is to render the greatest service to the dairy industry and to the consumer of dairy products.

To me it is always a sad commentary on inspection when told of the many cases of prosecution, and nothing at all is said about the bacteria count of the milk, or the value of the improvements which the inspectors have convinced the dairymen were necessary to properly conduct their business. Practically all States and most cities have some form of dairy and milk inspection. In some instances inspection is by police power only, in others by means of elaborate milk laws and ordinances so far advanced for the city or State that they *cannot be* and *are not* enforced. In other instances we find cities devoting a great deal of time and money to educational work in a philanthropic spirit because of inadequate laws or lack of moral support to enforce compliance with the suggestions and requirements of the inspectors.

The men responsible for this diverse direction of time and money of their respective cities all believe that their own system of work is best or the surest method of securing a clean and safe milk supply. Sometimes, however, the question of politics is the determining influence and the deciding factor as to who shall do the work and how it shall be done.

What a fertile field for instruction and educational work among milk inspectors, law makers, and some of the governing forces of our States and cities! How many of you living in cities where the milk is shipped in from another State, have experienced a visit to certain dairy sections from which the milk is shipped to different points, and after giving your instructions to the dairyman have heard him say, "I will do what you say, but the inspector from Blankville was here last week and he said just the contrary to what you told me to do. Now, what I want to know is which one of you fellows is right and which one knows what he is talking about?" Each of these men may have been following the law or ordinance in giving his instructions to the dairyman, but what a feeling of resentment toward inspection was engendered here, although each inspector was doing his work according to the laws of his State.

It is sometimes amusing to hear of the adoption of ideal milk ordinances, and after allowing sufficient time to elapse to compel compliance with these laws, find conditions practically the same as before, and yet the lives of the babies actually depend upon those very laws (at least the people were so informed). Why, then, put on the statute laws which are impracticable and which no one dares enforce?

We need a coming together, so to speak, on these milk problems. As long as the creameries and milk dealers pay as much for an inferior, filthy product as for a clean product, just so long will they be putting a premium upon filthy milk, and all the inspection imaginable will not secure clean milk for our people or enable us to make the desired progress.



The question of farm inspection will be presented for your consideration by the Committee on Farm Inspection, and their investigations possibly may suggest a method for us to pursue to improve conditions.

Pasteurization of milk is now recommended for practically all milk, by some of the leading authorities.

Somehow I cannot acquiesce in this view without voicing my protest against these recommendations of constantly increasing from year to year the expense for pasteurizing without a corresponding increase in time and money toward securing a clean supply. Not one line do we find as to the duty of the factory owner or milk dealer toward this question of securing for his business a clean and safe supply. It seems to me that one who goes into a business of supplying food to our people should be compelled in some degree, be it ever so little, to improve that food article from year to year, and not depend altogether upon the pasteurizing process to insure its safety. I am not sure but that we are somewhat lax in this question of pasteurization when we demand that all milk be pasteurized when sold for drinking purposes, and then permit butter, buttermilk, and other dairy products to be manufactured from raw milk and sold to our people for food.

Is it any wonder that we are making but little progress in the control of bovine tuberculosis so long as we permit milk to be taken back from creameries, infected with tubercle bacilli to be fed to calves and other live stock on the farm? Denmark and a number of foreign countries are far advanced in this respect as compared to what we are doing in this country, and the time is not far distant when legislation must be enacted to compel pasteurization of all milk along lines which I have mentioned.

To overcome the problems of the various States and cities, the question of milk laws and more uniformity in their enactment and application is becoming of more importance daily, for the reason that as cities grow and expand, milk is shipped

to them not from one county or one State, but from two to five or more counties, and to some cities from as many States. State inspection is to be welcomed, but provision must be made to inspect all dairy farms and milk establishments better than is done by cities at the present time, or State inspection will fail. Inspection to be of benefit must be frequent, thorough, and in a spirit of helpfulness rather than prosecution.

Reasonably clean dairies, the use of small top pails, milk cooled promptly and stored in clean milk houses, properly handled by clean, intelligent men, will insure a reasonably safe milk.

Farm inspection and the use of the score card go hand in hand, but the utility of the score card is small indeed compared to what it might be were it possible to measure with it accurately the quality of milk. Ours is an organization whose aim it is to improve and elevate the milk industry. The results possible for us to attain will depend upon the kind of men and women who do the work and the spirit in which the work is done.

*"Gold that buys health can never be ill spent."*



## DAIRY AND MILK INSPECTION FROM THE STAND- POINT OF THE DAIRY EDITOR.

A. J. GLOVER, Associate Editor *Hoard's Dairyman*, Fort  
Atkinson.

The standpoint of a dairy editor in reference to efficient milk and dairy inspection and its benefits is no different from that of any other person who desires capable service. There are two sides to every question, and the subject of milk inspection is no exception. The dairy farmer constitutes one side and the authorities in charge of milk and dairy inspection the other; two forces which do not fully understand each other and often work in opposite directions. First, the farmer is a strong believer in individual liberty. He fails to co-operate with his neighbor because he must sacrifice some of his liberty, commonly called independence. Second, too many in charge of milk inspections have failed because they did not know the dairy farmers' problems. Two important factors in the production of wholesome milk are brought together that will hook horns as soon as they meet in the barn yard. What has brought about this condition? In brief, it is a lack of understanding, comprehension, and duty on both sides.

The milk producers, on the whole, have been slow to accept the new ideas of sanitation. They see no reason for them. The practices of most people are sanitary in their estimation. Their training from childhood has been in the practices they are following. The products produced by them are given to their families and what is good enough for their folks is good enough for other folks. And, besides, whose business is it? They own their farms or lease them, and it is their business and no one else's how they are run. The independence of farm life; its separation from close contact with other industries; the unrestraining influence of neighbors and the lack of proper educational facilities have developed an individual who

does not, in all instances at least, recognize his responsibilities and relation to those who use his products. There exists a condition, a mental attitude, that belongs to men whose occupation is agriculture. Their training, life and environment have made them what they are, and conditions of long standing are not easily changed. There are but few people who do not care to do right. But to change practices, be they ever so crude, that have been followed generation after generation is not the work of a day, but of a life time. It is plain to those who have studied the occupation of farming and the training and environment of the farmer, that we are not confronted with a police duty, but rather an educational problem.

How shall it be solved? By teaching the coming generations, the children of the farm, the correct practices of dairying. How shall this be done? Through the country schools, agricultural schools and such other forces as can be pressed into service. There is no reason why the country schools should not teach the fundamental and elementary principles of agriculture. To wait until the boy and girl have formed habits and ideas concerning practices which have to do with the welfare of the country is a serious mistake. They should be guided at an early age into the channels of right thinking and practices of the business they are to follow. There is an imperative demand for the schools to be reconstructed so they will meet the requirements of the community they serve. There is nothing uninteresting in the subject of agriculture. It is beaming and sparkling with delightful and useful information. The reason there is an indifference to teaching agriculture in the country schools is because those in charge of them have never seen the beauties and scope of this field. The farmer is moving slowly forward in his methods of doing things, but so far the process is painfully slow.

If the boys and girls of the farm could see with a clear and comprehensive understanding the conditions which the milk commissions, health departments and the like, are trying to create, there would be no power on earth to keep this great



army of young people from putting them into force. But the trouble is they do not see or understand, and the opportunity for getting light and understanding is not open to them. We sometimes lose patience with certain dairy farmers because they are indifferent to things which we know are for the benefit of all. In analyzing their mental attitudes towards modern methods in dairying and sanitation we are confronted with the fact that no guiding hand was ever extended to them in their early years, and we must exercise forbearance, for we are attempting to move a great load under a severe handicap.

The inspection of milk and dairies is largely an educational and not a police duty. It, therefore, becomes imperative that the men who do this be thoroughly trained in the art and science of dairying. Unfortunately for the cause of milk inspection, the authorities have not recognized in all cases the importance of selecting men well trained in dairying and with a sympathy for the man producing milk. Where inspectors have recognized that milk and dairy inspection is an educational problem the results have been all that anyone could expect. The milk producers, in other words, have responded to the demands of those whose duty it is to improve the sanitary condition under which milk is to be produced. Take the work done at Geneva, New York, with which you are all familiar, as a striking instance of what may be done when men of understanding take hold of the improvement of a city milk supply. As an example of a misconception of milk inspection and improvement, take the ordinance passed by the Chicago Council about five years ago, requiring all dairy products to come from tuberculin tested herds or to be pasteurized. The ordinance allowed a very short time for the dairy farmers to adjust themselves to the new requirements. Now, I thoroughly believe in the use of the tuberculin test as an agent to eradicate tuberculosis, and I am a strong supporter of a better milk supply for our cities. I fully agree with the object of our State and city boards of health and dairy and food commissions, but I have

often been out of sympathy with the methods instigated by them to improve the city milk supply. In most cases I think these institutions are honestly advocating and demanding what they think are right methods, but I have known of instances where men have been employed for political reasons and were absolutely incapable and made demands which were foolish and ridiculous.

The object of the Chicago ordinance was good, but the demands of it were impossible to meet, and it fell by the wayside. The ordinance required a physical impossibility for its enforcement in the time allotted. Further, it did not start at the proper place. It is important to eradicate tuberculosis from the dairy herds which supply milk for human consumption, and it is also important to eliminate conditions which provide for the development of tuberculosis. There is not much use in weeding reacting animals from the herd and still have the barn remain dark, dirty, and ill ventilated. The attempt to force the tuberculin test upon the dairy farmer without showing him the benefits to be derived from it and without leading him to make the necessary changes in his equipment for the production of pure milk prejudiced him against the movement. The result was that instead of gaining his cooperation in this great movement, he became, in too many instances, emphatically opposed to it. This condition I attribute largely to the misconception the authorities had of the correct methods of attacking this problem. Too many men who are simply doctors, chemists and bacteriologists are directing the work and not enough men trained in the art and science of dairy farming. The subject is far greater than a clinical or laboratory problem. It is largely a dairy problem.

About ten years ago, Mr. Strauss of New York, sent a young doctor to Chicago to aid in solving the problem of a better milk supply, especially for the children of poor parents. Mr. H. B. Gurler, then producing a milk of certified quality for Chicago, and I were called into conference. The upshot

of it all was we were politely informed that we could bring nothing to this subject worth while and we, of course, withdrew our aggravating presence. It was an amusing situation. Mr. Gurler, a lifelong student of dairy farming and one of the first men in the country to tackle and master the task of producing clean milk for Chicago, was considered incompetent to bring any information worth while to the subject of a better milk supply. The young doctor knew the chemistry, bacteriology, etc., of milk, but it was plain he had no understanding of the application of the principles which produced wholesome milk, and like many dairy farmers, was contented in his own bigotry and ignorance. Here was a chance for the heartiest co-operation between men of pure science and men who knew dairying from a practical standpoint to work in unison for a better milk supply, but it was dissipated because the man of letters felt he was the consummation and end of all knowledge pertaining to milk production. Was this man's attitude so different from the dairy farmer who refuses to accept the aid of men who have information that would help him? A knowledge of the chemistry and bacteriology of milk is useful, but it is of little value except as it helps in solving the principles of the production of wholesome milk. Chemistry never discovered a poison, it only determines the substance that kills. Bacteriology never discovered an injurious organism; it locates those that have proved themselves by their deeds to be injurious.

Many more examples could be mentioned that would help to illuminate the central thought of this paper, namely, that milk inspection is an educational problem. The men in charge of milk inspection, on the whole, need not only a training in the laboratory, but to get actually in contact with dairy farming. They should know, too, the heart and motive of the dairy farmer. The lack of such information is and has been the great weakness in the system of inspection. I would not venture the statement that inspectors as a class are not sincere or that some of them are not fully capable of discharging their

duties, but taken as a whole, men who have had these duties to perform have not received the training necessary to make their work the most effective. I am not making these statements to condemn or to criticize or belittle the efforts of those who are attempting to improve the city milk supply, but rather to point out conditions as I view them. This is the only way to provide for a more efficient service.

To briefly summarize. The dairy farmer views the subject of milk production from a different standpoint than men in charge of milk inspection. His notions, conceptions and ideas concerning the production of milk are, to a certain extent, inherent. His early training prepared him to do what he is now doing and to get him to change to the modern practices of dairying is a slow, educational process. Many things indicate that progress is being made and there is nothing to fear as to what the final outcome will be.

The men in charge of milk inspection have a different viewpoint concerning milk production than those engaged in the production of milk. They have seen the other side of the subject; they have observed the results of the imperfect work of the dairy farmer and have attempted, in their way, to change his practices. Their efforts have not been without their rewards, but through the lack of understanding of the problems of dairy farming, a large amount of energy has been wasted.

As I view the subject of milk inspection, it is almost entirely an educational problem, and until viewed from this standpoint little headway will be made in getting all the dairy farmers to practice correct methods of milk production.

*“Prudence is the knowledge of things to be sought, and those to be shunned.”*

## REPORT OF COMMITTEE ON DAIRY FARM INSPECTION.

DR. WM. H. PRICE, *Health Officer*, Detroit, Chairman of  
Committee.

A report of investigations undertaken for the improvement of any condition should contain a statement of what the problem implies, and the Dairy Farm Inspection Committee of the International Association of Dairy and Milk Inspectors offers the following relative to the milk problem :

First. Milk is a perfect food. It contains all the elements necessary for human nutrition in an easily digested form. It is one of the cheapest foods. Without milk, our civilization as at present constituted, could not exist.

Second. Diseases may be transmitted with milk. Long lists of epidemics of contagious diseases laid at the door of the milk supply are available. Cleanliness of the milk supply has a marked influence on the morbidity of children. Dirt in milk impairs its food value by lowering its digestibility. Dirt is too often present in market milk in sufficient quantities to become a serious menace to the public health.

Specific disease is spread by milk only when that milk has become infected by contact with the germs of that particular disease. Milk may be contaminated by the cow herself, her milker, or those who handle the milk either at the dairy farm, country receiving station, or city milk plants, and by the consumer in the home.

Correlated with the public health side of the milk problem is the economic side. Fairly accurate figures are available of the cost of distribution. The cost of production is a mooted question.

The problem involved, for the solution of which civilization is seeking, is :



First. That the milk contain normal milk constituents.

Second. That it be safe and clean.

Third. That it can be bought for as low a price as is consistent with the first and second requisites.

Fourth. That its production and distribution should return to the producer and dealer a reasonable profit.

Only one method, that of pasteurization, has been devised to make milk that may possibly have become contaminated with the germs of specific human or bovine diseases safe for human food. Milk, however, must not only be safe, but it must be clean, and pasteurization must in no sense be regarded as a substitute for cleanliness. Adequate dairy farm and city milk plant inspection is essential for the safeguarding of the public health, in order that milk may be properly guarded from infection, both in its production and subsequent handling, whether it is to be pasteurized or not. Dairy farm inspection if handled by competent men offers an effective means of keeping a large part of both the soluble and insoluble dirt out of milk. Without farm inspection the clean dairyman is forced into prohibitive competition with the unclean. Improvements in dairy farm methods have kept pace with other sciences to the advantage of the producer as well as consumer, and the adoption of these scientific aids through the medium of the dairy inspector fosters the dairy industry and makes the work of the dairyman more economical and efficient.

It is a fundamental principle that admits of no denial, that he who bears the responsibility should control the means of administration, and to that end this Committee unanimously recommends that local Health Departments responsible for the health of the people of their respective cities should be empowered to enact any legislation necessary for the control of its milk supply. The only dissent from this opinion would be in case the above authorities had neglected their responsibilities, or in case the public health authorities of a State have progressed beyond the limitations possible for its contained cities, in which case, should it prove impracticable to remove

the local authorities, the responsibility for the administration of dairy inspection should be reposed in the constituted State health authorities.

As a basis for the preparation of a city milk ordinance this Committee recommends the model prepared by the late George M. Whitaker, of the United States Department of Agriculture. This ordinance is flexible and wisely recognizes the varying conditions prevailing in different localities. A copy of this ordinance is appended hereto. This Committee recommends that the constituted authorities charged with the enforcement of milk legislation scan well all bills and measures offered for passage by whatever persons or organizations to the end that improper or useless, though plausible enactments, may not find their way to the statutes.

Dairy farm inspectors should be appointed by the Health Officer in the locality where the product is to be marketed and be responsible to him for their conduct. There should be one dairy farm inspector to each 100 farms, each farm being inspected at least once a month. An efficient dairy farm inspector should acquire information by which he may be kept generally informed regarding the units of his field at much more frequent intervals. Civil Service should protect both inspectors and the public, but should not be of such a character as to be the means of keeping inefficient men in the service.

While many capable men with but little previous experience are doing good work in many communities as dairy farm inspectors, it must be said that everything else being equal, trained men offer greater promise of efficiency and should be preferred when new appointments are to be made. Graduates of State Agricultural Colleges possess the training best calculated to produce the most efficient dairy inspectors, and as such graduates are likely to be preferred, these colleges should provide more detailed courses in dairy farm sanitation and inspection. On an equal plane with previous training is the personality of the inspector. The chief work of the dairy farm inspector is to induce a large number of men to acquire habits

of sanitation that are for the most part but slightly more burdensome than those of insanitation that have prevailed. The personality of the dairy inspector, his knowledge of all phases of dairy production and dairy products, tact, patience and persuasion, coupled with scientific training, are productive of permanent results in dairy inspection.

Only a very few cities in this country are provided with a milk supply that may be pronounced satisfactory. A comparatively brief investigation will determine that opposite conditions prevail elsewhere. The first work of the dairy farm inspector is therefore to improve existing conditions. It is the opinion of this Committee that the score card of the Official Dairy Instructors' Association as adopted and used by the National Dairy Division in the hands of a competent inspector who is proficient in its use offers greater facilities for improving the average dairy farm conditions than any other agency. This dairy score card has provided us with a system of measuring the relative merits of dairies far in advance of men and administrative methods yet available for utilizing it to its fullest extent.

The dairy inspector with his score card is coming to be the arbitrator of many thousands of dollars, and it is vital that the inspector be a man qualified for the important duties he is to perform. For not until those in whose hands the score card is put become as competent by training and experience as are those who drafted it, can the highest results in its use be expected or obtained.

This Committee believes that the production of a clean and reasonably safe milk is a comparatively simple process, easily within the reach of all careful dairymen, if paid a price sufficient to induce them to become genuinely interested in its production. We believe that the consumers of milk will be ill advised if they do not trust less to prosecution under the law and more to efficient dairy inspection and dairy instruction for security against bad milk.

After many years of much law and agitation, and many at-

tempts to classify and grade milk, this Committee finds that further study and research is necessary to secure the essential scientific facts necessary for the intelligent grading of milk. And we therefore recommend to our Associates a further study of the problem and a postponement of any attempt to grade milk until there is sufficient data available to establish the grades on a scientific basis. Instead of entering into a discussion of methods for conducting dairy farm inspection, this Committee endorses the above named score card and the Bulletins of the National Dairy Division, Quarantine Section, and Public Health Service, and desires to mention in particular:

- Score Card System of Dairy Inspection.
- Milk and Its Relation to Public Health.
- Sanitary Milk Production.
- Extra Cost of Producing Clean Milk.
- Sanitary Relations of the Milk Supply.
- Important Factors in the Production of Sanitary Milk.
- Designs for Dairy Buildings.
- Ideal Milk and Some Phases of Milk Inspection.
- Milk and Cream Contests.
- Care of Milk and Its Use in the Home.
- Study of Bacteria Which Survive Pasteurization.

The National Dairy Division, U. S. Department of Agriculture, the various State Experiment Stations, Agricultural Colleges and Boards of Agriculture are rapidly accomplishing the work of revolutionizing the dairy industry. This Committee is persuaded that only those qualified to be dairy instructors should be appointed as dairy inspectors, and while dairy farm inspection is not a cure for all dairy ills it will, if conducted in a sane manner by competent men, be productive of results in the prevention of sickness and the saving of human lives.

*“Expedients are for an hour, but principles are for the ages.”*  
—Henry Ward Beecher.





OUTLINE FOR CITY MILK ORDINANCE, AS PREPARED BY THE LATE DR. GEORGE M. WHITAKER, OF THE UNITED STATES DEPARTMENT OF AGRICULTURE.

AN ACT (ORDINANCE) TO REGULATE THE SALE OF MILK IN .....

SECTION 1.

THE REQUIREMENT.

No person, himself, or by his servant or agent, or as the servant or agent of another, shall sell or deliver or have in his possession or custody with intent to sell or deliver:

- (1) Milk to which water or any foreign substance has been added.
- (2) Milk which has been wholly or partially skimmed.
- (3) Milk not of standard quality.
- (4) Milk concerning which any misrepresentation has been made.
- (5) Milk produced by diseased cows or by cows which have been fed unwholesome food or contaminated water, or
- (6) Milk which has been produced, stored, handled or transported in an improper, unclean or insanitary manner.

SECTION 2.

DEFINITIONS AND EXCEPTIONS.

For the purpose of this Act the word "person" shall be construed to mean individual, partnership, or corporation; the word "milk" shall mean milk, cream, or evaporated or condensed milk, so far as may be applicable; the expression "milk not of standard quality" shall mean milk having less than 8.5 per cent of solids not fat and less than 3.25 per cent of milk

fat and cream having less than 18 per cent of milk fat. Skim-milk having less than 9.3 per cent of milk solids exclusive of fat shall be considered adulterated.

Nothing in this Act shall be construed to prohibit the sale of skimmilk or of understandard milk if the receptacle containing the same and from which it is sold is plainly marked with the word "skimmilk" in the case of skimmilk, or with the per cent of milk fat contained therein in the case of understandard milk or cream. The aforesaid words and figures shall be distinct and conspicuous; they shall be permanently attached to the aforesaid container above the center of the same; they shall be of uncondensed gothic style and their length shall be at least one-tenth of the height of the container on which they are placed; when glass bottles are used the required marks shall be blown into the side of the bottle and also distinctly printed on the cap or cover of the same.

Nothing in this (Act or ordinance) shall be construed to prevent the sale of modified milk in bottles, each holding a single feeding, into the side of which the name of the person who manufactured or prepared the same has been blown together with the words "Modified Milk." Nothing in this (Act or ordinance) shall apply to evaporated or condensed milk contained in hermetically sealed packages labeled distinctly with the name of the manufacturer or person who prepared or put it up, and the brand under which it is made or sold. Certified milk shall mean milk produced under the regulations and supervision of a regular county medical society acting through a committee or commission, which has certified that its requirements have been complied with.

For the purpose of this Act, cows which react to the tuberculin test shall be considered diseased; milk produced at a dairy which scores (on the National Dairy Division score-card) below 50 and milk sold by or from a city milk plant which scores (on the National Dairy Division score-card) below 70, shall be considered as produced or handled in an im-

proper, unclean and insanitary manner. Milk from a cow two weeks before calving, and five days after, shall be regarded as insanitary. For the purpose of this Act, milk with a temperature above 50 degrees F., or having more than 500,000 bacteria per cubic centimeter, shall be regarded as insanitary. When milk is bought or sold by the quart or gallon, the gallon of 231 cubic inches and the quart of 57.75 cubic inches shall be the standard and shall be so understood.

### SECTION 3.

#### LICENSES.

Every person before selling milk or offering it for sale, or before conveying milk in carriages or otherwise for the purpose of selling or delivering it in the city of . . . . . shall be licensed by the Chief of the Milk Inspection Bureau hereinafter provided for to sell milk within the limits thereof, and shall pay . . . . cents to the use of the city. The license fee shall be paid to the Chief of the Milk Inspection Bureau and by him turned over to the city treasurer. Licenses shall be issued only in the name of the owners of carriages or other vehicles, or of stores or booths. They shall, for the purpose of this Act be conclusive evidence of ownership of the business, and shall not be sold, assigned or transferred. Each license shall contain a serial number and the name, residence and place of business of the licensee. Each licensee before engaging in the sale of milk shall cause his name and number of his license to be conspicuously posted in his place of business and shall cause his name, the number of his license, and his place of business, to be legibly placed on each side of all carriages or vehicles used by him in the conveyance and sale of milk. The application for license shall be in writing and on a blank furnished by the Chief of the Milk Inspection Bureau. The application shall give the name of all drivers and other persons employed by the applicant in conveying or selling milk.

It shall also give the names of all persons from whom the applicant is at the time purchasing or receiving milk, their residence and post office address, and such detailed information as to the condition of their cows and premises and their methods as the aforesaid Chief may require. The application shall contain an agreement that the Chief of the Milk Inspection Bureau, his deputies and assistants shall have the right to inspect the cows, premises and methods of said producer.

Holders of licenses shall promptly notify in writing the Chief of the Milk Inspection Bureau of any change of drivers or other employees or of any change in the source of their milk supply. Each license shall be granted on the condition that it is subject to suspension for violation of any provision of this (Act or ordinance) or of any regulation thereunder. All licenses shall be renewed on or before the first day of ..... of each year.

#### SECTION 4.

##### BUREAU OF MILK INSPECTION.

A milk inspection Bureau of the Health Department is hereby created. The (Board of Health or Health Commissioner) shall (annually or biennially) appoint a Chief of the Milk Inspection Bureau at an annual salary of \$..... (Make provision for assistants, chemist, bacteriologist, etc., if place is large enough.)

The aforesaid Chief shall enforce the provisions of this (Act or ordinance) and regulations thereunder, under the general direction of the Board of Health (or Health Commissioner) and be responsible to (it or him) for the conduct of his office. The Chief of the Milk Inspection Bureau by himself or a duly authorized deputy or assistant shall at least four times each year inspect all animals, stables, milk rooms, vehicles, places of business, shipping stations and other buildings

or places used in the production, handling, transportation or storage of milk for sale in the city of which he is an officer, using the score card of the Dairy Division of the Bureau of Animal Industry of the United States Department of Agriculture, and rating the dairies thereon. He shall also investigate the health of employees and attendants handling said milk supply. He shall take samples of milk for chemical and bacteriological examination. For the purpose of enforcing this law the aforesaid Chief and assistants may enter all aforesaid places and buildings used in the production and handling of milk for the city of which he is an officer; he shall have access to all animals producing milk for said city and to all vessels and utensils used in the production, preparation for market, and sale of such milk; and he shall be allowed to take samples of milk on offering payment therefor. He may revoke or suspend the licenses heretofore provided for, for violation of this law or of the regulations made thereunder. The aforesaid Chief of the Milk Inspection Bureau shall annually test or cause to be tested with tuberculin, all cows furnishing milk for the city of .....

## SECTION 5.

### MISCELLANEOUS.

A person suffering from any contagious disease, or one in whose residence, or among whose associates, any contagious or infectious disease exists, must keep away from cows, milk or milk utensils. When any person engaged in the production, storage or distribution of milk is suffering from any contagious or infectious disease, or when such disease exists among his employees or their immediate associates, or within any building used in any way in the milk business, no milk shall be sold or delivered from such dairy or milk establishment, except by permission of and in the manner prescribed by the Board of Health. No person who has anything to do



in the production or handling of milk shall enter any place where exists any contagious or infectious disease nor have any communication with any person who is an occupant of such infected place. Every producer who sells milk directly to the consumer shall promptly notify the Board of Health of any case of a communicable disease among his employees, their immediate associates, or members of his family. Every milk producer who sells his product to a middleman for re-sale shall notify said dealer of the existence of any communicable disease as aforesaid and said dealer shall at once notify the Board of Health.

No milk shall be dipped from cans or poured into other vessels except in the regular milk room of a dairy plant. No milk shall be bottled upon any wagon.

Milk tickets shall be used but once.

No one shall deliver milk to or remove any empty milk bottle or receptacle from a dwelling where any contagious disease exists, until authorized by the Board of Health in the way prescribed by the Board.

No one shall place or permit to be placed in any vessel or utensil used in the production, sale or delivery of milk, any offal, swill, kerosene oil or other offensive material; nor shall he return or cause to be returned any milk can or bottle which is in an unclean or offensive condition.

The presence of a diseased animal in a herd from which milk is sold shall be *prima facie* evidence that the milk of the diseased animal is sold contrary to law.

The Board of Health (Health Commission) may make all necessary regulations for enforcing this (ordinance or Act).

## SECTION 6.

### PENALTIES.

Whoever violates any provision of this Act (ordinance) or any regulation made under its authority, and whoever hinders, obstructs or interferes with the Chief of the Milk In-

spection Bureau or any of his inspectors or assistants in the discharge of their duty, shall be punished by a fine of not less than \$..... or more than \$.....

### DISCUSSION.

PROF. C. B. LANE. It is difficult to get one score card that will apply equally well to the North, South, East, and West, on account of the differences in temperature and other conditions. An inspector using the score card must also use some common sense. Where the stables are open the year around, the question of ventilation, which is really a means for securing fresh air, really does not apply, and a perfect score should be given. The same principle would apply to bedding, when the cows were lying in the open pasture.

DR. WM. H. PRICE. I would like to ask Mr. Lane if it would not be possible, instead of having a great variety of score cards for different sections of the country, making a comparison of conditions impossible, to use instead one score card; as, for instance, the score card of the Official Dairy Instructors' Association; and to so interpret that card that it would be applicable to local conditions, as, for instance, in a warm section where there is no need for an automatic ventilating system, and the stables are of open construction, give a perfect score for ventilation. Also regarding the storage of milk; I believe certain credits are given for storage below 50 degrees, but there is also a footnote which says that if milk is delivered twice a day, allow a perfect score. Would it not, therefore, be preferable to stand by one official score card and interpret it according to local conditions, rather than have a card representing different standards for each section?

PROF. LANE. I have always advocated that. It is a very simple matter to give a perfect score where any item found on the card is not required.

MR. BROWN, Tennessee. I have had a little experience,

both personal and otherwise, with the official score card. The result of that small experience has been that so far as our conditions are concerned, I believe the present standards allow too much value for equipment and too little for methods. There is a great work laid out for the man in charge of scoring who would undertake to make the score card applicable to all sections.

MR. HENDERSON. In the State of Washington we have a very mild winter, the average temperature being about 45 degrees. When the temperature of the stable is suitable for the comfort of the animal, we give a perfect score, but if animals are crowded into a barn where the air space would be less than 500 cubic feet, and it is probable that it will be uncomfortably warm, we do not give a perfect score. If the barn has adjustable windows, we give perfect for ventilation. We do not require an adjustable system of ventilation, because the King system of ventilation does not seem suitable to our climate on account of the humidity in winter and the heavy fog that rolls in off the ocean. We give a perfect score where the windows are taken out altogether and cloth is placed over the openings. We give a perfect score for bedding where the cattle run under a covered shed or out on the pastures at night. I think the Dairy Farm Score Card of the Official Instructors' Association, as adopted by the Government, can be made to fit any locality in the United States if judgment is used in scoring.

PRESIDENT STEFFEN. It has been suggested that there are a number of resolutions to come before the Association to be acted upon, and the president will appoint as a Committee on Resolutions, Dr. Price, of Detroit, chairman; Mr. Henderson and Mr. Bossie, of Omaha. Any member who has anything to offer can present the matter to the chairman, who has headquarters at the Sherman House.

## REPORT OF COMMITTEE ON BOVINE TUBERCULOSIS.

DR. GEORGE W. GILLIE, *Chief Dairy Inspector, Ft. Wayne,*  
Chairman of Committee.

In presenting this report on bovine tuberculosis, the committee has subdivided the report as follows:

- A. General Survey of Bovine Tuberculosis.
- B. Milk as a carrier of the disease.
- C. Best known methods for determining the disease.
- D. Control or possible eradication.

Bovine Tuberculosis, one of the oldest diseases of animals, has been a subject of much investigation. In 1865 Villemin showed that it was infectious. In 1882 Koch discovered the bacillus of tuberculosis. The disease is specific, because it is produced by a single cause, the tubercle bacillus; infectious, because the tubercle bacillus must first be taken into the body. The tubercle bacilli which produce tuberculosis in cattle differ slightly from the bacilli which cause tuberculosis in man, but they are known to belong to the same species.\*

Several Government commissions and many scientists have made investigations as to whether bovine tuberculosis is transmissible to the human race. It is now generally conceded that the human race, especially children, can become infected with tuberculosis from cattle, through the milk supply.

In an article by Dr. Mohler, of the Bureau of Animal Industry, is the statement: "According to Von Behring, the question of infection in man usually goes back to childhood, as he believes that many of the cases of pulmonary tuberculosis in adults are of intestinal origin, infection having occurred primarily through the intestinal tract, remaining latent until adult life."

"Dr. Park has summarized the results of his work and that

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\* Moore's Bovine Tuberculosis.

of Krumweide, as well as the work of other authors throughout the world with the following results: Of 63 children dying of tuberculosis at the Babies' Hospital, 59 cases proved to be human infection and 4 bovine, a percentage of  $6\frac{1}{3}$ . Of 9 children dying of tuberculosis at the Foundling Hospital, 4 proved to have derived their infection from human sources and 5 from bovine, a percentage of 55.

"Of a total of 88 children under five years of age who died of tuberculosis, 77 had derived their infection from human sources and 11 from bovine, a percentage of  $12\frac{1}{2}$ .

"Combining the cases studied in New York with those of other observers in different parts of this country and Europe, the following results are found:

Adults, 787 cases—777 human and 10 bovine infection.

Children, five to sixteen years, 153 cases—117 human and 36 bovine infection.

Children under five years, 280 cases—215 human and 65 bovine infection."

Frazer, of Edinburgh, reports "seventy cases of surgical tuberculosis. Forty-one of these showed bovine bacillus, and twenty-six human. Three showed both bovine and human. Sixty-seven of these cases were in children twelve years and under, and three cases were in adults, twenty-four, twenty-five, and thirty years respectively. Taking the children from the zero to the five-year period for comparison with results given by Park and Krumweide, we find among the forty-seven cases thirty-two infected with the bovine germ, twelve with the human, and three with both. When we come to study the family history of these cases, we find some impressive facts. In twenty-one cases there was a family history of tuberculosis. Among these, fifteen gave human cultures and six bovine. In fifty-two cases, no tuberculous history could be elicited—among these, only nine human cases and forty-three bovine.

The age incidence is very striking, as shown by the following figures:



Age—years.	Cases.	Bovine.	Human.	Both.
0 to 1	4	4	0	..
1 to 2	12	8	2	2
2 to 3	15	11	3	1
3 to 4	10	6	4	..
4 to 5	6	3	3	..
5 to 6	3	0	3	..
6 to 7	5	3	2	..
7 to 8	6	4	2	..
8 to 9	1	0	1	..
9 to 10	1	0	1	..
10 to 11	3	1	2	..
11 to 12	1	1	0	..
Adults	3	0	3	..

#### *B. Milk Supply as a Carrier of the Disease.*

The two principal sources of infection of bovine tuberculosis in the human family are from the meat and milk of tuberculous animals. As dairy inspectors we are more deeply concerned with milk as a carrier of the disease.

First, milk from a tuberculous udder may transmit the infection.

Second, Gaffky and Eber in Germany, and Schroeder, of the Bureau of Animal Industry, have shown that the dust and manure from stables where tuberculous animals are kept contain tubercle bacilli, and this material may infect the milk.

#### *C. Best Known Methods for Determining Tuberculosis in Cattle.*

At present there are four methods for determining the presence of tuberculosis in cattle.

- 1 Subcutaneous method.
- 2 Intradermal method.
- 3 Ophthalmic method.
- 4 Physical Examination.

The second and third methods are modifications of the subcutaneous method. Their claim to attention is based upon simplicity, but they are as yet in the experimental stage.

**Physical Examination.** It has been shown by many investigators and veterinary experts that physical examination of dairy herds for tuberculosis has been most unsatisfactory. Among the dangerously tubercular animals may be found at post mortem examinations the best looking cows in the herd.

**Subcutaneous Method.** The subcutaneous method of tuberculin testing by reliable competent veterinarians is the only recognized method for determining the presence of tuberculosis in cattle. This test is considered by authorities as being  $98\frac{3}{4}$  per cent positive.

#### *D. Control of Bovine Tuberculosis.*

There are two all-sufficient reasons for the control of bovine tuberculosis.

First. That the disease is an economic scourge, a problem affecting the farmers and stock raisers of the country and the country in general. It has much to do with the high cost of meat and meat products. The packer does not lose on the Government inspection in the slaughter houses. The loss falls on the consumer and the farmer.

Second. That the disease may be transmitted from animals to mankind through the medium of an infected milk supply.

The prevalence of the disease in pure bred herds must be stamped out, as the sale of stock spreads the disease. The following figures from an investigation at the Michigan State Fair shows need of educational work among breeders:

Herds investigated at Michigan State Fair.....	23
Beef types .....	9
Dairy types .....	14
Beef types tested.....	1
Beef types not tested.....	8
Dairy types tested.....	11

Dairy types not tested.....	3
Cars cleaned and disinfected.....	14
Cars not cleaned and disinfected.....	9
Stables cleaned and disinfected at fairs.....	2
Stables not cleaned and disinfected at fairs.....	4
Depend on Fair Society to clean and disinfect.....	17
Care in watering.....	22
No care in watering.....	1
Test additions to herds.....	15
Do not test additions to herds.....	8

One breeder thinks he infected his herd at Fairs; some have no faith in test, due to dishonesty on part of veterinarians and shrewd breeders; others have cleaned up herds by continuous testing. Breeders, generally, are not as much interested as they should be.

Beef type breeders claim they do little stabling and have a more hearty type of animals.

More time should be spent to interest the dairyman in having his herd tested for his own protection, and against indiscriminate buying of untested animals. Where one good influential dairyman in a locality has his herd cleaned up, it goes a long way towards interesting others. The compulsory testing of all cows furnishing milk to a city, as carried out in some cities and towns, has not proven a good plan, as there is always opposition and too little co-operation to result in much permanent good in controlling the disease. The work done by country dairy inspection in improving stabling conditions as to ventilation, light and drainage, is helping. This can be pushed a little harder, and as the work goes on, it becomes easier to have these improvements made.

At the Minnesota Experiment Station a few years ago, the writer had occasion to study the prevalence of bovine tuberculosis under specific conditions of stabling and breeding. We investigated the stabling and breeding of something over 3,500 cattle tested with tuberculin, with the following results:

	No. Cattle Tested	No. Reactors	Per cent Tuberculous
Native .....	2,839	223	7.8
High Grades .....	157	17	10.8
Pure Breds .....	258	41	16.6
Fair Ventilation .....	1,087	67	6.1
Poor Ventilation .....	1,210	201	16.6

Minnesota's showing for the year ending August 1, 1908, was for pure bred cattle tested, 1,329, of which 36.8 per cent reacted. Of grade cattle there were tested 25,887, of which 7.7 per cent reacted. The average percentage of reactions among cattle for the year, regardless of breed, was 9.3 per cent. I would call attention to the very close agreement of Minnesota's average for this year with the general average for the United States, 9.25 per cent for the fifteen-year period reported by Dr. Melvin.

Under the new law, which took effect January 1, 1910, ordering official tuberculin test of pure bred cattle sold for breeding purposes, there were tested during the first seven months 3,035 cattle with 11.2 per cent reactions. During the following year, which began August 1, 1910, 1,717 cattle were tested, of which 1,214 were given their second test with only .9 per cent reactions. These figures quite plainly suggest the serious prevalence of tuberculosis among pure bred cattle and the possibility of controlling the disease in this particular class of cattle.

Methods Needed. More uniform State laws, all working in co-operation with the Federal Government to regulate tuberculin testing, and the manufacture and sale of tuberculin to keep it out of the hands of dishonest and untrained men; quarantine laws to stop the interstate traffic of reacting animals; the compensation by States for condemned animals, also strict regulations for disinfection of infected stables, cars, stock yards, and exhibition stables. Sections 29, 31, and 33

of a law passed July, 1913, in Pennsylvania, if generally adopted, will be of great help in the control of tuberculosis:

SEC. 29. Each sale in this Commonwealth of tuberculin for cattle and each injection or test made with tuberculin shall be reported in writing within one week, to the State Veterinarian. Each report shall be signed by a person who shall have made the sale or test, and shall give the name of the purchaser of the tuberculin, with the amount sold, and the date of sale, the name and address of the owner of the cattle tested, a description of the animals tested and a complete statement of the actual result of such test. It shall be unlawful to fail or refuse to do so.

SEC. 31. Any domestic animal affected with advanced or generalized tuberculosis, or tuberculosis of the udder, or any animal which has reacted to the tuberculin test, may be plainly branded by any member, agent, or employee of the State Live Stock Sanitary Board, upon the forehead or upon the right side of the neck, from 6 to 10 inches back from the jaw bone with a capital "T" not less than 2 inches long, one and one-half inches wide. Such branding shall not be construed as cruelty to animals, within the meaning of the penal laws of the Commonwealth.

The above is a permanent, lasting and pure method of marking diseased animals and would effectively end the profitable traffic in diseased animals, which is an important step in control work.

SEC. 33. Every owner, operator or manager of a creamery, cheese factory, receiving station or skimming station, shall, before returning to or delivering to any person or persons any skimmed milk or separator slop, to be used for food or feeding purposes for calves or swine, cause such skimmed milk to be thoroughly pasteurized by heating it to at least 178 degrees F.

The above is very important, as one diseased cow could easily infect calves and swine on a great number of farms.



The following from an address on Bovine Tuberculosis, by Dr. J. G. Rutherford, Department of Agriculture, Ottawa, Ontario, 1912: "There are certain districts in Canada where the percentage of tuberculosis in hogs is appalling. We know where the hogs come from. Every hog is killed under the eye of one of our inspectors, and we find that by far the heaviest percentage of tuberculous hogs come from these districts where cattle and hogs run together."

The next heaviest percentage is found in the co-operative dairy districts where the skimmed milk is taken back and fed to hogs and calves. There are a few districts where the skimmed milk is pasteurized and where the trouble shows a remarkable diminution.

If some quicker and less expensive means of showing the presence of tubercle bacilli in milk samples from known farms could be devised, the tuberculin test could be enforced for such herds without much opposition, as public sentiment would back up such procedure.

A new law in Michigan taking effect August 15, 1913, provides much needed quarantine regulations with power to enforce them. It provides for additional compensation for condemned animals, so that the loss of the farmer is slight. It provides for a State veterinarian at a fair salary, whose entire time is given to work of infectious diseases of animals, in conjunction with the State Live Stock Sanitary Commission, who seem to be much interested in the control of tuberculosis. Similar laws have been enforced in Pennsylvania for some years, and are now beginning to show results in a lessened percentage of tuberculosis from year to year. The best law ever framed can be made an utter failure by stupid or injudicious administration, while on the other hand, the most drastic legislation can be rendered acceptable if enforced with reasonable tact and diplomacy.

We must guard against the introduction of politics and the mercenary interests of local veterinarians into this work where

neither have any legitimate place. To ensure completeness, thoroughness and a disinterested prosecution of the work, we would have it done under the general direction of the Federal Government, in co-operation with the State Live Stock Sanitary Commissions, and the local health authorities. We should appeal to the farmer from an economic standpoint and try to show him that it does not pay to keep tuberculous cows.

### DISCUSSION.

DR. WM. S. GIMPER. Dr. Gillie has referred to the reduction of percentage of reactions in Pennsylvania. In 1896, when the tuberculin test first came into general use in Pennsylvania, the percentage of reactors was 22 and a fraction. The percentage has fluctuated from year to year slightly, but the decrease has been gradual down to 1912, when the percentage was 9.3. In 1913, we tested 1,534 herds, that had 20,554 animals, and the percentage of reactions was 1.4. There were something over 2,000 animals that we examined physically, but which had not been tested with tuberculin. The percentage of positive cases found among those physically examined caused the percentage to run up to 13.4. So you see there has been an increase of about 5 per cent during the year.

At first observation you might say our methods of handling the situation have been effective on account of the reduction in percentage, but there are other things to be taken into consideration. Some of those herds have been tested from year to year. They have been cleaned up to each year. They have been retested with the result that no reactors have been found. That would account for the reduction in the percentage, but nevertheless we feel we have the situation under control to some extent.

We have been criticised for the increase in the percentage of reactors for the year 1913. They claim that it shows that the situation is getting away from us, that the disease is becom-

ing more disseminated, but we don't think so. During that year we had a large corps of milk hygiene agents who make routine inspections. There was something over 50,000 inspections made during that year. They went from farm to farm. All of these milk hygiene agents were veterinarians who had an intimate knowledge of the disease of animals, tuberculosis in particular, and most of them had a special training in milk hygiene work both from the practical standpoint and from the laboratory standpoint. Most of these men were farmers' sons, boys who had been raised on the farm and had taken the veterinary course at the school. The subject was taken right home to the farmer. As a concrete example of that, I want to quote you one case in the eastern part of Pennsylvania. There were twenty-six head in the milking line. The dairyman was producing a high grade milk for which he was getting an extra price. Most of his stock was registered. Practically all of it he had raised himself. When the milk hygiene agent visited him he found the sanitary conditions very good, but in making a physical examination of his animals he pointed to one cow and said, "This cow has tuberculosis," he said, "I can detect it in both lungs." The gentleman went up in the air. It was like insulting a member of his family to say that these cows that he had raised and which he actually loved, to say that they were affected with tuberculosis. The discussion went on until he pointed out another one that he was sure had the disease. The gentleman was very angry and the inspector left. We were told that he hadn't gotten off the place hardly before he called his two hired men and took those two cows over to the woods and killed them and inspected them himself, and he found the disease there. Then he was interested. He called in the local inspector, and the result was that the other twenty-four were tested with tuberculin and twenty-three out of the twenty-four head reacted to the test. They were still under the inspection of his own veterinarian, and lesions were found in each one of them.

There was sixteen head of dry stock there and they were subsequently tested and fourteen out of the sixteen reacted and they were also slaughtered. Now that man would never have known that his herd was afflicted if it had not been brought to his attention by the visit of that milk hygiene agent. So I say that that accounts for the increase in the percentage of reactors, simply because we have gone out and done this intensive work and found them.

Now the methods that are employed by the various States for the control of tuberculosis are very similar. There is a fund appropriated by which these animals can be appraised and slaughtered. Those methods have been in use for a number of years, but I think I am safe in saying that they have been ineffectual and very wasteful. When we adopt such methods as that it brings it down to a dollars and cents standpoint. It eliminates all moral consideration. We are doing it through the pocket-book of the taxpayer and through the pocket-books of the actual owners, and that is why there is so much opposition to the work. There must be some less expensive method developed for the handling of the situation before we are going to arrive at the desired point at which we have been aiming for a number of years. Now, in my opinion, I think it is wasteful, very wasteful. The actual situation in this country, as you all know, of both our beef cattle and our dairy cattle, is in a precarious condition, the supply is diminishing rapidly. And this method of indiscriminate killing of reacting cattle is wasteful and is adding to the danger of the situation. In my opinion, these reacting cattle should be segregated under the control of State authorities, that is, all of those which do not show physical evidence of the disease. It can be done economically. They can be put under the control of proper persons who thoroughly understand the situation, as long as they remain in a healthy condition, and I am sure that the vast majority of them would die of old age before they died of tuberculosis if they were

kept under good sanitary conditions and given the proper food.

Now if there were points established in the State at which these apparently healthy though reacting cattle could be segregated and could be bred to desirable animals and the offspring sold to the dairyman; give them an opportunity twice a year to come in and buy this young stuff at auction. They could be kept under the bond system and at the age of six months or past six months tested, and I am quite sure from our experience at the State farm that practically all of them would pass the test. In that way you would be disseminating among the dairymen a better grade of cattle and you would be increasing the available supply instead of under our present wasteful method, of indiscriminately killing them.

I believe that in the first place the question comes up as to the economy of it. You see, it requires a large appropriation and that is hard to get, but I think it would be money well invested, and I believe that it could be done on such a basis that it would be self-sustaining, irrespective of the vast good that would be done by increasing the available supply and adding to the quality of the dairy herd by putting out a better breed of animals.

Another way that we may get at the control of this disease would be to go to the fountain head. It is indisputable that a large amount of tuberculosis is disseminated by the use of skim milk from skimming stations and creameries, fed by the farmers to their calves and hogs. Those hogs, a large per cent of them, if you take the experience of the inspectors right here in the Stock Yards, the hogs that come off the Northwestern roads, that are gathered up in the dairying districts, that are raised largely on the skimmed milk, the per cent of those that are condemned is very much larger than what comes from the corn belt where they practically feed after the steers. We have got to study it from the standpoint of political economy. We succeeded at the recent session of the Legislature in Pennsylvania in having a law enacted which



will compel the thorough pasteurization of all skimmed milk and separator slop before it is returned from the creamery to the farmer. I understand there are several States in the Union in which that law has been in effect for several years, and before the meeting is adjourned I want some information in regard to the effect of it, whether it has been in force and what the result has been, and particularly I want some information from the economic side of it.

DR. KINYOUN. I can thoroughly endorse what has been said with regard to the physical examination as a method of eliminating tubercular cattle from the earth. I take issue and direct issue with my good friend, Professor Moore, of Cornell University, who, in a recent publication, has stated that all, nearly all, if not all of the tuberculous infected cattle, can be removed by a careful physical examination. For the last thirty years I have been engaged in physical examination of the human species, and I will say when you get a long, lean, lanky person that perhaps you can find some lesions in his lungs, but take a fat man and it becomes more difficult. And applying that same method of physics to a cow or a bull, I don't believe it will bring about as good results as with a fat man.

Now I don't think I would like the impression to go out among the inspectors that a physical examination of a tuberculous animal is easy. The only means we have at hand at the present time of practical application is that of the tuberculin test. There then arises a question as to the quality of the tuberculin administered and the way in which it is administered. I know something about the preparation of tuberculin, and I know that it cannot be too well safeguarded in its preparation, and moreover, every particle of tuberculin which is used for this purpose should be subjected—I mean each lot prepared—should be subjected to a thorough cleaning up just before it is to go on the market or in the hands of the veterinarian. The second is to have this test applied by those

who know how to apply it. I have seen it applied in a way in which it should not be applied in more cases than one.

I disagree with one of the findings of the committee about the co-operation which you must expect from the farmer when you find proof beyond question of doubt that tuberculosis exists in his herd. Occasionally here and there you will find some one who has progressed far enough to appreciate the gravity of the situation. As a rule, and I am speaking of my own personal experience with the milk producers in and around Washington, they have not taken kindly to any suggestion which we have made for the betterment of the health conditions. Even when we have found tuberculosis in the milk, why, the only thing that brought them to their senses was a notification that they could not longer sell their milk in Washington.

While the question of segregation of tuberculous cattle seems plausible and feasible, the experience we have had around Washington would not bear that out. That is to say, that cows have been added to herds and which have been kept from one and sometimes two years, and when tuberculin tested were found to be tuberculous and have been eliminated and have been kept under observations. It is not a paying proposition, so I am told by those who have done it, because many of those cattle go down within a year or two afterwards, and consequently, money is lost in the care and maintenance of such cattle.

I believe, however, that there must be a general concerted campaign against this one disease because we will all admit that it is a source of danger for the child. From the economic aspect, the sooner tuberculosis is eradicated from the herd the sooner the herd becomes that much better as an investment.

MR. EDWARD J. FRIAR, Flint, Mich. My experience with the tuberculin test extends over a period of about one year. In 1912 the present milk ordinance of Flint was passed. This milk ordinance had as one of its provisions the tuberculin

test. It was put in there mainly through the influence of four or five milk producers who had previously tested their cattle. The Common Council gave the rest of the producers until May 1st, 1912, to test their cattle. There are about eighty-five herds supplying milk to Flint. Along about March of the present year a few of the producers got busy and tested and their example was followed by the rest of them. There were about fourteen hundred cattle tested, and of that number there were thirty-six reactors. We had one of the Government meat inspectors from Detroit come to Flint and these cattle were taken to one of our packing houses near Flint and killed, and of the total number, lesions were found in all but four. The State Veterinarian was there and the State refused commissions to those producers whose cattle had the lesions. At the present time the test is going on. When I left Flint the other day there was four herds to be tested during this present week. A certain amount of money was appropriated so that it was not a total loss to them.

A short time ago a new milk concern opened in Flint. Besides pasteurizing milk, they manufacture other dairy products. This company was opposed to the tuberculin test. The President of the concern came before the Board of Health and tried to have the law changed. What he wished to accomplish was to do away with the tuberculin test because his company was going to pasteurize the milk. The Board of Health refused to give in, and so he carried it up to the Common Council. The milk producers got together and fought this milk company. They preferred to have the tuberculin test. So the Common Council refused to back down and the tuberculin test is kept in the ordinance, and I presume it will be. The farmers seem to be satisfied, and everything seems to be going along satisfactorily to them.

PROF. E. H. WEBSTER. As a student of the tuberculosis question as it applies to dairying, I have kept in close touch with what has been going on. The paper that I represent,

*Hoard's Dairyman*, as you know, has for years taken advanced ground in regard to the tuberculin test and its application. Although we represent in a way both the producer and the consumer, yet we have felt and feel to-day that there isn't a farmer in this land who can afford from any standpoint whatever to harbor tuberculosis in his herd. From an economical standpoint he cannot afford to have cows in his herd infected with this disease. It threatens the life of all animals in his herd. It means a pecuniary loss if he has tuberculosis in his herd, and it has been very hard for us to understand why a good many farmers have taken such violent opposition to the cleaning up of the herds. I think much opposition has been brought about by irrational acts, such as was mentioned this afternoon in the case of the city of Chicago, where Doctor Young, in trying to do a good work, overstepped the bounds of possibilities and tried to accomplish things that could not be accomplished within the time set. Such things are discouraging a good many men. It has brought in some cases ridicule on those who have been trying to handle this great question. But while these cases have come up, it has not altered the facts in any sense whatever, and I think ultimately the good sense of our American dairymen is going to be on the side of cleaning up and eradicating this disease. Looking at it from the side of the possibility of carrying disease to the human through milk, it seems to me that any sane man ought to take the ground that if there is any danger whatever of transmitting tuberculosis to children by means of milk, that that in itself is enough excuse for making a pretty rigid enforcement of the tuberculin test. And on those grounds particularly, I can't see why any farmer should stand out against what is to his own best interests and to the best interests of those to whom he is catering in the distributing of his milk. It seems to me that he is taking a whole lot of responsibility upon himself if he says he doesn't care, if he will blind his eyes to the facts and say that he doesn't know and doesn't

believe in it and consequently is not going to submit his herd to a test. If there is that danger, and, as has been shown here by the committee, we have lots of evidence to show that there are many, many cases of tuberculosis in children that have been traced back to the cow—why any man should take the responsibility upon himself to say that he didn't believe that or didn't care anything about it, is almost beyond human comprehension. And because we have these men in the business who close their eyes to facts, who will not see although the evidence is placed before them, we have got to do a very large amount of educational work to bring people to a different moral standard on this question.

I am glad to feel that the people interested in producing and the health officers and the inspectors throughout the country, and the consumers to a large extent are awakening more and more to this question, and while it is going to be a long fight, yet ultimately the best interests are going to win and this question of tuberculosis will become in a few years a minor question in our dairy problems. We will look back at this in twenty-five years from now and think with some astonishment that people were so slow to act when they knew the facts.

*"It is a part of the cure to wish to be cured."*





## REPORT OF COMMITTEE ON THE CHEMICAL AND BACTERIOLOGICAL INSPECTION OF MILK.

PROF. HORATIO N. PARKER.

This committee was appointed this summer and it consisted of Dr. Jordan, of Boston, myself and Mr. Henderson, of Seattle. We have had no chance to get together as we have been so far separated. I tried to see Dr. Jordan in Boston but did not have the chance, and so as a committee we have acted no further than to recommend that this Association adopt for the present the standard methods used by the American Public Health Association. We would like to have those used in our laboratories at the present time. I presume most of the inspectors who are doing bacteriological work as a matter of fact are using those methods. It is the opinion of the committee that there should be a committee on bacteriological methods, and that so far as possible we should work along a little different lines than other similar committees. I don't know how far it would be possible to get rapid tests that would do for commercial work. So far as this work has been gone into I believe it has not yielded very promising results. I don't think that should be a reason why men of this kind should not make a study of these results and see if some test can be evolved which will help in forming a tentative judgment as to the quality of milk.

MR. HENDERSON. For the last three and a half months, our laboratories have been using the alcohol test for the detection of abnormal udder condition or garget. The test requires the use of 5 c. c. of milk and 5 c. c. of a sixty-five per cent solution of alcohol. It can be made very easily on the farm and we have in the certified herds producing milk for the city, made this twice a week. If there is udder disorder in the sample taken from the individual cow, there is a precipitation thrown

down and a curd formation on the sides of the test tube. A week ago we went through the herds of one of the certified dealers so that he would be sure that he would not enter into competition at this Dairy Show any cows showing symptoms of udder disorder. One cow gave a positive reaction to this test. Four days later this dairyman reported the cow had developed a very severe case of garget. We have tried it out in twenty or thirty different cases with practically the same results.

### DISCUSSION.

DR. KINYOUN. We have been in the last year in Washington using the Endo media for the examination of milk and it has been everything desired in determining the colon group.

I believe with properly prepared and standardized Endo media that the pasteurizing plants have within their power the ascertaining within twelve to fourteen hours very valuable, if not complete knowledge as to whether their process has been perfected or not, using the colon bacillus as the index.

I am glad to say that quite a number of my colleagues, both in Washington and elsewhere, have seen fit to use the same tests and I am gratified to say that they are getting the same results.

MR. HENDERSON. I would like to ask Dr. Kinyoun if he has made a decision as to the number of colons that he would allow on the plate before he could condemn the milk?

DR. KINYOUN. Anything over a few colon in milk is looked upon with great suspicion. Ten thousand we have no doubt of at all, and when it gets up above that to one hundred thousand or more, why it is beyond me, I turn it over to the legal department and we don't have anything to do with it, further.

MR. HENDERSON. If you have a count of ten thousand you would be justified in condemning that milk or keeping that milk off your market?

DR. KINYOUN. When milk contains as many as ten thousand colon and say one thousand to ten thousand streptococci, something is wrong with that milk. We, unfortunately, have no legal limits in Washington regarding the number of bacteria in milk. We are governed entirely by the pure food and drug act. They haven't yet established a numerical limit, but they have made prosecutions and they have won every case in court so far.

PROF. PRUCHA, Champaign. In speaking of bacteriological methods for the determination of the cleanliness and purity of milk, I would suggest the committee to look up the method of the Collard test. Some men who have tried it claim that it is quite efficient and it takes but a few seconds to do it.

DR. FROST, Madison. I have been very much interested to see that the discussion has gone beyond the mere enumeration of bacteria in milk. As I understand, the standard methods before have taken into account the total number of bacteria alone, but this afternoon a number of people have spoken of methods that take into account the kind of bacteria, which is very important, something that has been done a good while in water. My own belief is that our methods are in embryo merely, that the quantitative method alone is not satisfactory. If we want to get the total number we must do more than incubate at thirty-eight degrees, which is unfavorable, in my opinion, for the development of perhaps the majority of the bacteria. The use of clay tubes in incubators that have no moisture, prevents the development of a much larger per cent of the bacteria. I have done some work this past year on bacilli and quantitative method for determination which seems to me of considerable value, and I certainly think that the committee which is in charge of this work has a big job in getting a method which will be satisfactory from a purely scientific standpoint. And then if they are to try to produce a method which is to consume only a short amount of time, which is to be preliminary in nature and at all reliable, it seems to me that they

have a still larger task. But that should not deter us from putting into the work all our strength.

DR. PARKER. I might say here that the city of Boston uses direct microscopical examination. They take the Slack smears and examine them with an oil lens and plate out only those samples from smears that show high numbers under the microscope. This in a large city like Boston reduces the amount of plating that is necessary and consequently reduces the expense.



## THE MILK SUPPLY OF THE CITIES OF URBANA AND CHAMPAIGN, ILLINOIS.

PROF. HORATIO N. PARKER, *University of Illinois.*

This Association has heard how large cities with generous appropriations, staffs of inspectors and well organized health departments, backed by police power, improve their milk supplies, but it has not been told of the milk problem in small cities. Therefore, the situation in Urbana and Champaign is described in the belief that the story is interesting in itself and that it exemplifies conditions throughout the United States in cities of like size and similar sanitary education or advancement.

The twin cities, as they are called, are in Champaign County, 126 miles southwest of Chicago. From a sanitary standpoint they compose a single community, having an area of 6 square miles, a resident population of 22,500, and a floating population 4,300, composed of the students and faculty of the University of Illinois. Because of the division of the community into two cities it is not governed by uniform laws and so civic problems are handled differently. Amongst other things, this is true of the sanitation, including the administration of the milk codes of the two cities. Urbana trusts in a board of health of two members, physicians, at a salary of \$100 a year each, and Champaign in a health officer, a physician, at \$180 a year. However, the milk codes of the two cities, which were enacted about two years ago, are practically identical, having been drawn up by B. R. Rickards, then a member of the University faculty. The codes were thought by Professor Rickards to be well adapted to the conditions that obtain in the two cities. The principal provisions are:

1. All persons selling milk shall take out a license therefor.
2. No whole milk shall be sold that (a) contains over 100,000 bacteria per cubic centimeter; that (b) has a tempera-

ture of more than 60° F., or that (c) contains less than 12 per cent total solids of which not less than 3.25 per cent shall be butter fat.

3. No milk shall be sold that contains water or any added foreign substance.

4. No milk shall be sold from any cow within 15 days before or 5 days after parturition, and no milk shall be sold at any time from cows with inflamed udders or from cows known to be tuberculous.

5. Dealers must notify the City Clerk of the occurrence of communicable disease in his family or amongst his employees.

6. Milk bottles shall not be removed from premises whereon infectious disease exists.

7. Wagons and stores wherefrom milk is offered for sale must be clean. Milk must be sold in bottles or in original covered containers.

8. Milk containing over 100,000 bacteria per cubic centimeter shall be considered unfit for sale and shall not be pasteurized.

9. The Mayor shall appoint some one to collect milk samples, at least once in two weeks, from each licensed dealer, and to submit them to a competent person for chemical and bacterial analysis. The results of these analyses shall be open to public inspection in the offices of the city clerks.

10. Fines and the revocation of the license are provided as suitable penalties for infraction of the codes.

Soon after the enactment of these ordinances, verbal agreements were made with the two cities that samples collected for analysis should be examined at the University free of charge. Professor Rickards made this promise because he was actively interested in getting the ordinances passed, and because he believed that the University had a responsibility to the students in the matter of making a safe, wholesome milk supply available for their use. The result sought in the passage of these laws was not attained, for there has been virtually no attempt to enforce them. In Urbana thirty (30) licenses have been

taken out in the two years that have lapsed since the passage of the ordinances and no samples of milk have been submitted for analysis. In Champaign, 56 licenses were taken soon after the ordinance was passed and a milk inspector collected a few samples, but in effect the law has been dead, though within a few weeks past a newly appointed health officer has had a good many samples collected. It is believed that no one in either city has ever been punished for violating the code. In truth, then, here is an unregulated milk supply, concerning which the following facts are presented from data that have been gradually accumulating during the past two years. The estimates of the quantity of milk used are based on careful inquiry amongst dealers and have been checked up by questioning restaurateurs, ice cream manufacturers, confectioners, and others. It is believed that the figures are right within ten per cent.

The bulk of the milk consumed in the twin cities is produced on the flat prairie land of the corn belt, and is brought by wagon from farms lying within a radius of ten (10) miles from the University. Some milk is brought by interurban railway from the following places:

<i>City.</i>	<i>Miles</i>	<i>Gallons Daily.</i>
Koch Crossing .....	6	15
Bondville .....	7	20
St. Joseph.....	10	15
Rantoul .....	14	5
White Heath.....	17	60
Total.....	..	115

By steam railroad milk comes from:

<i>City.</i>	<i>Railroad.</i>	<i>Miles.</i>	<i>Gallons Daily.</i>
Bloomington .....	Big 4	60	24
Paxton .....	I. C.	25	24
Kankakee .....	I. C.	72	24
Manteno .....	I. C.	80	24
Chicago .....	I. C.	126	Occasionally
Total.....	.....	.....	96

Farmers are paid 20c. a gallon for milk delivered at the creameries. Bottled milk sells at 10c. a quart and 5c. a pint; loose milk sells at 8c. a quart, or in a few places at 7c.

The total daily consumption of milk is 1,200 gallons. The milk is distributed by 20 dairymen who have been in the business long enough to be regarded as permanent purveyors, and by 20 to 25 farmers who maintain a wagon route for a month or so and then stop delivery until the spirit moves them to begin again. Two dairymen deliver thirty (30) per cent of the supply and seven dairymen deliver seventy (70) per cent. The daily supply is absorbed in the following manner:

	<i>Gallons.</i>
Confectioners .....	150
Ice cream plants.....	100
Restaurants .....	200
Fraternities and clubs.....	100
Stores .....	20
Families .....	630
	—
Total.....	1,200

Twenty (20) per cent of the milk sold in restaurants is bottled, the rest is dipped. The confectioners, in addition to receiving milk from the local dairymen, receive milk from Chicago and Bloomington, and the ice cream plant uses condensed milk from the same cities. The bakeries use very little whole milk; condensed milk, milk powder and skim milk taking its place. Since dairying is regarded by the average corn belt farmer as of less importance than crop growing, it follows that dairymen have little capital invested in the milk business. Indeed, tenant farmers often find it difficult to get their landlords to so much as keep the farm buildings in repair, and those owners who are willing to expend money in improving the lighting and ventilation of barns, building of milk houses and cement construction are more than rare. In general, herds are not more than of fair quality and are not tuberculin tested; few barns have cement floors, equipment is scanty and old-

fashioned; milk, if cooled at all, is cooled with well water, and cleanliness is not unduly emphasized. The University dairy is the only one equipped to sterilize milk bottles, consequently, there is the ever present possibility of a bottle-borne epidemic occurring.

About 18 months ago, H. E. McNatt, of the Dairy Department of the University, scored a good many dairies supplying Urbana and Champaign. Twenty (20) of these are still in business; they have an average score of 11.9 for equipment, 13.1 for methods, and a total average score of 25.5 out of a possible 100. This is believed to fairly represent the state of the average dairy farm in the vicinity. Under such conditions it is difficult to produce milk that is of uniform quality or even milk that is tolerably clean.

From time to time the City of Champaign, dealers and others have furnished samples of milk to the Dairy Department of the University to have the fat content determined and bacterial counts made. In this way considerable information concerning the quality of milk supplied by the different dealers has been acquired. The average results that have been obtained on the milk of the principal dealers are these:

Dealer.	No. of Samples.	Lacto-meter	% Fat.	Bacteria per c.c.
L. D. Wilson.....	37	31.3	3.5	14,900
Urbana Dairy.....	17	31.7	4.6	453,000
Champaign Creamery	65	31.4	4.1	196,000
H. P. Stinespring....	23	32.6	4.3	49,000
E. N. Kirby.....	6	32.0	4.6	44,000
Rogerson .....	3	30.8	4.0	106,000
H. G. Fry.....	6	33.0	4.3	34,000
E. Cline.....	5	31.1	4.3	89,000
Pasteurized milk from Peoria, Bloomington and Chicago.....	14	32.8	3.5	240,000
Total.....				1,225,900
Average.....				136,211



These samples were taken in the cooler months of the year when bacterial counts would run lower than in summer time.

Perhaps the best picture of milk offered the public is obtained from the results of tests that were made in October, 1913, of the milk of all the producers of two of the large distributors, to wit:

## DAIRY A.

October 14, 1913.

No.	Lactometer.	% Fat.	% Acid.*	Number of Acid Forming Bacteria per cc.	Total Number of Bacteria per c.c.
1	31.2	4.0	.187	60,000	210,000
2-D	31.3	4.2	.1835	200,000	290,000
3	30.2	4.8	.180	800,000	800,000
4	31.2	3.8	.216	120,000	150,000
5	32.1	5.0	.169	700,000	1,000,000
6	30.6	3.9	.187	60,000	430,000
7	31.2	3.9	.191	no acid colonies	20,000
8	31.5	4.2	.177	200,000	290,000
9	30.0	3.5	.192	140,000	280,000
10	32.1	4.8	.169	20,000	160,000
11	31.4	4.3	.180	70,000	120,000
12	30.6	4.0	.173	2,500,000	3,800,000
13	31.2	3.4	.187	220,000	370,000
14	31.9	3.75	.187	no acid colonies	600,000
15	30.0	3.2	.216	825,000	830,000
16	31.6	3.6	.205	90,000	900,000
17	32.5	4.7	.223	no acid colonies	430,000
Wil	30.7	3.7	.1655	150,000	234,000
100	31.3	3.9	.180	300,000	1,700,000
Total.....					12,614,000
Average.....					664,000

\* Expressed as Lactic Acid.

## DAIRY B.

October 17, 1913.

No.	% Fat.	% Acid.*	No. of Acid Forming Bacteria per c.c.	Total Number of Bacteria per c.c.
1	4.3	.180	170,000	410,000
2	3.1	.213	7,390,000	7,400,000
3	3.8	.184	740,000	930,000
4	4.0	.216	3,950,000	4,000,000
5	3.6	.234	49,990,000	50,000,000
6	3.2	.220	408,000	410,000
7	4.0	.220	900,000	1,600,000
8	2.7	.220	570,000	670,000
9	3.4	.188	2,500,000	2,600,000
10	3.6	.216	8,000,000	8,600,000
11	2.9	.162	1,060,000	1,460,000
12	4.4	.205	25,200,000	26,500,000
13	3.3	.1945	6,750,000	6,800,000
14	6.2	.220	1,430,000	1,650,000
15	3.0	.177	1,990,000	2,500,000
16	3.7	.229	0	27,000,000
17	3.4	.198	470,000	500,000
18	5.5	.1765	110,000	240,000
19	4.4	.213	32,495,000	32,500,000
20	4.0	.162	110,000	120,000
21	3.6	.159	140,000	170,000

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Total..... 176,060,000

Average..... 8,383,000

The owners of these dairies have said that the farmers deliver the milk to them the year round uniced; that from late spring to early autumn its temperature ranges between 60° and 75° F. and that the farmers often fail to cool the morning's milk. So it seems probable that the high bacterial counts are

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\* Expressed as Lactic Acid.

in great part due to lack of icing, but they are not to be explained wholly on this ground, for most of the milk yields dirt aplenty on being passed through a Wisconsin or a Wizard sediment tester.

A factor in the situation is the University Dairy which is operated by the University of Illinois for instructional purposes and which puts out daily 75 gallons of clean milk and cream from tuberculin tested cows. Milk is delivered in Urbana and Champaign to both faculty people and town folk. The demand for it greatly exceeds the supply because it is known to be produced from healthy animals and to be carefully handled. Some attempt is made to provide for invalids and ailing babies during their necessity, but otherwise the customers change but little from year to year and so the influence of the dairy on the trade may be closely estimated by dealers. The following table shows the results of tests that have been made during the past two years of the milk of the dairy.

*University Dairy.*

August 16, 1911—December 31, 1911.

	No. of Samples.	% Fat.	Bacteria per C.C.
Milk .....	9	3.6	27,400
Standardized milk...	78	4.1	428,200
Cream .....	40	27.8	474,900

January 1, 1912—December 31, 1912.

Milk .....	264	3.6	37,800
Standardized milk...	346	4.1	46,500
Cream .....	299	25.1	130,000

January 1, 1913—August 31, 1913.

Milk .....	236	3.3	10,500
Standardized milk...	235	4.1	11,100
Cream .....	236	23.9	85,500

These figures need some comment. When Professor Rickards took charge of the University Dairy it was putting out a milk that was not particularly satisfactory and that had a high

and variable bacterial content. Steps were at once taken to improve the supply and efforts in this direction are still continuing. The high bacterial count in 1912 and 1913, is in part to be accounted for by the fact that the natural milk is enriched or standardized to 4 per cent by the addition of cream. This cream is obtained by skimming the night's milk with a separator, is kept overnight in an ice-box and is added to the morning's milk. There is nothing commendable in this practice but it was made necessary by the fact that the University Dairy advertised 4 per cent milk at a time when its herd, being composed almost wholly of Holsteins, did not produce milk of this richness. More Guernsey and Jersey blood has been introduced into the herd and it is hoped that soon standardizing may be abandoned.

The University Dairy provides practical experience for students taking the course in City Milk Supply; it provides a good quality of raw milk for a few, and it has enabled dairymen to get a good price for their milk because it has created discriminating customers and so a demand for good milk.

From what has been said it must be apparent that good milk is difficult to obtain in Urbana and Champaign. The milk supplied the towns should be much better than it is. Under present conditions mothers are at their wits end to get milk that they feel is safe to carry babies through the first two years of infancy, and the managers of fraternities and other student clubs find it impossible to get milk of the quality they desire. However, the supply has been improved in the last two years by, first, public lectures on milk given by members of the Dairy Department and others, and by efforts to interest farmers through inspection of their farms, etc.; second, by one of the large dealers slowly and steadily eliminating slovenly farmers from his producers; third, by some of the smaller dealers seeing a chance to get trade by improving their farms and methods. Still, results are coming very slowly, and it seems unlikely that any great improvement will be made within a reasonable time.

To the writer it seems likely that the problem will be solved in one of the following three ways:

1. By some local man putting enough capital into the business to enable him to operate his farm on a large scale, with modern labor-saving machinery, and a first-class equipment for bottling milk, and sterilizing milk bottles, etc.

Amongst the difficulties such a one would have to contend with are bad roads and the fluctuating demand for milk, caused by the floating population of faculty and students. Thus, this population on June 1, 1913, numbered 4,014; by July 1 it was reduced to 784, and on the first of August to nothing. On October 1 it was increased to 4,384.

2. Some large dealer in Chicago, Peoria, Kankakee or elsewhere may capture the trade from the local dealers and farmers by shipping in milk and at the same time inaugurating a delivery system that shall have courteous employees and be reliable. That this has not actually happened is, perhaps, because the entire milk trade of the two cities is not large enough to be particularly tempting to capital.

3. A serious milk borne epidemic may convince both business men and the University that an efficiently regulated supply is a necessity.

## DISCUSSION.

PROF. FRANDSEN. Most of my energies have been centered on other phases of dairy work, but I am intensely interested in work of this kind, and it is for that reason that I stole away from the work that I ought to be doing today. The splendid(?) way in which the milk ordinance of Champaign has been enforced, is probably typical of the way that the ordinance in every small town has been enforced. I know of a number of small towns in my State in exactly the same condition. About the only thing that the housewife has been taught to look for, is yellow milk and a good cream on it. They tell this story of a newly-wed out there who called down her milkman



for not having enough cream on the top. The man said, "The reason is I am too honest, I fill my bottles with milk and consequently there isn't any room left for the cream." I think that after all a great deal of this work must come from the educational point of view. We can legislate, but if you haven't public opinion behind you, you aren't going to get proper results. A good deal of the trouble has come from lack of interest, lack of faith, lack of confidence in the people who have been doing this work. I know of one in my home city; we, up to within a year, had a milk ordinance of less than one line in length. So far as I know, there has never been a prosecution for adulterated milk, at least, very few. Last year, they had a severe epidemic of septic sore throat there. We now have a milk ordinance covering several pages, but no prosecutions that I know of, and the City Council, while they have passed an ordinance covering several pages, forgot to make any appropriations for enforcing that ordinance and also to appoint a milk inspector.

Now, what I have stated here in no way applies to the condition of the larger towns in the State. I know Mr. Bossie has been doing very efficient work in handling the work in Omaha, but there are many of our small towns where absolutely nothing has been done along that line. Now, whenever I have occasion to talk to a woman's club, I always emphasize the importance of work of this kind, and I think that through our organizations much could be done to educate the people along this line.

After all, I don't know that you can blame the dairyman for not producing better goods than the people call for. It costs money to produce this better milk and the consumer must be willing to at least appreciate the better quality. Now, some of the milk in my own town is sold for 12 cents a quart, some for 10, some for 6. Too often the question asked is, "What is the price of the quart?" And too often the buyer selects only the milk that he can get at the lowest price. As long as price only is considered, no wonder we are not getting a better quality, but if through our inspectors' organizations we would empha-

size the absolute necessity of the best quality of milk, then I think that the work of the inspector will be made more effective, because he will have back of him a constituency who not only will help to enforce it, but will aid in every way. And if these organizations will appoint committees off and on, it will be a stimulus that will help the dealer to do better. But as long as absolutely no interest is taken in that feature of it, why I fail to see how we can arouse them to the necessity of giving the best possible quality.

Dr. Moore, in a recent report calls attention to the conditions found in Copenhagen, Denmark, and I think in that report he speaks of conditions there as being more favorable from the milk supply standpoint than many other cities, and he criticises our American cities, in that we are expecting too much at the start. It is too difficult to demand or expect that the farmer must dispose of everything that he has on his place and start out with a few tested cows. He states that while the people there were getting interested in this question, while they were realizing the importance of better milk, the authorities limited their activities to weeding out by careful, conscientious physical examination, those animals most likely to contaminate the milk supply, and as the people realized its significance, saw its results, that was an easy step to later on demand that every drop of milk sold should come from tuberculin tested cows. I think that he advocates action somewhat along that line should be the forerunner for better milk in our average American city.

Now, I am very glad in this discussion to note the tendency to emphasize some points by some of the members. Too many of our ordinances say milk of one hundred thousand bacteria must not be sold. Now the buttermilk, or lactone that you daily consume runs up into millions and millions of germs. That is all right. But let us begin to realize that there is something more important in our milk standard than mere numbers. Of course, that is an indication as to how the milk has been cared for. But let us emphasize the fact, because that gives

you an idea of the possibility of contamination from tubercle bacilli. Let us get at these shorter tests as fast as we can, or anything that will help us to get at the kind of germs rather than the number alone.

MR. J. D. MICKLE. We are advanced out in Oregon. I came here today, gentlemen, expecting to find conditions far ahead of what obtained in my own State, but I believe with all honesty to ourselves that we are equal to you today, even way out in Oregon. I came here to receive dairy education myself from the dairy and food commissioners. I don't know half enough about all of these questions. The more I work in them the more I find out, if I were a physician, a chemist, a lawyer and practical dairyman combined, I would be better equipped myself. It is a great work, it is a benefit for the whole people, and I am glad today that it is my privilege to be among you listening to these things that I have heard today, and I am going home encouraged.

PROF. PARKER. Lest it be thought that the University has been slack in not making an attempt to educate both the consumers and producers in Champaign and Urbana, I would say that considerable work has been done by the dairymen. We issued a bulletin on the care of milk in the home, which was sent out to all the patrons of the University dairy, and to the entire mailing list of the State Agricultural Experiment Station. I presume many of you gentlemen received that pamphlet. If you have not, and would like it, I would be very glad to furnish it to you on application. We have accomplished something by education, but it is slow work, it is awfully slow work.

DR. KINYOUN. Discouraging, too.

PROF. PARKER. No, I won't say it is discouraging, because you do get some result, but I will tell you it is work that should be carried on all the time, constantly, and never drop off a minute. The minute you stop talking, people stop thinking. That is a question for wiser heads than mine to decide, just where the duty of a University stops. Research and investiga-

tion or getting at the information, everyone will admit is the duty of the University. How far a University shall go in making people disseminate the information which the University has painfully collected is another question.

Maybe you can do it better with your Board of Health and your Dairy Associations and the Women's Clubs, etc., but there is one thing I feel perfectly confident of, and that is, the minute you stop the movement will stop, except as it grows very slowly, almost imperceptibly through the community.

*"Many receive advice, only the wise profit by it."*

## METHODS EMPLOYED AND RESULTS OBTAINED IN IMPROVING THE MILK SUPPLY OF IOWA.

DR. O. P. THOMPSON, *State Dairy Inspector*, Waterloo.

The first laws passed regarding milk in Iowa were contemporaneous with the establishment of the Office of State Dairy Commissioner in 1886. He had but one deputy whose duties were merely clerical and the energies of this department were devoted almost exclusively to the gathering of statistics regarding dairying in general.

In 1892 the Dairy Commissioner was empowered to appoint in cities of 10,000 or over a local city milk inspector, and legal limits for milk and cream were established. Food laws were enacted in 1906. Local inspectors were usually appointed on recommendation of the Mayor, and often were appointed because they were good "vote getters." Prosecution was the only means for regulating traffic, and practically all cases were for milk low in butter fat, or for visible dirt. There was an epidemic of "formaldehydeism" from about 1900 to 1904. This is not strange, as at that time dairy supply houses advertised preparations as perfectly harmless, known as "freezene," "milk sweet," "preservaline," etc., the base of which preparations was formaldehyde. Numerous prosecutions resulted.

This was the condition when I took up the work of State Dairy Inspector in 1910, when the office was created. The enforcement of all dairy laws in Iowa is now vested in the Dairy and Food Commissioner and his agents. The Dairy and Food Inspectors, the State Dairy Inspector, and local milk inspectors are appointed by him. Local State inspectors are usually appointed on recommendation of the State Dairy Inspector, and the Commissioner has made a ruling that he will not appoint a local inspector in any city where local authorities do



not take sufficient interest in their milk supply to first appoint a city milk inspector whom we later could also appoint as State Inspector. We do this because a city takes much more interest where they have money invested and we are able to secure much more competent men as inspectors, as the compensation is thus more nearly commensurate with the services rendered. We impress our inspectors that their efficiency is not to be measured by the number of prosecutions, and we secure as inspectors men who are competent to act as instructors.

We have inaugurated an educational campaign and prosecutions have been made only as a last resort. I am pleased to say that complete harmony exists between this department and all allied organizations in the State, including the State Agricultural College at Ames, the State Board of Health and State Veterinarian, and the State Dairy Association, and all of these have been doing educational work along dairy lines, particularly the last named, which has an annual appropriation of \$5,000 devoted almost exclusively to educational work.

Our Department has a lantern and equipment for making photographs and slides, thus making possible original views and enabling us to show conditions as they actually exist. We believe there is no place for a muck-raker in the discussion of the milk question, hence our slides usually show the best, rather than the worst conditions. Illustrated talks are given before women's clubs, milk dealers, medical societies, and Chataquas, as well as Farmers' Institutes and Dairy meetings.

During the last two years we have used the score of the Official Dairy Instructors' Association recommended by the United States Dairy Division. This we find the most systematic way of securing a record of conditions of the different dairies, and in the hands of a competent inspector, it is certainly the best method known. You will thus see we are depending almost exclusively upon the education of the dairy-men, as well as the consumers, for the control and improve-

ment of the milk supply. We are thoroughly convinced that this is the proper system, and that no permanent good can be accomplished without the hearty and earnest co-operation of all parties concerned, including the inspector, the producer, the dealer, and the consumer of milk. The results obtained cannot be measured accurately. I am convinced, however, that there is a marked improvement in the milk supply of Iowa during the last few years. The average score of the dairies is increased with each inspection, often quite materially, and the efficiency of inspection can be best measured by the results obtained in increasing the score of the dairies.

I was impressed recently with the efficiency of milk inspection while in conversation with a milk man. He said: "When you, with the local inspector, first stopped me and examined the milk in my wagon and said to me that my milk was dirty, I felt like *climbing* out of my wagon and pounding you, but I was very much chagrined and mortified, and I came near *falling* out of my wagon, when you picked up a bottle of milk and showed me the dirt in the bottom of it. I said to you that my strainer must have been at fault, but you advised me that the milk in Iowa on the whole would be better if we used no strainer at all, and the right way was to keep the dirt out of the milk. I immediately commenced to investigate to find out why and how this dirt got into my milk. I did find out and removed the cause, and I never start out on my route now that I do not examine the bottom of a number of these bottles for sediment."

In 1911, the dairy laws then on our statute books were practically annulled and an entirely new dairy law was enacted. This law empowered the dairy and food commissioner to use the State's funds in further educational measures for fostering the dairy industry. It also provided for a license fee of one dollar per year for all milk dealers in all municipalities, and, most important, it provided that the Commissioner might withhold a license from any applicant whom he might deem

unworthy, or revoke a license issued to any person who had violated the terms thereof, or failed to comply with any of the requirements. This provision is certainly a very powerful weapon to use in getting rid of the dirty milk man. We have, however, actually refused or revoked a license in but three or four instances. When we point out to the undesirable milk man that he must improve his conditions and refer to this section of the law, it usually has a marvelous effect, providing he wants to stay in the milk business.

There was enacted last winter a new sanitary law which went into effect July 4th. This, we believe, is the best and most complete sanitary law of any State, and while it has been in effect only a short time, the working of the law has been gratifying to this Department.

I have thus far outlined methods employed by the State. The cities have been using methods quite varied, and some of these have been "freakish" in the extreme. Some six years since, the people, and particularly the doctors, got very much excited and stirred up over bovine tuberculosis and its relation to human tuberculosis, and took measures to force the dairy-men to have their cows tested and the reactors eliminated. While our friends of the medical profession are usually our strongest allies, I want to say to you as inspectors that if they sometimes appear to be unduly exercised about having the cows tuberculin tested, you must remember that tuberculosis is properly called "the great white plague," and that they come in contact with its victims and appreciate the importance of its prevention as no others can. In these cities where this measure was instituted it was not followed up, and I know of no place where tests of these same herds have been made since the initial test, until within the last few months, and this in only one of these cities. In one instance, a city passed an ordinance requiring that all cows be tuberculin tested, in the evening, and arrested two milk men the following morning, within twelve hours after the ordinance was passed, for viola-

tion of this ordinance. You can readily see it would be a physical impossibility for these men to have complied with the requirements within this time, and the result was a milk famine in this city the next day, as none of the milk men had tested herds and they feared arrest and conviction. After a spasmodic effort along this line in practically all of these cities these ordinances have proved a dead letter. The usual procedure in cases of this kind was for the Mayor and City Council to get together, and upon the advice of their local health officer, usually a young man who had received his training in a drug store and laboratory, to pass these ordinances without in any way consulting the men most interested—viz., the milk dealers.

Hardly any two cities are pursuing the same method, and we are pleased to have them try out the various ways of handling this question with the view of finding out the best way. I am inclined to believe the best method for improving the milk supply is to grade the milk. However, it would be folly to inaugurate this system except in cities where a number of dealers could and would qualify for "A" grade, and where inspection is efficient. We find that most breeders of registered cattle have their herds tested, not because an ordinance may require this, but they do it for the protection of their herds against the invasion of this disease. In one city where we have graded the milk, a large per cent of the dairymen have had their cows tested at their own instigation, that they might be able to qualify for the "A" grade, and when cows are tested in this way, rather than under protest, to comply with some city ordinance, the testing is effectively done, and will probably be followed up. In this city fourteen milk dealers had their cows tested during the month of April of this year.

Iowa is particularly fortunate in that she has within her borders no large cities, for we recognize that the larger the city, the more complicated becomes the question of the control of the municipal milk supply. Possibly over 95 per cent

of the milk consumed in Iowa is produced within hauling distance of the consumer, and 50 per cent of the milk is *consumed* before it is twelve hours old, and 90 per cent before it is twenty-four hours old. Pasteurization is not extensively practiced, and when used it is not efficient. We have fifteen city milk inspectors at the present time. Of this number, four are M. D.'s, four are veterinarians, and seven are men from other walks of life. These cities pay their inspectors from nothing to as much as \$100 per month for doing this work, and the State pays them from \$15 to \$45 per month. Under the State law, we are authorized to pay these inspectors for securing samples of milk, testing it for butter fat, preservatives and other adulterations, examining the condition of the wagon and utensils. The cities are supposed to pay their inspectors for visiting the dairies, or source of supply, and inspecting and scoring them. We believe that this should be turned exactly around and that the State should have the supervision and inspection of the dairies and the city should look after the milk after it reaches the city and is offered for sale.

In conclusion, I shall mention the greatest factor in this educational work—The Public Press. We find them ever ready to publish items relating to the milk question. This department issues bulletins at frequent intervals, and these are quite generally published by the local papers. In some cities they insert reports at regular intervals of the butter fat tests of the milk of local dealers. In others they publish the total score of the dairies as well.

In our work we must expect some adverse criticism. Elbert Hubbard says: "To avoid criticism, say nothing, do nothing, be nothing." Remember also the Persian saying, "It only takes a thimble full of brains to criticize, but it takes a world of information to be a critic."



WHAT HAS THE DAIRY INSPECTOR DONE, AND  
WHAT CAN HE DO TO INTEREST THE  
FARMER IN THE PRODUCTION  
OF CLEANER MILK?

A. N. HENDERSON, *Chief Dairy and Milk Inspector, Seattle.*

The phrase, "cleaner milk," as used in the above inquiry, may describe as many kinds of milk as there are degrees of comparison between dirty and clean. It seems necessary to confine our observations to an arbitrary individual definition of the term. To me, cleaner milk has a broader meaning than milk which is free from visible sediment, and which may pass a satisfactory bacteriological examination. Milk having the above qualifications, when produced at a loss, cannot be "cleaner milk" because it is contaminated with the farmer's financial worries, the loss of time of himself and family.

Cleaner milk in my judgment should be milk produced by practical dairymen from profitable cows, economically fed, housed in clean quarters, milked and attended by intelligent and well paid milkers. Such milk, promptly cooled and so kept, without contamination until consumed, and last but not least, milk produced so that the cost will not be prohibitive, and sold at a price which will give the producer a legitimate profit, is in the truest sense the "cleaner milk."

The dairy inspector has interested the farmer in the production of such milk in two general ways: first, in developing and protecting an active market for cleaner milk; second, by teaching the farmer to meet the demands of such market. The specific ways and means by which this has been accomplished, necessarily vary according to local needs and conditions. The personality of the dairy inspector means much at this juncture, but the standard of the supply has generally been raised in the following manner:

First. By establishing and enforcing proper minimum legal limits.

Second. By well directed publicity.

Third. By educating farmers in the science of economic milk production.

Fourth. By educating farmers in the science of sanitary milk production.

The first step taken by the dairy inspector to establish a market for cleaner milk is in the enforcement of conservative milk legislation, which takes into consideration not only the protection of the consumer, but the well being of the dairy industry as well. Proper minimum legal limits, which are the proven conclusions of dairy inspectors, have increased the commercial value of cleaner milk. As an article of commerce, milk derives value by virtue of its food properties, which properties are not stable but may be changed by careless handling or dishonest manipulation. The average consumer's inability to detect these changes has made necessary the legal regulation of the dairy business. Without regulations, milk, as an article of commerce, would have but little value and the incentive for cleaner production would be much less than it is now. The municipal dairy inspectors in enforcing proper milk regulations are allowing only the cleaner milk to be placed upon the market. This has a strong tendency to control the milk supply of the city, and consequently means an increasing demand and an active market condition; and logically, therefore, just as long as the municipality protects such a market from the invasion of slovenly and dangerous competition, just so long will the municipality pay a premium for cleaner milk. A practical example of such market is manifested in the city I represent.

In our territory are located ten factories for condensing milk, the patrons of which are subject only to State dairy regulations. The State Legislature in the past has not seen fit to provide sufficient funds for the maintenance of sufficient

systematic State milk control. On the other hand, the city authorities have, at all times, endeavored to maintain an efficient systematic surveillance over all milk sold within its boundaries, and this practice resulted in establishing an active market for cleaner milk, at an increased price. Owing to the elimination of slovenly competition, the city dealer has been compelled to pay an average of twenty-five cents per hundred pounds more for milk of a quality to pass city requirements than the condensaries pay for their milk. Is this twenty-five cents per hundred pounds sufficient to induce the farmer to produce cleaner milk? A dairyman producing four hundred pounds of milk per day would receive one dollar per day, which would be \$365 per year, or in other words, the same as though three good grade cows were added annually to the herd; and again there is the added revenue derived from increased production, resulting from better dairy methods. In my own city, I can say positively that this increased revenue which city shippers receive over and above condensary shippers is sufficient to interest the farmer in cleaner milk production, and furthermore, the dairyman who ships to the city seldom voluntarily goes back to the condensary. Public sentiment influences the market for any food product to a greater or less degree; therefore a substantial market can be maintained only by the sale of an honest article of food. So also in the milk business, public sentiment and confidence is an asset of high value. The public has long been defrauded by dishonest, unscrupulous dairymen, even suffering to such an extent from slovenly methods that a general sentiment against the use of milk has at times been created. The enforcement of milk standards will place on the market an improved milk. In Seattle, at the time of the inauguration of Milk Inspection, 1908, the consumption of milk per capita was .35 of a pint per day—to-day the consumption is .65 of a pint, an increase of approximately 100 per cent, and this increase is going to continue as the consumer places greater confidence in the pro-

ducer, and consequently this increasing market is interesting our farmers in cleaner milk production.

Enforcement of more exact standards by dairy inspectors is compelling city dealers to demand of farmers cleaner milk. This demand of our city inspectors has reached such a point, that some city dealers now maintain an independent system of milk inspection, resulting in the purchase of milk on a quality basis. This system of buying is causing the careless producer a loss of a large share of profit, which might rightfully belong to him if his milk were produced and handled in the best way. The enforcement of exact standards is also causing the careless farmer loss, financially, from condemnation of unwholesome milk by the dairy inspector. These losses can be avoided by producing cleaner milk, and the farmer who is conducting his farm on business principles is becoming interested in cleaner milk production, thus insuring himself against such losses.

Mentioning the word "publicity" in a dairy meeting is like flying a red flag in the face of a bull. The antagonistic attitude of farmers shown toward publicity is a just one. The flaring, destructive newspaper articles, written by persons who possess no knowledge of the subject, or at best but a superficial knowledge, condemning this great industry and branding the farmer as a thief, are unjust, utterly unfair and should be most severely condemned. On the other hand, the intelligent use of publicity by an efficient and conscientious inspector is a means of interesting the farmer in cleaner milk production. The honest, careful dairyman who is endeavoring to place upon the market clean milk of high quality, is entitled to the honor and financial benefit which honest publicity may bring to him. In the make up of an individual, there is in his disposition a quality which responds more or less to praise, and the dairy inspector by recognizing that quality in the farmer and appealing to it judiciously, can oftentimes arouse an interest for better milk production when all other

methods have failed. Through public commendation, this attribute of nearly every human being may be reached.

In each section of our territory is located one or more small towns in which is published a weekly newspaper which has a wide circulation in that locality. After the dairies of that section have been scored, the inspectors can call upon the editor and give him the list of farmers who are maintaining a satisfactory score, and in a general way praise the work of such dairymen. The unsatisfactory dairymen's names are not mentioned. In this way, an honor roll is established which creates considerable interest in that community, and farmers, pleased with this publicity, will endeavor to maintain conditions which will entitle their names to appear in the honored list.

The publication of classified milk scores has greatly interested the farmer in cleaner milk production. The essentials of this plan of scoring take into consideration sanitary conditions of the farm and the chemical and bacteriological examination of the milk. The scheme is as follows:

One hundred points are allowed for the dairy farm, 100 points for chemical analysis, and 100 points for bacteriological analysis, making a perfect score of 300 possible. The rating of the dairy farm is made according to the system of scoring in use by the United States Dairy Division. The rating of chemical analysis takes into consideration only the total solids of milk and the value assigned to the different percentages of solids, ranging from "0" to "100". For example, milk containing 11.25 per cent total solids or less is given a rating of zero; 11.26 to 11.49 per cent total solids a rating of 10; 11.49 to 11.74 per cent of total solid, a rating of 20 per cent, and so on until a perfect score of 100 is reached.

The bacteriological rating is determined in practically the same manner, ranging from "0" to "100". For example, milk containing 200,000 bacteria or more to the c.c. is given a rating of zero; 180,000 to 160,000 bacteria to the c.c., a rating of 10;



160,000 to 140,000, a rating of 20, and so on until a perfect score of 100 has been reached. Using this score, if a dairy farm received a rating of 59, chemical analysis of milk showed 12.89 total solids and 84,000 bacteria to the cubic centimeter, according to our system, his rating is 69.6 per cent, as 12.89 total solids has a value of 90; 84,000 bacteria per cubic centimeter a value of 60. The dairy score of 59, plus chemical rating of 90, plus bacterial rating of 60, equals 209, which is 69.6 per cent of 300. This rating is published monthly in the daily papers, giving also the name of the dealer receiving the milk. The above scheme of scoring has necessarily interested the farmer in cleaner milk production, and taking into consideration not only the sanitary conditions of the dairies, but the wholesomeness and nutritive value of his milk as well. The publicity given these scores has aroused dormant self-pride in the farmer, and given the city dealer an opportunity to choose his supply from the higher rated dairies.

Recently our department held a competitive milk contest under the supervision of the Mothers' Congress of our city. This contest aroused more interest in cleaner milk than any other thing we have tried, and although interesting the majority of the producers only in an indirect way, the splendid results obtained and the future possibilities shown in this contest were so great as to be worthy of mention.

The Mothers' Congress is composed of representatives of all women's clubs of the city, and as such represents the city as a whole. This Congress held a "Better Baby Contest" and in connection with the same, offered the milk department certain prizes to be distributed among the dairymen and milk dealers of the city who were placing on our market the highest scoring milk. The method of determining the highest scoring milk was left to our department. The plan worked out was as follows: Milk dealers of the city were classified as follows: certified, raw, and pasteurized, according to the milk sold, and first and second prizes offered in each class. A beautiful loving cup was

offered as a grand prize, or sweepstake for all classes. Two pint samples were taken from each dealer on the same day without previous notice, and these samples were scored by a representative of the United States Dairy Division. Our department collected eighty-eight samples, representing 75 per cent of the total number of milk firms in the city. The milk was scored in our laboratory, and at a public presentation meeting, which was attended by fully 500 mothers, prizes were awarded and the milk placed on exhibit. The results from this contest have been most gratifying. The dealers receiving low scores are now asking that another contest be held that they may redeem their reputations. One noticeable fact observed was that consumers were brought into closer contact with the milk dealers, with the result that they received a fuller understanding of what constitutes a cleaner milk. The dealers receiving high scores are alert to their opportunities and are living up to their established reputations. Likewise, the dealers receiving low grades are not only paying closer attention to their milk plants, but in order to successfully compete in another such contest, are fortifying themselves with a higher grade of shippers, which means more active competition between farmers, and an increased interest in cleaner milk. Finally, the most satisfactory result of all, was the interest the consumer took in the contest. The Mothers' Congress and our department have distributed more than 2,200 pamphlets giving the results of the contest, and from all indications those firms receiving the highest scores are receiving just financial reward.

The second division of this subject, ways and means of teaching the farmer how to meet the requirements and demands of an active market for cleaner milk, is by far the most important work in municipal milk control, and yet it is the most often neglected. The one great criticism of municipal milk inspection today is that our standards require cleaner milk than the market is willing to pay for. This criticism, we are sorry to admit, is a just one. It is not enough that a milk inspector make arbi-

trary standards to which milk must conform, and then expect the farmer to comply with these standards. He must go farther and help educate the producer to comply with certain standards in the production of milk which will bring his supply up to the standard, but which will not, at the same time, be financially prohibitive through his honest efforts to produce a cleaner milk.

The profitable methods to be employed in educational milk inspection are a matter of personal opinion, and must be worked out by individual, conscientious work and by the exercise of good judgment and common sense. The qualified inspector, however, should begin his work fully realizing that he must make himself sufficiently helpful to the farmer in order to obtain his confidence and friendship.

As the dairy cow is the farmer's financial investment and mother of his business, as well as the foster mother of our babies, she should be a profitable and a healthy cow.

What has the dairy inspector done to interest the farmer in such a cow? The score card provides the most profitable and intelligent way of interesting the farmer in the healthy, profitable cow. In scoring the animal, the inspector should point out the physical defects as he sees them. If the cows are half starved, show signs of brutal treatment, and of not being cared for as delicate balanced machines should be, the economic side of the question is presented, and the loss caused by such methods fully explained to the farmer.

Experience teaches us that there is a great difference in the profit derived from different cows of every herd, and the dairy inspector is acting an important part in the production of cleaner milk by interesting the farmer in the individual, annual profit of every cow in his herd.

In our territory, the records of thirty-five dairymen who are weighing and testing the milk from the individual cow, have been studied and show the following results: The first dairy score of these producers before the weighing and testing of

milk was engaged in, showed an average of 49; after two years of weighing and testing, the score of milk from these dairies showed an average of 67.4. The improvement these dairymen have made has been voluntary on their part, the inspector offering suggestions only along lines of economic production. Our least bacterial counts are found in the milk of these thirty-five producers. We have more new barns and better ones, better facilities for handling milk, and in every way better milk coming into our city from these producers than from any others in the territory. The reasons for these facts are plain. These farmers are more prosperous; they have definite knowledge of their profit and loss; they milk only profitable cows and are increasing their annual profits by the use of improved sires and by more intelligent farm management. They have changed their feeding standards, balanced rations have taken place of malnutritious feeding. The feeding of native grass hay in winter has been supplemented by ensilage and alfalfa.

The extravagant waste by pasture feeding has been eliminated and soil feeding has taken its place, and these farmers are feeding more home grown feed and buying less of the broker.

The experience of these thirty-five farmers has clearly demonstrated to my mind that the milk inspector who interests the farmer in the use of scales, the Babcock test and practical farm management is interesting the farmer in cleaner milk production.

Of the many systems adopted by different dairy inspectors in interesting the farmer in cleaner milk production, the score card system stands out preeminent. Both from the sanitary and economical standpoint, this method of dairy inspection is indispensable. It brings before the producer's mind a picture of the ideal condition, points out all defects, increases his confidence in the inspector and in himself and causes more attention to be given to details, which is an important economic factor in any business. To me this is one of the greatest advantages of this system, because it causes the farmer to stop and consider details

which have never before been considered, and it is an indisputable fact that the farmer who gives the most time and thought to raising his dairy score is the one who is making a financial success of the business.

Next in importance to the personal instruction offered through the use of the dairy score card, comes the matter of developing the reading habit in the farmer. Our department has partially succeeded in this by distributing among them interesting Department of Agriculture Bulletins and pamphlets of our own, bearing upon sanitary and economic milk production, and by giving stereopticon lectures throughout the territory.

The competitive milk contests which are held in connection with the different dairy shows, are becoming a means of helping the dairy inspector to interest the farmer in cleaner milk. By scoring this milk the defects are pointed out, thus giving the producer an opportunity to know faulty conditions, that he may remedy them. Scoring also plainly demonstrates the influence which aseptic precautions have in milk production. The most notable benefit derived by our department from these contests, is that the honors have naturally gone to the leading dairymen of our territory, and because the farmer is a good imitator, the methods followed by these exhibitors and prize winners have been watched, studied and copied more or less, throughout the district, to the great advantage of themselves and of our consumers as well.

The sediment test is proving its value in educational dairy inspection. Filtering sediment from a definite amount of milk, and being able to show the sediment to the producer, is a strong argument as to the efficiency or inefficiency of his dairy methods. If careless methods are being followed, oftentimes the disgusting appearance of the cotton disk will bring quick results.

In prophesying the future activities of the dairy inspector which will interest the farmer in cleaner milk production, the bovine tuberculosis situation stands out preeminent.



My experience forces me to say that the dairy inspector has made a dismal failure in trying to force farmers to produce milk from animals free from tuberculosis. In the campaign that has been waged against this dread disease, those in authority have completely ignored the economic and practical side of the question. In my judgment if any substantial reduction is to be made in the total number of tuberculous dairy cows in the United States, we must stop forcing the tuberculin test upon the farmer, and enter upon a campaign of education dealing with the economic and practical side of the question.

*"We must not contradict, but instruct him that contradicts us; for a madman is not cured by another running mad also."*



THE RELATION AND RESPONSIBILITY OF THE  
AGRICULTURAL EXPERIMENT STATION AND  
AGRICULTURAL COLLEGE TO THE WORK OF  
DAIRY AND MILK INSPECTION.

DR. H. A. HARDING, *Head of the Department of Dairy Husbandry*, University of Illinois, Champaign.

The work of successful dairy inspection presupposes two essential things; a standard according to which dairy conditions can be measured and an inspector capable of accurately applying this measure.

This standard of measurement, if it is to be most successful, should be clear-cut and grounded on such well established facts as to command the confidence of all parties concerned. If the dairymen are to accept this standard of inspection as a guide to their business, the standard must be sufficiently simple and plain so that it can be thoroughly understood by all. The present basis for dairy farm inspection is in all instances a score card, and in most instances is the score card approved by the Official Dairy Instructors' Association and printed by the Dairy Department of the Bureau of Animal Industry at Washington. This card was originally established upon the basis of the personal judgment of a few men, and has since been gradually developed as experience has dictated by various representatives of the agricultural colleges and the Dairy Division, so that the score card as is now stands is the product of the best judgment of these men.

It is not necessary to enumerate the good results which have followed the use of this card, nor is it necessary to dwell at length upon the fact that the card is as yet far short of perfection. There are two general reasons for this latter condition. The first is, that our conception of the use to which the score cards may be put has been rapidly developing, so that we are now attempting to use the score card for purposes that

were never considered at the time the card was originally devised. More fundamental than this is the fact that at the time the card was formulated and to a considerable extent even up to the present time, exact information regarding the relative influence of various dairy operations upon the desirability of milk has not been available. In the absence of careful measurements, the men had to rely upon their own personal judgments, supplemented by such information as was at hand.

The original purpose of the card was to direct attention to details and to measure somewhat relatively the sanitary conditions surrounding the dairy. At present the tendency is to use the results of this scoring of dairies as a basis for estimating the sanitary quality of the milk produced. It may be of interest in pointing out how this difference in point of view affects the applicability of the card, to consider what proportion of the present card ratings are allotted to those factors which directly influence the germ content and sanitary quality of the milk. If we were to enumerate the items which are principally concerned, we should include the health and cleanliness of the cow, the health and cleanliness of the milker, the construction and cleanliness of the utensils and the cooling of the milk. If we test the present situation by noting what proportion of the card points are allotted to these subjects, we will find that they receive but slightly more than fifty per cent. In other words, nearly one-half of the emphasis of our present score card is upon points which have comparatively little or no influence upon the sanitary quality of the milk produced in a given dairy. To many of you this may seem like an extreme statement of the case. It is worthy of serious consideration only in so far as it is based upon actual measurement of the influence of dairy operations, and any conclusion we may reach as to the accuracy of the estimates here given should be based upon careful measurement of the facts concerned. Those of you who have attempted to make careful measure-

ments of the influence of single dairy operations realize that such an undertaking is beset with great difficulty and calls for an unusual control of conditions, as well as great accuracy in the measurements. While the municipal laboratories are often equipped for making the measurements, they are so far removed from the dairies and from the possibility of accurately controlling the operations within dairies that they are practically prevented from making such measurements. In reality the possibility of such studies is very closely limited to a relatively small number of the experiment stations where both dairies and laboratories are in close contact and under a common management. Therefore, we must necessarily look to such combinations for the data on which a more accurate basis of scoring will be ultimately built.

It is a significant and encouraging fact that the Official Dairy Instructors' Association, which has thus far developed the score card, has given the problem to one of its committees of devising a new score card which shall more accurately express the commercial quality of the milk from a given dairy than would be possible by any reasonable modification of our present dairy score card.

Important as is the matter of a proper basis for scoring, the question of the properly trained inspector is scarcely of less importance. I know from personal experience the trials and disappointments and friction accompanying the transformation of a railroad baggage master into a satisfactory dairy inspector, and the experience of practically every new municipal dairy movement is filled with similar incidents. The responsibility of furnishing courses which will properly train dairy inspectors for their work lies upon the agricultural colleges. That they have not thus far offered more in this particular line is due largely to the uncertainty as to just what qualifications are most needed for this work. A beginning has been made in several places and it is to be hoped that we shall later, as the demand for this class of men becomes more settled,



be able to provide a fairly constant and satisfactory supply. A great handicap in the presentation of such courses is the lack in the dairy department of men who are acquainted with the applied end of the city milk business as well as with the scientific facts connected therewith.

In summarizing, I would say that inasmuch as the agricultural colleges and stations were responsible for the standards which are used in the city milk inspection, the duty and responsibility lies upon them to make those standards as satisfactory and accurate as possible and that the like responsibility lies upon the agricultural colleges to provide men trained in the application of these standards.

*“Considering the limitations under which the agricultural colleges have developed, without sympathy, with the indifference and sometimes the opposition of educators—the very men who should have known better—with wholly inadequate funds, it is little less than marvelous what they have accomplished within a generation.”—Prof. L. H. Bailey.*

## METHODS EMPLOYED AND RESULTS OBTAINED IN IMPROVING THE MILK SUPPLY OF AUGUSTA, GEORGIA.

A. L. HAGGERTY, *Chief Dairy Inspector, Augusta.*

Augusta had its first Milk Inspection in 1906. At that time, Augusta elected an Inspector who was given the privilege of practicing Veterinary Medicine, which was a bad thing. An inspector who is working for himself as well as for the public will protect his own interest first. The dairymen around Augusta, by giving their veterinary practice to the Inspector, received his protection and grew very lax in their methods. To cover this up they were scored very high. For example, dairies that were scored by myself in June of 1912, and which were rated by me 37—48—50 and 82, were given, under the old inspection, a rating of 68—72—82 and 92 respectively. The public got a wrong impression of the condition of the dairies supplying milk to the city, so long as they were scored by an inspector who depended on these same producers for his veterinary practice.

I found dairymen were not required to use small-top pails, or to cool their milk. They were allowed to deliver it in cans, from which it was dipped at the wagon. Dirt floors were allowed in the stalls, and these were kept in most any condition.

To frankly sum up the situation, inspection amounted to nothing, because the producers did whatever they pleased and got away with it.

I arrived in Augusta June 5, 1912. My first mission was to go over the situation with Dr. Murphey, President of the Board of Health. I then started a preliminary survey of the dairies, and I reported only 8 per cent of them were fit to supply milk to the city. This caused a little stir, but I began publicity

work with the daily and Sunday papers, publishing articles on Care of Milk in the Home, The Bacteria of Milk, The Proper Way to Produce Milk, etc., and kept this up all summer. I also published a booklet on How to Produce Clean Milk, which I sent to all the dairymen, physicians, and those interested in clean milk. The Board of Health of Augusta was created by the State Legislature and given full power to make all its ordinances, and they do not have to go to the City Council for adoption. My next step was to get enacted by the Board an ordinance that provided necessary authority.

In the latter part of June, I gathered my first samples for examination for bacteria, butterfat, sediment and specific gravity. The condition of this milk at that time was about as follows:

July 12, 1912.			
Name.	Butterfat. (per cent.)	Bacteria.	Sediment-
B—s . . . . .	5.	540,000	Bad
B—r . . . . .	4.	500,000	“
A—y . . . . .	4.	6,400,000	“
S—y . . . . .	4.8	9,200,000	“
T—s . . . . .	4.8	320,000	“

You will note in all cases the butterfat is O.K., but the bacteria and sediment are bad.

I now began to make regular calls on the dairies and to give them new ideas and tried to show them how they could improve their barns, and make their work lighter. By putting in floors and other improvements necessary, they now realize how much easier it is to do their work and that it is all for their good. They soon began to use small-mouth pails, coolers, and sterilizing apparatus, and all milk sold in the City is now bottled and delivered cooled within six or eight hours after milking.

In making our analysis, we take a sealed pint sample once or twice a month, according to the amount of work on hand. This is first sampled for bacteria count, then temperature,

specific gravity, butterfat, and lastly sediment. We closely watch the culture plates for possible evidence of preservatives.

We keep a complete record of all analyses made, using a card system. That the milk producer may have a record of each sample of his milk analyzed, a postal card is sent him with the complete analysis.

To show the improvement the dairymen previously referred to have made, I refer you to the following record, dated September 24, 1913:

Name.	Butterfat. (per cent.)	Bacteria.	Sediment.
B—s .....	4.3	10,000	Good
B—r .....	4.3	5,000	“
A—y .....	4.2	20,000	“
S—y .....	4.5	10,000	“
T—s .....	5.1	10,000	“

You will note in every instance the bacteria is much lower and sediment has greatly decreased. To further substantiate this improvement, note the comparison of number of deaths of children under five years of age.

	White.	Colored.
1912 .....	102	97
1913 .....	64	71
	38	26
Decrease .....		

I have tried to get these results with the least possible expense to the dairymen and by so doing they have co-operated with me.

*“The best way to help ourselves is to help others, and often the best way to help others is to help ourselves.”—Elbert Hubbard.*





## LEGISLATION AFFECTING THE MANUFACTURE AND SALE OF ICE CREAM.

WM. F. LUICK, *Treasurer National Association of Ice Cream  
Manufacturers, Milwaukee.*

The standards set by the Pure Food and Drugs Act for ice cream I think are admitted, by many of you at least, to be entirely too arbitrary.

Ice cream is and always has been a compound. Ice cream as made by myself twenty-five years ago, and by my father forty years ago in the highest grade establishments in New York and Philadelphia, was of very low butter fat content. I do not believe in a butter fat standard in ice cream. One reason is that high or low butter fat content does not indicate more or less wholesomeness nor does it mean more or less food value. From the physician's standpoint, less butter fat content in summer would make it a better food, easier digested, and we know physicians advise foods with a minimum of heat producing value in hot weather.

Now I want you to keep this point in mind. You certainly must admit that it is a fact that ice cream of 6 per cent butter fat content made of the same quality of raw material excepting as to butter fat content, can be and is under the same conditions of fully as much food value, and a better food in hot weather than ice cream of 14 per cent butter fat content. Now, why in the name of common sense compel the public to buy 14 per cent ice cream when the other answers the purpose just as well? The cost of living is going up all along the line, and in a great many cases the advance cost of foods to the consumer is legitimate and worth to that consumer every penny of advance. If milk goes up 1c or 2c per quart because milk is now produced under better conditions, which means more expense, that milk is worth to the consumer every penny

of advance. But why compel the public to buy 14 per cent butter fat ice cream if a 6 per cent from the standpoint of food value and wholesomeness is just as good? There would be plenty, of course, who would buy the 14 per cent cream because they like it and would be willing to pay the difference in price, but it certainly should not be compulsory.

I think you might just as well try to regulate the amount of flour the housewife puts into her gravy to thicken it or the number of raisins in her pudding. Ice cream, you know, is not eaten primarily as a food the same as bread or meat. It is a dessert, and the requisite to its popularity must be its goodness and ability to please the popular taste. Some of the most delicious ice cream I ever ate in my life was made of extremely low butter fat percentage. We used to call it custard cream, and take my word for it, it rated high in food value but very low in butter fat content.

Do you gentlemen realize what it would mean if all the ice cream made in the United States were made of 14 per cent butter fat standard? During the year 1912, according to the estimate made by men who would best be able to determine this, there were manufactured in the United States about one hundred and fifty-four million gallons of ice cream. At an average weight of six pounds per gallon this would mean nine hundred and twenty-four million pounds of ice cream.

At 8 per cent average, and I think you will agree with me when I say 8 per cent will cover the average butter fat percentage manufactured last year all over the United States, there were contained in this ice cream seventy-three million, nine hundred and twenty thousand pounds of butter. If all the ice cream manufactured in the United States last year had been made 14 per cent butter fat standard, it would have taken an additional fifty-five million, four hundred and forty thousand pounds of butter fat.

Now stop and figure what that would mean. You know the farmer has not been very keen these past few years on the

dairy end of his establishment. It means get up early in the morning to do the milking; in fact, that is one job it is hard to get help for. Help on the farm is getting scarcer just the same as it is in the city. Butter this past two years has been very high even during the heavy producing season. Now supposing you demand fifty-five million more pounds of butter fat for the ice cream industry, what do you suppose the poor man will have to pay for butter, or for that matter when it gets to that point, what chance has he got of buying ice cream? The poor man, or just the average man, likely could not afford either ice cream or butter, and what would you have gained if you had compelled this fifty-five million pounds of butter to be used in the ice cream manufactured in the United States? Nothing at all that I can see.

Some people like rich ice cream, some like ice cream with very little butter fat in it. In localities where they are accustomed to 6 per cent or 8 per cent butter fat ice cream it would not have done them any particular good to raise this to 14 per cent. They are buying this 6 per cent and 8 per cent ice cream for less money than those people who are eating 14 per cent ice cream.

I do not believe the Food Commissions and Health Departments in the various cities are banded together to raise the price of such a necessity as butter, but that is surely what they would do if you compelled all ice cream to be made 14 per cent butter fat standard.

Why should the exact ingredients of ice cream be determined by the Food Commissions or Health Officials any more than the exact ingredients in bread? Bread is primarily a product of grain, wheat or rye. It should not make any difference to the Health Department whether that bread is made with milk as a shortener or lard as a shortener, or the quantity of these ingredients, nor the exact amount of salt in the bread so long as all the ingredients are good, sound, raw materials, and wholesome for consumption as human food. It

is up to the manufacturer of that bread whether the public will like it and therefore buy it, and that depends principally on how well he knows how to make bread.

From the manufacturer's viewpoint, that is the exact condition that should exist with reference to the manufacture of ice cream. Ice cream being a compound, it is up to the manufacturer to make his ice cream so good that the people will buy it. It is the Food Commissions' and Health Departments' business to see that the manufacturer uses nothing but good, wholesome material, and produces this product under good, clean, sanitary conditions so as to deliver to the consumer a product that is harmless, wholesome and healthful. We, the manufacturers, do not think that it is within the province of Food Commissions and Health Departments to determine exactly how much butter fat, or how much sugar each manufacturer shall put in his ice cream. We believe there is a field and a demand for various grades. We believe, as I said before, that some people like ice cream very rich in butter fat and other people do not like it rich at all.

We also believe that each manufacturer will get a price commensurate with the quality of the product he produces. We believe that so long as he makes a product that is wholesome and healthful which conforms to the accepted term of ice cream, that the exact amount of ingredients, whether that be butter fat, sugar, or flavor, be left to him, and we feel that the public will without any question determine who makes the ice cream best suiting their taste by buying that manufacturer's product.

From my personal contact with most of the large ice cream manufacturers in the country, I do not believe that any class of food manufacturers are more anxious to bring their plants up to a high standard with reference to sanitary methods and cleanly handling.

The manufacturer of ice cream is handicapped against other food manufacturers by the fact that so much ice and salt are

used, which continually keeps floors wet and unsightly, and it is therefore difficult to have a model appearing plant. In spite of these handicaps, I think that the progress made in the condition of ice cream factories has been marvelous. Model plants are being built everywhere. The sanitary handling of the product and cleanly conditions in the factory are the very first things thought of and planned for.

Those are the regulations I believe the Health Department and Food Officials should give attention to, and these regulations I also believe are welcomed by the ice cream manufacturer as a whole in the United States. I do not believe it necessary to determine the exact amount of butter fat content in the product, and especially I do not believe in demanding so high a butter fat standard as to actually increase the cost of both butter and ice cream all over the United States.

#### DISCUSSION.

DR. KINYOUN. I believe that the writer has used the wrong illustration when he compares the production of ice cream to the bread that the housewife makes. There is great difference of opinion as to the kind of bread that should be made and what should not be made. Many cities have regulations as to bread being sold as fresh bread or stale bread. Others have gone so far as to suggest, I don't know whether it is regulation or not, but I am sure it will be, as to the weight of a loaf of bread, and certainly the most important thing is how much water is allowed in fresh bread. I am told that there is already some legislation on that point. So the whole trend of an article, if it is a commercial article, is that it shall be standard. Wouldn't it be better under those circumstances to put on the package of your ice cream so many calories food value, and that will tell the whole story.

MR. LUICK. When I used the word bread as an illustration of what I was about to say, I didn't expect that I was going to open up an argument on the question of bread. I merely



used that to say that it should not make any difference to the health official whether the manufacturer or the housewife used milk or water in the manufacture of bread. Both have been used and bread made both ways and accepted as standard bread. I merely wished to illustrate that ice cream, whether it contains six per cent butter fat, or seven, or eight, that it might be and is actually just as good food value at six per cent as it is at eight or ten per cent.

MR. KELLEY. I would like to ask the gentleman whether he considers ice cream a luxury or a food?

MR. LUICK. I would say a luxury.

MR. KELLEY. We consider the ice cream as a luxury and take no steps in the standardization of ice cream. We simply take steps to see that the manufacture of ice cream is sanitary. As far as the hoky poky man is concerned, we do not allow him to sell exposed ice cream in cones on the street. He can sell ice cream in bricks, but that is the only way. I consider ice cream to be a luxury. It is often prescribed by a physician for a sick person, and then it should be made in the home under sanitary conditions and as the physician prescribes it.

MR. LUICK. With reference to ice cream for the sick, I would suggest that about three and one-tenth per cent butter fat would be lots better than fourteen per cent.

MR. MICKLE. I believe that the public official we want in this work must feel that he is the servant of all concerned, he is the servant of the consumer and the servant of the manufacturer; but here we find that whenever we would have any article of commerce in food regulated that the manufacturers of that article come before us and say, "We are the only ones, we handle this product, we know more about it, we are concerned more about it, and we are the ones who should establish the standard." Then on the other hand comes the general public, and they are saying, "We look to you to protect us, we look to you to see that these people come through with the goods, and we pay you your salary to do that work."

Now, in considering this question without a basis of standards your food official is almost helpless. But as to what the proper standard should be, whether fourteen per cent or eight per cent or ten per cent or twelve per cent, I believe the time is ripe that we come now to some understanding, and I believe it is well and good that we invite these gentlemen in here to talk to us. In Oregon we have a twelve per cent standard, and our physicians, I believe, recommend that standard for the sick. When the matter was brought up, the manufacturers came in there in a hoard and said, "We know more about this business than you folks do," and endeavored to crowd the standard down from twelve to nine. In every case we find the manufacturer coming in and asking that he shall be the one to establish the standard, but, gentlemen, that cannot be. On the other hand, there is the consumer, and we find that the public is just as insistent as the manufacturer.

MR. HENDERSON. I would like to ask the gentleman if he has ever considered bacteria count of ice cream?

MR. LUICK. I haven't given it a great deal of thought, excepting, that if the bacteria count will absolutely determine whether the ice cream is produced under proper conditions or not, then I would be in favor of the bacteria count. I would be in favor of bacteria count if it would determine whether the raw materials in that cream were good raw materials and were manufactured under good sanitary conditions, but unless it will determine that I would not be in favor of it.

*"He makes no friend who never made a foe."—Alfred Tennyson.*



## THE SANITARY INSPECTION OF RETAIL MILK STORES.

ERNEST KELLY, *in Charge Market Milk Investigations, U. S. Department of Agriculture, Washington, D. C.*

In all milk control the element of practicability must play an important part. The dictionary tells us that "practical" means "capable of applying knowledge or theory to practice."

Dairy inspectors, especially, should bear this definition in mind. The sale of milk by grocery stores and other establishments of like character presents a rather complex problem. Without a shadow of doubt it would be better, from a sanitary point of view, to require that all milk be bottled at the dairy or city milk plant. Many cities have already taken this precaution, but there are many others where the practice of selling dip milk in stores is still in vogue. Those of you who have had wide experience in milk control will realize that the abolition of this practice cannot be secured at once. Therefore, we have thought it most practicable to urge these cities to work up to such a requirement, but in the meantime, we must give them some system which will immediately improve existing conditions.

From a nation-wide contact with milk inspection, I have had it forcibly impressed on me that the store problem has been much neglected, especially in the smaller cities and towns. It is unnecessary to tell this body that a very careful watch should be kept of the general store which sells milk. Such stores are often without adequate means of protecting the milk from contamination or of keeping it properly cooled. Often the proprietors have no knowledge of milk or the proper way to handle it. The result is that the consumer purchases a fluid which is not only lacking in the proper food elements, but which is dangerously contaminated. I will not cite specific in-

stances in proof of this, but have on file ample evidence to support the assertion.

In view of these facts some system is necessary which will protect the consumer and which at the same time will educate the storekeeper in the proper handling of milk. To accomplish these ends the score card system of inspection seemed, in the light of past experience, to be the most efficient medium.

Accordingly the following score card for stores handling "bulk" or "loose" milk has been prepared and is already in use in some cities:

This card is based on the same principles used in the dairy farm score card; that is, forty points are allowed for equipment and sixty points for methods. The card deals with the construction and cleanliness of the store and the means provided for keeping the milk protected and cool. Credit is given for clean utensils and for facilities for cleaning them. Light, pure air and screens are also considered. Special emphasis is laid on the importance of placing the milk on ice as soon as received.

I have seen, even recently, some most revolting practices accompanying the dispensing of store milk. If a proper system of inspection had been in operation it would have been impossible for these things to occur more than once.

The proper scoring of these stores will undoubtedly lead to the elimination of many stores which otherwise would rather give up the business than take the necessary precautions. Other stores will improve their sanitary conditions, and thus the grade of store milk will be materially raised.

I cannot leave this subject without a consideration of the stores that sell only bottled milk. Such stores should also be under a most rigid inspection. I have seen bottled milk delivered to groceries, in the dust and heat of midsummer, without ice or protection until sold, some of it being perhaps 24 hours under these conditions.

Another practice which should be frowned on is the splitting



**UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF ANIMAL INDUSTRY—DAIRY DIV.**

**CARD FOR SANITARY INSPECTION OF STORES HANDLING BULK MILK**

EQUIPMENT.	SCORE		METHODS.	SCORE	
	Per- fect	Al- lowed		Per- fect	Al- lowed
<b>BUILDING:</b>			<b>BUILDING:</b>		
Location: Free from contaminating surroundings.....	2	.....	Cleanliness.....	10	.....
Separate room for milk handling..	5	.....	Floor.....	3	.....
Construction.....	8	.....	Wall.....	2	.....
Floors tight, smooth, cleanable 1			Ceiling.....	2	.....
Walls tight, smooth, cleanable 1			Show cases, shelves, etc.....	3	.....
Ceilings tight, smooth, cleanable.....	1	.....	Freedom from flies.....	3	.....
Show cases smooth, free from ledges and crevices.....	1	.....	Freedom from rubbish.....	2	.....
Provision for light (10 per cent of floor space).....	1	.....	<b>AIR.....</b>	4	.....
Provision for pure air.....	1	.....	Freedom from dust.....	2	.....
Screens.....	2	.....	Freedom from odors.....	2	.....
<b>UTENSILS.....</b>	15	.....	<b>UTENSILS.....</b>	20	.....
Construction: Easily cleaned; free from open seams and complicated parts.....	5	.....	Thoroughly washed and rinsed	10	.....
Condition: Free from rust, dents, etc.....	2	.....	Steamed.....	10	.....
Facilities for cleaning:			(Scalded, 5)		
Water clean, convenient, and abundant.....	2	.....	<b>ICE BOX.....</b>		
Hot water or steam.....	3	.....	Cleanliness of ice box.....	3	.....
Brushes and washing powder, 1			<b>HANDLING:</b>		
Protected from flies and dust when not in use.....	2	.....	Placed on ice as soon as received.	5	.....
<b>ICE BOX.....</b>	10	.....	(Protected, put on ice inside of an hour, 2)		
Separate ice box for milk.....	5	.....	(Unprotected, but put on ice inside of an hour, 1)		
(Milk kept in separate compartment, 2)			Temperature of milk, below 50° F	10	.....
Construction.....	3	.....	(51-55, 8; 56-60, 5; 61-65, 2)		
Tight and cleanable.....	1	.....	Freedom from undue exposure to air.....	2	.....
Nonabsorbent lining.....	1	.....	<b>CLEANLINESS OF ATTENDANTS.....</b>	1	.....
Good drainage.....	1	.....			
Protected from flies and dust... 2					
<b>TOTAL.....</b>	40	.....	<b>TOTAL.....</b>	60	.....

Equipment ..... + Methods ..... = Total .....

NOTE—If the conditions in any particular are so exceptionally bad as to be inadequately expressed by a score of "0," the inspector can make a deduction from the total score.

of quarts into pints in the store. I have seen this done a number of times, and the milk was placed in unsterilized, sometimes unclean, bottles.

I wish to urge, then, that a close watch be kept on all stores handling milk, especially those places where bulk milk is dispensed. Without this, precautions at the farm or in the city milk plant may be entirely invalidated. A close watch should also be kept on the quality of milk supplied to such stores, as sometimes an inferior quality is furnished the storekeeper by unscrupulous dealers.

*“Be prudent, and if you hear—some insult or some threat—have the appearance of not hearing it.”*

## COST OF MILK PRODUCTION.

PROF. OSCAR ERF, Ohio State University,  
Columbus.

Whatever else may contribute to the cost of milk production, there are two fundamental factors that stand out boldly, namely, loss of soil fertility and increase in population. These two work diametrically opposite, and to overcome the continually increasing cost of milk production we must increase the productive power of the soil, to have it keep pace with the increase in population. This has been done in other countries and must be done in this country. Nature abundantly provided the past generations with soil fertility, but this is now gradually becoming exhausted. To raise crops of similar yield as in the past, it is necessary to resort to the use of fertilizers, either in the shape of manure or commercial fertilizers. The application of this material and the material itself is expensive and must be applied to the cost of feed. Low yields of forage and grain crops with increased cost of raising these crops directly increase the cost of feed for the cow and indirectly the cost of milk.

It is the purpose of this paper to present the various items that enter into the cost of milk production. The figures given have been derived from different sources, chiefly from the cow testing associations and Advanced Registry records from all parts of Ohio. While conditions vary somewhat, we shall endeavor to give the maximum, minimum and average figures for each item that enters into the cost of milk production.

Feed. In keeping a cow, the dairyman must charge the feed to the cow according to the market price, minus the cost of transportation from the farm to the market. We find feed costs ranging from \$24 to \$92 per cow, for one year. The high feed costs were in cases where dairymen had no farms

and were obliged to purchase all their feeds, thus making it necessary to charge to the cow a high price for the feed, plus transportation charges. The cows charged with the low feed cost were those that had freshened in the spring and had been pastured on waste land. The pasture was charged to them at 25c per cow for each month that they were on pasture. They were fed a fairly good ration of roughage and concentrates early in the winter, but later on were given what is commonly called a "dry period ration," consisting mostly of corn fodder and some hay. In another instance, waste hay from a stack from which the good hay had been baled, was fed. This hay was purchased for \$2 per ton and charged to the cow at the rate of \$3 per ton. There is a difference of opinion as to the value of damaged feeds, which are sometimes produced as the result of bad weather conditions, but the quantity produced on any one farm should not be very great and hence it need not be given serious consideration on the average dairy farm. Cows have been found that were fed for less than \$24 per year, but these were not profitable cows and were producing an abnormal milk not fit for distribution. We are making a feed charge of \$46 per year for one cow, as this seems to be the average cost of feed for the profitable cow. The great difference in the market value of feeds makes equally as great a difference in the cost of milk. Two years ago corn was worth 70c per bushel and oats 53c. The past year corn sold for as low as 42c and oats were readily selling at 29c. Last year hay sold for \$10 per ton, while two years ago, the market price of hay ranged from \$16 to \$20. Again, this year hay is gradually approaching a high price. Corn has already reached 70c and the chances are that it will go higher, and oats are now selling for 43c. Since there is an increase of 75 per cent on the actual cost of the feed, it is reasonable to assume that the cost of milk should be increased in proportion to the amount of feed fed and the price of the same. In making the average feed charge for a profitable cow for one

year, from the statistics that were gathered, it was found to be about \$61.40 for 1911, but under similar conditions in 1912, it was greatly reduced, being about \$46.

Labor. The labor cost is a big item. In some cases we have a labor charge of \$54 per cow, per year. This was in the case of the production of certified milk. In some cases in the production of ordinary market milk, the labor cost has run up to as high as \$36 per cow per year; while in others that are producing milk with a fair degree of cleanliness, the labor cost was only \$18. There are many cases in which the labor cost is less than this. In fact, there are a few instances in which it was only \$7 per year, but this was where no pretense was made of stabling the cows properly, where they were milked on manure piles, into galvanized or wooden pails that had never been scalded and perhaps not even washed. These men milked with hands that were unclean. The udders of the cows were filthy and usually gargety as the result of filth. We know that such conditions exist at the present time, but we have never found a man who could produce milk that could be considered sanitary, at a lower cost than \$18 per cow per year. The average cost is approximately \$25.50 for each cow.

Interest on the Investment. This is probably the next item of importance. The value of cows differs greatly. They may be bought at the present time for as low as \$35, but there are very few profitable cows on the market. A profitable cow can seldom be purchased for less than \$75. This has reference to grade cows only. Pure bred cows are of much higher value, and consequently the interest on the investment would be greater, but this is offset by the value of the calf, which is also much greater than that of a grade cow. The majority of cows are grade cows having a valuation of \$75, and figuring 6 per cent interest on the investment, we have \$4.50 to charge up to the cost of milk production.

Deterioration by Age. After a cow has reached maturity her value decreases as she advances in age. For illustration,



a cow is worth \$60 at the age of five or six years, but gradually as she grows older her value decreases until she reaches the age of thirteen or fourteen years, when as a rule if she has been a good producer, she becomes unprofitable, and if sold for beef is very seldom worth more than \$35, even at the present high cost of meat. This would be a loss of approximately \$25, which would be distributed over a period of eight or nine years and would amount to about \$3 per year. But as a rule, cows are sold at an earlier period and for that reason the loss on the investment is less. Two dollars and fifty cents is a reasonable estimate for this item.

Loss by Death or Disease. This is another factor that is quite difficult to determine, as it varies greatly. We have been able to get statistics from well regulated dairies only, where such loss is usually at a minimum. There are individual cases in which the loss has amounted to as much as \$13.25 per cow per year, but under average good conditions, we find that it is safe to estimate this loss at \$1.50 per cow per year.

Cost of Bull Service. This depends entirely upon the animal used. In good herds no service can be considered as costing less than \$5. On the other hand, with an ordinary grade bull \$1 is the minimum. Even in a grade herd a dairyman should keep a sire that would produce better heifers, and under such conditions the average service would be worth at least \$2.

Interest on Dairy Stable. This varies according to conditions. There are stables that cost as much as \$400 per cow and there are others in which the investment is as small as \$5 per cow. In fixing this item we have considered the cheapest possible structure allowed by the boards of health. According to the present value of building material, no barn can be built with the proper degree of sanitation and with storage space to provide room for feed, for less than \$50 per cow. Six per cent interest on this amounts to \$3.

Straw. This is becoming a very important item since the

demand for it by the paper mills for packing is so great. While in some places straw can be bought for as low as 50c per ton, the market price at the present time for baled straw is \$6. One dollar and twenty-five cents of this is for baling. In the city the price is considerably higher than this. Considering the bulk straw as it is upon the farm, it may be valued at \$2 per ton and it requires at the very lowest estimate, one ton of straw to bed a cow during the fall, winter and early spring months. This is assuming that there is proper drainage in the stable. If this is not the case and the liquid must be absorbed by the straw, at least two tons per year will be required.

**Cooling the Milk.** This item is one that has not been considered in the past, but owing to the demands that milk shall be delivered into the city at a temperature ranging from 50 to 60 degrees, it is an additional item in the cost of milk production, especially during the summer months. It requires approximately one pound of ice to cool a pound of milk and keep it cool until it reaches the city, at an average distance of ten miles. Where a small amount of ice is used and water is used for cooling the milk, the expense must be applied to labor required to pump the water, or in case a gasoline engine is used, to gasoline and wear and tear on the engine. The lowest cost of this item would be \$2.50, figuring ice at 20c per hundred.

**Hauling Milk.** The cost of hauling milk to the station is generally considered to be worth about 10c per hundred. But farmers that live some distance from the market and especially when there is railroad transportation, are required to pay 1c, and in most cases 1½c per gallon. The cost of this will range from \$5 to \$10, depending upon the amount produced. We will, however, not take this item into consideration, owing to the fact that it does not apply to the average dairyman.

Summarizing the different items in the cost of keeping a cow for one year, we have the following:

Cost of Feed.....	\$46.00
Cost of Labor.....	25.50
Interest on Cow Valued at \$75.....	4.50
Allowance for Deterioration by Age.....	2.50
Allowance for Death and Disease.....	1.50
Interest on Cow Barn.....	3.00
Bull Service .....	2.00
Straw for Bedding.....	2.00
Cooling Milk .....	2.50
Hauling Milk .....	5.00
General Maintenance Expenses.....	3.00
	\$97.50

This makes a total of \$97.50, the cost of keeping a cow for one year. But we are obliged to credit the cow with the by-products other than milk. Manure is the most important of these by-products. With the manure the value of the straw is also estimated. From nine years of crop production the Ohio Experiment Station has estimated the value of a ton of manure, if reinforced with 50c worth of superphosphates, to be \$4.50, thus making the value of a ton of manure \$4. The average cow voids about ten tons of manure during the year. In the best regulated dairies about one-sixth of this is lost, but under average conditions about three-fourths of it is lost. When the farmers understand the value of manure as compared with commercial fertilizers, more care will be taken to preserve it. Other experiment stations report that manure is worth from \$2 to \$6 per ton, depending somewhat upon the crops that are being raised. It is fair to assume the value of a ton of manure to be \$2.75, compared with the present prices of commercial fertilizers, so we credit the cow with eight and one-third tons of manure at \$2.75 per ton, or \$22.92. This manure has to be transported from the barn to the land and properly applied. This is another factor which differs, de-

pending upon the distance which the manure has to be hauled. It is fair to assume that with the interest and the wear and tear on the spreader, it would cost approximately \$2.10 to haul eight and one-third tons of manure. Deduct this from \$22.92 and we have left \$20.82.

Usually a calf is born each year to a cow and this has a value, which may be considered as another by-product. There is a wide variation in the value of calves. Ordinarily we do not place any value on a grade, male, dairy calf, but in some cases a value of \$2 has been placed on it at the time of its birth. Heifer calves are usually worth from \$3 to \$8, depending upon the milk producing power of the mother. Occasionally there is a year in which the cow does not produce a calf. It is just to credit a cow with \$3 every year for a calf. We then have the value of the by-products as follows:

8 1/3 Tons Manure at \$2.75 (less \$2.10).....	\$20.82
Calf .....	3.00
	\$23.82

Deduct the value of the by-products from the total cost of keeping a cow—\$97.50, less \$23.82—and we have \$73.68.

In making all our estimates we have assumed conditions a little better than the average dairy in the State of Ohio, for the average dairy would not be approved by the city boards of health in most cases. For instance, the milk is not cooled in many dairies. The producing powers of the different dairies vary to a great extent. In some cases cows are giving as little as 300 pounds of milk per year, while in others they are producing as high as 7,000. The cost of milk production varies with the amount produced, as shown by the following table, considering \$73.68 as the cost of keeping a cow for one year:

3,000 Pounds per Cow, Cost per Gallon.....	21.1c
4,000 Pounds per Cow, Cost per Gallon.....	15.8c

5,000 Pounds per Cow, Cost per Gallon.....	12.7c
6,000 Pounds per Cow, Cost per Gallon.....	10.6c
7,000 Pounds per Cow, Cost per Gallon.....	9.05c

Where cows are of very high producing capacity, there should be a slight extra charge for feed, while with some of the very low producers there might be a small reduction. But the difference in the cost of a gallon of milk would be very small. In this table we have placed the limit at 7,000 pounds per year, although there are many cows that produce much more than that. We have, for instance, such cows as Banostine Belle De Kol, Pontiac Clothilde De Kol II and Colantha 4th's Johanna, all of which produced over 27,000 pounds of milk in one year. But it is a rare type of man who feeds that kind of cows, and a skilled man does not work for \$40 per month. If the real value of the man's services be applied to the cost of production it would amount to more than that of the ordinary cow. High production requires extra skill, and this must be charged to the cost of production.

With the present price of milk it is exceedingly discouraging to the average dairyman when he faces these facts, but there is a grand opportunity for the man who uses good judgment in feeding. Since the cost of feed is the only fluctuating item in the cost of keeping a cow, it is the important factor in reducing the cost of milk production.

*"It is only by labor that thought can be made healthy and only by thought that labor can be made happy."—John Ruskin.*



## HELPS AND HINDRANCES IN THE WORK OF DAIRY AND MILK INSPECTION.

PROF. C. B. LANE, *Supplee Alderney Dairy*, Philadelphia.

While not a charter member of this organization I joined it the first opportunity I had, because I believe it can accomplish great things in the improvement of the milk supply. I had an opportunity to study this question for several years from the standpoint of an official of the National Government and more recently from the commercial point of view, and I believe that all who are doing their work with honesty and sincerity, whether Government experts, State or city officials or dealers are endeavoring to accomplish the same result, and all are hampered in their work by the same obstacles and helped by the same means.

Among the important aids are proper laws, sufficient appropriations, competent inspectors, co-operation, public sentiment, proper attitude of producers, dealers, and consumers, police support, education, score card, milk contests, etc. On the other hand we have many hindrances. Among them may be mentioned lack of funds, ignorant inspectors, laws that are not workable, bad politics, dishonesty, lack of interest, and lack of co-operation. In endeavoring to accomplish the same results, however, the Government cannot do the work of the State, or the State the work of the city.

Each has its own field of work. And it is well that it is so, because to a certain extent one can do the work that the other cannot. One can co-operate with the other and accomplish results which neither could do alone. You will pardon one or two personal illustrations here. A few years ago when in the Government service, I was called to a city to look over the "swill" dairies which were a menace to the city at that time. I think they were the most filthy and disgusting places for the production and handling of a food product I ever saw, so dark

were they and so full of steam from the warm, fermenting distillery slop that it was impossible to get a picture in the middle of the day without using a flash light and then the steam had to be removed from the lens an instant before the picture was taken. In addition to this filthy condition, we found at least 3 quarts of water in each can standing in the stable waiting to receive the milk. The combined evidence of Government, State and other officials concerning these conditions was sufficient to secure their removal. The Government also helped in many instances in stopping the traffic in dirty milk from State to State by securing overwhelming evidence of high bacteria and filth and proving that the milk was unfit for food.' This is real co-operation.

Again a dairyman in one of our southern cities was bottling milk out of a tank containing the ordinary product, sealing the bottles and selling them to the customer for certified milk. This man was brought before the court, and as I happened to be in the city at the time was called in as a representative of the Government to testify as to what certified milk was and to show how the public was being deceived. The case was won for the city health department without any difficulty.

When a milk shipping station discharges a patron for persistently bringing dirty milk and he goes over to the cheese factory a half mile away, where his product is received, there is something wrong with our dairy inspection. On the other hand, when a State official steps in as he has done in our State more than once and says, "You cannot ship your milk anywhere until you clean up," that is real co-operation.

#### APPROPRIATIONS.

At the outset, in order to carry on proper inspection we must have money, and if a State or city fails to provide ample appropriations the work is bound to be sadly handicapped. In some of our States hundreds of dairies are never visited at all, in others *once a year* is the rule. No money, no inspection.

## HEALTH OFFICERS.

With an ample appropriation we must have a health officer who is competent and whose whole soul is in the work and who is capable of laying out the work of his department and securing results. He should hold office because he is qualified for the place and not because someone owes him a political debt. If he is the right man in the right place he is the biggest help the inspection department can have. If he is not the right man for the position, the chances are he will care little about inspection and the work will amount to nothing.

It has been my pleasure to meet many health officers in various parts of the country who are doing their work in a most thorough manner and who, with everything against them at the outset, have won out all along the line. I have one in mind particularly, who found everything disorganized when he went into office, in fact the Board of Health in that city was absolutely dead, so far as being of any benefit to the community. In a few brief months, however, the dairy inspectors, who were political heelers and who were in league with the farmers, and who could be bought for a few dollars when the farmers got in trouble, were discharged, as was every other man in the Department who wasn't doing his duty. The heads of all the divisions were required to meet for a conference with him every two weeks and if they failed to do this it was counted against them. He soon commanded the respect of the whole community and the farmers as well. He introduced the score card in dairy inspection and considers it one of the biggest helps today.

Another Health Officer went into office because the people demanded a reform. The milk was filthy, the cows were badly tuberculous, the meat sold was exposed to the flies, and children bought fruit and candy covered with dirt from the streets. In one particularly bad dairy he told me that he warned the farmer to take out a diseased cow before he returned again, or he would shoot her in her tracks. A few weeks after he found the cow still standing in the stable and he was as good as

his word. This may be called heroic treatment, but it sometimes takes a bomb to wake people up. His action was soon known among the farmers, and he never had another occasion to use his Iver Johnson, although he always took it with him.

A good sign of the times is the establishment of a school to train officers for what has been called "The Public Health Militia," which has been established under the joint auspices of Harvard University and the Massachusetts Institute of Technology. There is no question but that the need of precise training for public health officials is a crying one and that the graduates of the new school, the first of its kind in the field, will be in position to render great civic service. Rosenau says: "The public health administration is a profession which bends its knee to none so far as ideals and service are concerned. The health officer should be more than a practicing physician, he should have knowledge concerning vital statistics, sanitary engineering, water purification, sewerage disposal, disinfection, and the making and breaking of health laws."

#### LAWS.

We cannot have successful dairy inspection without laws to back it up. Education will help a large per cent of dairymen, but there are a few in all communities who must see the club before they will stop the sale of filthy milk. Gradually a legal structure is being built so well and so strong that the person who persists in selling his fellowmen filthy milk will be a law breaker and denied a market for his product. The Court of Appeals of the District of Columbia, recently settled the status of the man who sells cow manure in milk. A milk dealer in the city of Washington was tried before the police court of the District of Columbia for having sold milk that was adulterated in that it consisted in whole or in part of filthy, decomposed and putrid animal and vegetable substance and had thereby violated the national food and drug act. The milk in question contained large numbers of colon bacilli and streptococci, indicating un-

sanitary production or handling of the milk. The bacteria count was 89,400,000 per c.c. The defendant was found guilty and appealed, but the Court of Appeals sustained the conviction. The justice in delivering the opinion said among other things: "We are not dealing with a regulation relating to milk alone, but with an act generally regulating the sale of food products. Milk is a food product, and if found to be impure it will be held to be adulterated within the provisions of the act." This to my mind is one of the greatest helps that has recently come to the inspection work of the health departments of our cities and those who control the milk traffic in interstate commerce.

#### INSPECTORS.

If all the health inspectors were of the type of men who belong to this organization, there would be little to criticize. Unfortunately, the larger per cent of this class of men scattered through the country have had little or no training and are poorly prepared for their work. One illustration will be sufficient on this point. The inspection force appointed in a western city consisted of an engineer, a detective, a solicitor, a watch maker, a machinist and an ex-policeman. Is it any wonder that the dairy farmer objects to being inspected when men from such callings are sent to tell him how to conduct his business? Where greedy politicians rule and there is no civil service, plums must be distributed and election debts paid. Says a member of the Health Board in one city, "Politics, with its attendant change in office of mayor, council, health board, police, prosecutor and judges is the great and almost insurmountable obstacle in the way of carrying on the work. Fortunately, our men were put under civil service some years ago, which is the only thing that keeps the work alive."

One method which is working out well and securing the confidence of the farmers consists in leaving competent inspectors permanently in the same districts. Great success has followed this plan, particularly where inspectors have been continuously in the field for several years and have the confidence



of the farmers to a remarkable degree and acquire a knowledge of each man's means, energy, etc., which is invaluable.

#### PUBLIC SENTIMENT.

It has been possible to enforce many an ordinance through the aid of public sentiment. When the majority of the people demand reforms and improvements they are bound to come. This is of no little importance as a help in improving conditions. When people really *want* better milk, they will get it, and the reason we haven't got better milk in many of our cities, is because the community as a whole has not interested itself sufficiently to demand it.

For example, according to an investigation recently conducted by one of our daily papers, the entrance fees at moving picture shows in one of our larger cities averaged in 1912, \$5.85 for every man, woman and child in the city. This expenditure shows that we *can* get the things we really want.

#### EDUCATION.

Education that takes the form of a demonstration or illustrates in a practical way is always helpful to the farmer and an aid in inspection. Take, for example, the work carried on in Wisconsin. Dr. Russell placed 12 healthy calves with one diseased, and in less than three months eight calves acquired the disease and four were condemned and tanked. A practical illustration that will appeal to any farmer. Animals have been taken out of herds and tested and when found infected they have been killed under public inspection and in some instances 1,500 to 2,000 people have come to see the ravages of tuberculosis.

There are now over 21 cities and towns in Wisconsin that have taken up the movement. An educated public sentiment is doing the work. I do not agree with those who are inclined to give up the tuberculosis problem because it is so big and do nothing. We have got to face the question whether we want to or not. We should take hold of this thing before we get into

the condition of Denmark, where 40 per cent of their herds were tuberculous. If individual cities would take hold along this line I believe that inside of a few years we would conquer the disease. We must get educated public sentiment first, then we can get all the laws we want.

#### THE SEDIMENT TEST.

The sediment test is also a great help to the city inspector. Says Dr. Eddy, Chief Inspector of Cleveland, "The sediment test has been the most valuable aid to our work of any one feature. Dirty samples are filtered, the cotton plug with dirty sediment consisting of manure, flies, hair, scabs, straw, pus, etc., is sent the dairyman or he is requested to come in the health office and examine it under penalty of losing his license. He never fails to come and is always impressed by the result."

#### THE SCORE CARD.

In discussing the helps in dairy inspection I would be leaving out one of the big helps if I did not mention the score card, which is conceded to be the most efficient system in use. The card has now been adopted by 185 cities, 27 State bodies, 49 schools or colleges and 13 commercial organizations. Several cities in Canada are using the card and it has been translated into French for use in that country. Over 17,000 copies of the card were sent out by the Dairy Division in Washington last year. I base the following on reports that frequently come to my attention from the health officers themselves:

Geneva, N. Y.: Practically all of the poor and medium dairies have been eliminated in two years through the use of the score card and an educational campaign.

Richmond, Va.: The dairies were improved 73 per cent in one year through the use of the score card.

Springfield, Mass.: Dairies improved 12 per cent on second inspection, temperature of milk decreased 26 per cent after first year and bacteria decreased 75 per cent.

Seattle, Wash. : An improvement of 37 per cent in 2½ years.

Detroit, Mich. : An increase of 27 per cent in the score in one year.

I might multiply these illustrations indefinitely, but it is not necessary. It is not claimed by anyone that the score card is a cure for all ills, but that it is a definite help to the inspector when properly used and an education to the farmer has been established beyond question. It should be considered one of the essentials in the equipment for dairy inspection and should be supplemented by the chemist, the bacteriologist and the veterinarian. What we need now is a score card for the dairy farmer himself. He is the most important problem to solve. With the same equipment and the same methods he has been known to produce milk containing 40,000 bacteria per c.c. one day and 800,000 the next. You can't blame the score card for these results—it's the man. You can put some dairymen in a certified dairy and they will always produce bad milk; on the other hand you can put a certified milk dairyman in a dirty stable and turn out clean milk. It seems therefore, that it is necessary after scoring the dairy to go back of that and score the man who runs it.

#### MILK CONTESTS.

For the past seven years milk contests have been conducted under the auspices of national and State organizations and city health departments as well. They have proven to be a valuable agency in securing a clean milk supply. These contests show the dairyman very clearly what his defects are, and in hundreds of instances have resulted in immediate improvement. The contests are therefore of some aid to the dairy inspector, as they help to accomplish the very thing that he is endeavoring to accomplish. Only a few days ago a dairyman pulled his watch out of his pocket and very proudly showed me a medal on his fob that he had won in a milk contest. Having won this, he is after more this year.

## THE MILK DEALER.

The milk dealer can aid the inspector very materially, and is doing so in many localities at the present time. Being connected with a dealer myself I know what it is possible for him to accomplish. It is a question just how much of the burden of inspection should be carried by him, but he should at least lend his support in every way possible in perfecting the milk supply.

If you will excuse mentioning my personal experience in this direction, I will give you briefly the results of a tuberculosis campaign it was my privilege to conduct for the Supplee Alderney Dairy four years ago, and which has been kept up annually since. The object at the outset was to see what could be accomplished in the way of ridding herds of tuberculosis and awakening the farmers to the importance of the diseased cow.

When the canvassers were sent to the country to introduce the subject to the farmers, they were told not to return until they got results. When they finally did return they had secured the consent of six dairymen for the test, and when we sent the veterinarians to make the test they found that four out of the six had changed their minds, and starting with two dairies they made the first tuberculin test, which gave assurance to the farmers because we were fortunate to have no condemnations. The rest of the work was largely individual. Each difficulty was met as it came, and while there were many more than we anticipated, the successful conclusion of the task has made all worth while.

Among the arguments the farmers put up in opposing the test were that tuberculin gave cows tuberculosis, that they gave less milk after the test, that the test was not reliable, that it was a scheme to get their best cows and sell them to the butchers, etc. Every farmer put a price on each of his cows at the outset, and if any were found diseased we gave him a check

immediately, so he could replace them and continue the production of milk without any reduction in his supply. The check which they received from the State, frequently after a delay of several months, was turned over to us, but of course did not cover the price we had paid for the cows, expenses of veterinarians, etc.

To make a long story short, 1,063 cows were tested in the first year (1909) and 18.1 per cent were found diseased. In 1910 we found the number of diseased animals had been reduced to 4.61 per cent; in 1911, 1.87 per cent, and last year it jumped up again to 4 per cent. Five out of the ten diseased cows, however, were found in one herd. We invited all the farmers to follow their diseased cows to the slaughter house in Philadelphia, and satisfy themselves that they were really diseased. One trip was sufficient to convince them that there had been no mistake in the work of the veterinarian.

But you ask how the inspector is helped by such a campaign. He finds the educational work has been done ahead of him when he visits these districts, and that the farmers are in a better attitude toward, not only the tuberculin test, but the general improvement of dairy conditions. The improvement in the sanitary conditions in dairies where the tests were made was very marked.

Another way the dealer can help the inspector is by insisting that only clean milk shall come to his shipping stations. I have found the filter tests a great help in this work. The test is made once a week and the filter dried and returned to the farmer with his check marked good, fair or bad. As a result, many farmers are ashamed of their record and make inquiries as to the best small top pail and strainer to use.

I might also mention the scoring of dairies by milk dealers, which is now becoming quite a common practice, and the payment of premiums for scores up to a certain standard. We have scored all dairies shipping milk to us and have given them a copy of the score.



I haven't time to discuss picnics, farmers' meetings, distribution of literature, etc. All tend to pave the way for more effective work by State and municipal Health Departments.

#### CITY INSPECTION.

One of the more recent things that has been brought to the attention of the city inspector in his work is the classifying of milk. It is an experiment, however, and its real value as a general system is yet to be determined.

One city inspector tells me that the greatest aid in his city is the energy and enthusiasm of the personnel of the department carrying on the work. There are still a large number of dealers in our cities who are unfit for the handling of milk, having no conception of its nature or susceptibility to contamination. No laws can be made that will force such men to handle the milk properly. For example, men who wash milk bottles in the family wash tub with a few gallons of cold water and dress in filthy clothes, are a menace to public health and should not be permitted to continue in business. I have known milk men to wash bottles in one end of the horse stable and keep the horse in the other.

For the safety of the public these conditions in our cities should be gotten rid of immediately.

In closing, let me urge you as members of this organization to use your influence to increase the helps and overcome the hindrances and fight for better efficiency in *Dairy and Milk Inspection*.

*"Don't say things. What you are stands over you all the while and thunders so that I cannot hear what you say."—  
Elbert Hubbard.*



## A BACTERIOLOGICAL INDEX FOR DIRT IN MILK.

DR. JOSEPH J. KINYOUN, *Bacteriologist*, Health Department  
of the District of Columbia.

In a previous paper by the writer and Dr. L. V. Dieter, the results of a bacteriological examination of the milk supply of Washington, D. C., were given. This study included about 1,200 samples of milk and cream, and continued over a period of fourteen months.

Similar examinations have been continued without interruption until now nearly three thousand samples have been examined.

Our first work was to determine the actual condition of the milk and cream arriving in Washington, its treatment in the several dairies or milk depots here, and finally, and most important, its condition as it reached the customer.

These examinations, together with similar ones made subsequently, have disclosed certain facts which influence the character and quality of the city milk supply.

Since the beginning of our more recent examinations of milk and cream, much attention has been given to the kinds of bacteria found. This has in no way lessened the importance of the total bacterial content as indicative of the character of the milk, but isolating and studying certain groups of bacteria in the milk, together with the total content, give a much better idea of both the character and quality than the total content alone.

In making these examinations, the methods employed have been along the same lines as those adopted and recommended by the Laboratory Section of the American Public Health Association. Some minor differences, which do not change the final result, were made for the sake of economy. One set of dilutions were plated instead of two and incubated 48 hours,

at room temperature. This plan was adopted after a study of two sets of plates used for 1,000 samples. It was found that those plates incubated at 37 degrees C. showed a 10 per cent excess over those incubated at room temperature. No gelatin plates were employed for lack of facilities, and because they were not considered of much importance. In addition to the above mentioned methods, special media were employed for the isolation and study of the colon and streptococci groups.

Streptococci were estimated by the indirect method; that is to say, dilutions of milk were plated in lactose peptone bile and incubated for 4 days at 37 degrees C. Then preparations from these several dilutions were made, stained, and examined. If there are present the typical chains of streptococci in a given dilution, say 1/100 or 1/10,000 per c.c., as the case might be, it was then estimated that there were at least 100 or 10,000 streptococci present. No further attempt was made to isolate or identify the several strains. We have for the past three years been employing for the isolation of the colon group a modified Endo's medium which has given most excellent satisfaction. We feel that it is of so much importance that the method of its preparation is given here.

It is always better to make the media in considerable quantities, say in lots of 6, 8, or 10 liters. The amount of agar can be reduced to 2 per cent instead of 4 per cent as originally given.

Peptone, Witte .....	80 grams.
Meat Extract (Leibig's).....	80 grams.
Salt .....	40 grams.
Agar-agar powdered .....	160 grams.
Water .....	8,000 c.c.

Mix the peptone salt and agar with sufficient water to make smooth paste, and then add the balance to make 8,000 c.c. Add the meat extract and, without attempting to mix this, place in an Arnold sterilizer and steam until all is dissolved; this usually requires about an hour.

When it is melted it is then cooled to about 55 degrees C. and titrated to + 1 using phenolphthalein as an indicator. It is then placed in tall beakers, steamed for a half hour and then allowed to solidify. This is best done by allowing the beakers to remain in the sterilizer over night. In the morning a greater part of the precipitate will have gravitated to the bottom. The solidified agar is removed from the beakers, placed on paper and all the precipitate is cut off and discarded. The rest is cut in small portions, replaced in the beakers and melted. It is then allowed to cool down to about 55 degrees C. and standardized in the following manner:

Eighteen lots of 10 c.c. are placed in an equal number of sterile test tubes and these tubes are divided into two series; one the "acid" and the other the alkaline. To the "acid"

N

series, are added the following amounts of ———, viz: .01,

HCl

.03, .05, .07, .09, .1 c.c. To the "alkaline" series, the following amounts of a 2½ per cent solution of sodic carbonate is added, 0, .01, .03, .05, .07, .09, .1, .3, .5, .7, .9, c.c. Then to all these tubes, and while hot add to each 1 c.c. of a 10 per cent solution of lactose C.P. (crystal) 1 c.c. of a 2½ per cent. solution of sodium sulphite, freshly prepared, and 1/10 c.c. of a half saturated alcoholic solution of basic fuchsin. Pour, then, contents of each tube thus prepared into a sterile petrie dish and allow to harden. The surface of each plate is inoculated with typhoid and colon bacilli from a 24-hour-old bouillon culture; one-half of the plate streaked with typhoid, and the other with colon. The plates are incubated for 24 hours and the one showing a typical and luxurious growth of both typhoid and colon is selected as a standard for the stock, and the alkali or acid is added to bring the stock to the selected index.

We have found it most convenient for routine examinations to divide the stock media into 100 c.c. lots and employ for this



purpose a round bottle holding 120 c.c. which has been marked to 100 c.c. The bottles are filled up to the 100 c.c. mark and then sterilized in the Arnold for an hour for two successive days. It is then stored. When the media is used, it is melted; 1 gram of lactose crystal is added and as soon as dissolved 5 c.c. of a 5 per cent solution of anhydrous sodium sulphite (freshly prepared and hot) is added and followed by 1 c.c. of a half-saturated alcoholic solution of basic fuchsin. All these are thoroughly mixed when it is ready to pour into plates. For determining the colon content in milk by the direct method, we have found it to be of advantage to employ a petrie dish of 150 m.m. diameter and pour into the plate sufficient of the media to cover the surface and allow this to harden. Then the milk is pipetted directly on the media and just enough of the media is poured in to mix with the milk, so that when it hardens the milk will be held in a thin layer of the media. This procedure will not only prevent spreading, but allows the colon colonies to produce their characteristic reaction within a shorter time than would occur otherwise. In case the media is employed to isolate the typhoid bacillus from dejecta the same procedures are observed as set forth in the original papers. We have found that a 2 per cent agar answers every purpose and a 4 per cent agar is not necessary.

What is the significance of the colon group in milk?

The colon group comes from the intestinal canal of men and animals; indirectly it may be found in soil, water, and food. This is such a well established fact that it does not need discussion. When it gains access to food and drink, it must be from one of these sources. Water frequently contains colon bacilli, and sanitarians agree that in determining the wholesomeness of a water for drinking purposes, the colon bacillus is the best index for purity. The value of a drinking water diminishes in a direct ratio to the extent of the colon content. All this is based on water polluted with sewage, which frequently is the carrier of a pathogenic agent; like

cholera, typhoid, bacillary dysentery, and diarrhoeal diseases of infants. The colon bacillus *per se* may not cause disease, but some members of the colon group may do so.

When milk is contaminated by the colon group, it indicates that it owes its presence there to uncleanly methods at the time of milking, or to the collections of the milk in dirty vessels or from the air.

The greater proportion of the colon bacilli gain entrance to milk at the time of milking and owe their presence directly to fecal matter which has gained access to the pail by dirty, filthy cows, or from the hands of the milker. It is a well established fact that when there has been a careful preparation of the cow by removing the dried fecal matter from the hair and skin, washing and drying the teats and udder with clean water and cloths, employing the small mouthed pail, and doing the milking in a clean, well lighted room, not only the colon group is reduced to the minimum, but all other bacteria as well.

With regard to the presence of colon bacteria in the air of stables and milk rooms, it does exist in a small degree, at times, and at those times in particular when the dust is stirred up, as, for instance, at feeding time, or when the cows are driven in or out of the stable, but the number present in the air is usually so small that it has little or no effect on the milk. It is possible for a few, but a very few indeed, to gain entrance to the milk by this route, but it would have so little effect that it can for all practical purposes be considered a negligible quantity.

The colon content of the milk depends upon the amount of fecal matter put into the milk. It matters not when or how. It increases according to the absence of care and cleanliness at the time of milking, the cleanliness of the container and methods of handling. The rate of growth in milk is about the same as that of other bacteria present, and it is believed to be a conservative statement that over 90 per cent of the market milk found to contain colon bacilli in considerable

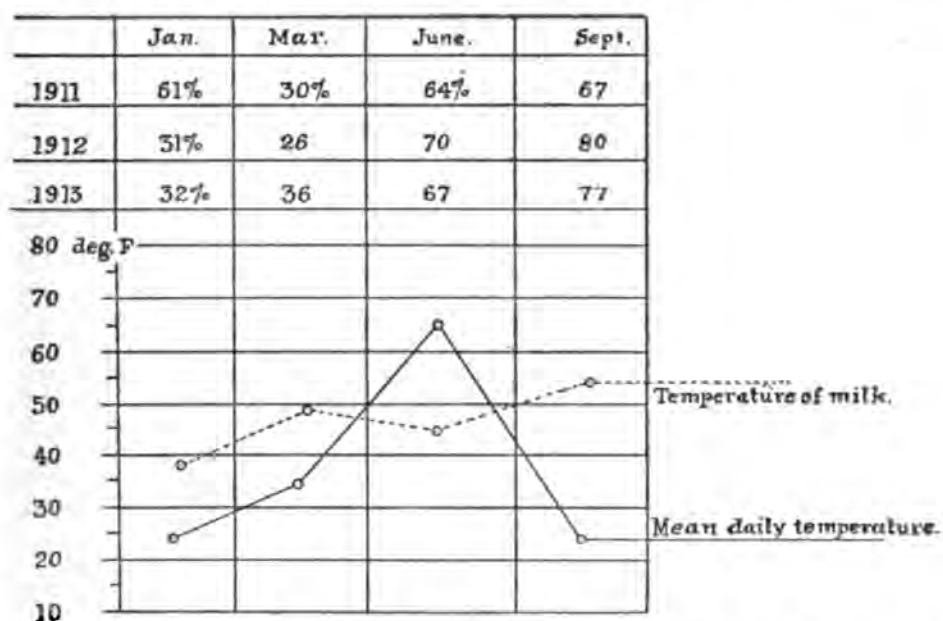
numbers receives its greatest contamination at the time of milking. This statement is based on the study of milk examinations covering the past three years.

The contamination arising from the pail or other container comes as a direct result of carelessness in cleansing and sterilizing, or from a contaminated water in which the container and utensils are washed. Milk pails and other containers may be dirty, containing all kinds of extraneous matter which has undergone bacterial decomposition. They may or may not contain colon bacilli, but if it be present, it originated from a previous colon contaminated milk, or from water. A number of examinations have been made from such containers, and where the colon group was found, there was as a rule a greater disproportion between it and the total number than was found in the samples of milk.

On the other hand, should any of the colon content be due to an infected water, with which the containers are washed or the milk diluted, it must be considered, not merely as a dirty milk, a filthy milk, but also a dangerous milk, unless in the latter case it can be definitely established that the colon bacilli in the water is wholly of animal origin and could not come from man.

When the colon content of a milk is large, one may be sure that it bears a direct relation to the amount of fecal matter which has found its way into the milk; increase depends upon the temperature and time. Up to a certain point all the several groups of bacteria increase in a fairly regular ratio; then when a degree of acidity is reached the colon group may remain stationary or diminish, but in no case has it been observed to entirely disappear even from the sourest milk and cream. Temperature plays an important part in the development of all the groups of bacteria found in the milk, and the more nearly the body temperature is reached, the greater their multiplication. The converse is true; the lower the temperature, the less the bacterial development. There is a larger pro-

portion of samples of market milk which contain colon than is found in water, but on analysis it will be found that the contamination is not so heavy as in the winter months. This is shown in the following table, where the percentages of the colon bacilli present to the extent of 1,000 per c.c. and over are charted in periods of three months each, together with the average temperature of the milk and the mean daily temperature for the same time.



Now when the analyses are grouped, and in one group is placed those analyses showing less than 1,000 colon organisms per c.c., and in the other 1,000 colon organisms and over, some curious and suggestive figures in percentages can be made. If the number of the colon group be now divided by the total bacterial content, the good milks, that is to say, those with low colon content, show a coefficient .0001 or less; whereas the group having a large colon content either proportionately or numerically has a coefficient .001 or more.

Such coefficients have been constructed from the averages taken for the same years and groups of months, as for the colon percentages which are shown in the following table:

	JANUARY		MARCH		JUNE		SEPTEMBER	
	Good	Bad	Good	Bad	Good	Bad	Good	Bad
1911.....	.0006	.05	.00025	.02	.000015	.009	.0002	.029
1912.....	.00005	.002	.00008	.003	.0001	.009	.00033	.002
1913.....	.00002	.005	.000026	.0052	.00001	.008	.00002	.002
Average for 3 years .....	.000037	.019	.000026	.0094	.000015	.009	.000024	.011

Here it is shown that there is present on a general average, 1 colon bacillus in the good milks to each 50,000 organisms, while in the bad milks there is present 1 colon bacillus to each 555 organisms.

This rule works out quite evenly for the 3,000 samples which have been examined during the past three years, and it is believed will be a fairly good guide in determining how the milk has been treated.

The streptococci content shows wide variations, but as a rule, where the colon content is high, the streptococci content will also be high, but not in the same proportions as for the colon. In some cases streptococci are present in great numbers, and when this is the case, the cause is usually found to be a diseased udder. The streptococci present may also come from the intestinal canal. No coefficient has been worked out for the streptococci, but where the streptococci are present in 100,000 or more, taken together with a large colon content, it is *prima facie* evidence that the milk has been contaminated with fecal matter and in generous quantities.

The colon coefficient has not been found of much service in determining the condition of the container for milk, particularly when the total number of bacteria reach enormous numbers. In this case the coefficient might show just the same percentage as for good milk.



Nor is this method applicable to an imperfectly pasteurized milk, in which the colon content, if present, has been almost entirely killed. A milk subjected to the pasteurizing process which has not killed the colon content has not been perfectly pasteurized. Just as long as the colon group is present, there is no assurance, if disease organisms were previously present in the milk, that they will not continue there, for the germs of diphtheria, tuberculosis, typhoid fever, dysentery, require the same degree of heat or a little more to kill them than do those of the colon group.

Unfortunately, there has arisen a false notion among some milk producers, some milk dealers and others, that any kind of milk can be rendered pure and safe by pasteurization. Attempts are being constantly made to do this, not for preventing the milk conveying disease, but for keeping the milk in a salable condition for a longer time. A milk of a high bacterial content, and particularly one containing a large colon content, is extremely unsatisfactory to pasteurize, and the difficulty increases in proportion to the size of the bacterial content. On the other hand a good milk of low bacterial content is easy to pasteurize, and this is the only kind of milk that should be subjected to the process. Milk with an extremely high bacterial content should not be pasteurized, *but boiled*.

I am strongly of the opinion that cleanliness in the production is the most important of all factors entering into the milk problem, and every means should be taken to insure cleanliness there consistent with the economies of the milk supply. Keeping the colon group to a minimum requires cleanly methods at the place of production, and during transportation and distribution. When we find the colon bacilli absent, or in extremely small numbers in raw milk, we can rest assured that we are dealing with a clean milk. By the employment of a standardized Endo Medium for isolating the colon group, their presence or absence in milk at any stage of the journey from the producer to the consumer can be demonstrated with ease and certainty.

The identification of the colon group in market milk is a matter of the greatest importance in determining the degree of cleanliness of such milk, and should be generally employed as an index of purity.

### DISCUSSION.

MR. HENDERSON. I would like to ask the doctor what he determines a typical streptococci. Two elements in a chain, or six elements?

DR. KINYOUN. I never think about counting the streptococci unless it has at least six and eight or more chapters. Now, I didn't make the statement in regard to streptococci in general. I recognize there is one closely associated in infectious meningitis which has a typical form. We have been simply as a matter of convenience classifying those with a plus mark because they more nearly resemble the streptococcus and the udder will frequently be inflamed, so we connect it with the inflammatory condition of the udder. But take the other form of streptococcus which is so commonly present in the intestinal tract mentioned most in the paper. I found it invariably in the intestinal tract of calves.

DR. KINYOUN. I made a test of all the pasteurization plants in Washington and I told them it was not for the purpose of getting up any data at all, that I wanted to see exactly how they managed things from the time the milk arrived until sent out to the consumer. So we started around, much to their discomfort, three of us, and there is always somebody wanting to fight. After we got done I said "When we get these results all charted out I want you to come up and have a heart to heart talk over the matter, and if there is any way I can help you I want to do it." And one fellow says, "Do you want to see me now about that pasteurizing?" "Come in. Sit down." He says, "I want to tell you to your face that I don't believe in them charts." I said, "Sit down and we will just talk these

things over. Here is milk that comes in and counts 140,000 bacteria, and it goes through your mixing tank and centrifugalizer, heating tank and passes all the way through," and I put down all the data and temperatures, "and it finally went over your cooler and came down with nine or ten thousand bacteria per c.c., I think, about ten thousand, no colon, no streptococci. Then there was a twelve foot pipe line over to your fillers in which it picked up one hundred and sixty thousand bacteria and ten thousand colon." And he says, "Blank that nigger, he told me he cleaned that pipe." I said, "Still you don't believe in sanitation."

*"It is within the power of man to cause all germ diseases to disappear from the world."—Pasteur.*



## WHAT HAS THE DAIRY AND MILK INSPECTOR DONE, AND WHAT CAN HE DO, TO INTEREST CONSUMERS IN THE PURCHASE OF BETTER MILK?

DR. JAMES O. JORDAN, *Inspector of Milk*, Boston.

To present the subject assigned with any degree of success, recourse must be had to former conditions as compared with those of today. We are prone to complain, and with some degree of justice, that there is lack of interest from consumers over this milk problem, but what we really mean is that insufficient attention is given to the subject, for by comparison of the past with the present, the facts demonstrate conclusively that there is keen desire on the part of many milk users to procure this product only when produced and handled under commendable conditions.

Returning to the "looking backward" theory, history would show that the only thought given to the question by most householders, even within a few years, was that of expectation that all milk was subjected to some form of tampering, either by watering, skimming, or coloring, or combinations of these forms of fraud. It must be admitted that there was much foundation for this belief. The chalk and water method of manufacturing milk was often advanced by the unthinking public in those days, but at the present time this nonsensical idea is so neglected that it has almost been forgotten. What is the present viewpoint concerning the chemical constituents of milk? It does not need a canvass of public sentiment to demonstrate that in communities where milk inspection has been carried on vigorously for a long period of years, most consumers believe that they are receiving milk from dealers without any dilution or abstraction of its chemical constituents. In justice to milkmen it should be stated that there is foundation for this sentiment on the part of the people, and the former are to be commended for what they have done toward making this attitude possible.



It cannot be said, however, that this has brought contentment with the quality of the product from other standpoints and with the methods of its handling. In fact, the infant, "interest in the milk problem" is becoming a lusty prodigy, and ample proof of this is almost daily furnished by those whose duty it is to receive personal, written, and telephonic complaints from consumers. What is the trend of thought in relation to these matters? A wide range is covered, and a partial list includes inquiry for sources of clean milk in which the authorities have confidence; complaints as to the lack of keeping qualities; the presence of dirt, flies, and similar foreign substances; uncleanliness of bottles, caps, and even of the carrying cases for holding bottles while upon the wagons of dealers; and the public is so critical and observant that complaints have been registered regarding the filling of milk bottles by dealers upon their wagons in the streets.

Now these objections, of whatever nature, are justified for the most part, and are the direct results of the efforts of the authorities and of public spirited individuals, who have given generously of both time and money to proclaim the advantages of clean, fresh milk. Here, too, the aid of those pioneer milk producers and dealers who have had the courage to provide supplies of this high grade product in advance of a stable market must not be overlooked, for without this co-operation the advance of the present day would not have been possible.

The leverage which has brought this new era was milk inspection in the various cities and towns, first from the standpoint of chemical constituents of the product. This was later followed by bacteriological oversight. These were subsequently supplemented by dairy inspection, which was shown to be a necessity by the examinations to which the product was subjected after arrival at the point of delivery. Milk inspection was the foundation stone of these campaigns for improved supplies, and from it have sprung the educational movements of which the present public interest in this question is a result.

While, as before mentioned, the zeal displayed by consumers in the matter of "better milk" is not as great as is desired, it must not be forgotten that this subject of clean supplies is one of comparatively recent origin. Under these circumstances has not much, rather than little, been accomplished? Careful analysis of the situation points to the conclusion that officials and others have been expecting greater returns in the way of co-operation from consumers than was justified, considering all of the circumstances and the difficulties which surround problems in which human frailties are involved. The public is not unwilling to be led to better things, provided no increased cost is involved, and this latter forms a vital feature of the present question. It is not an insurmountable obstacle, however, as demonstrated by the sentiment and backing already secured, and from which the future promises still greater returns.

Briefly, then, the present situation is one of having gained a degree of public support, and of providing supplies of clean milk more than ample to meet the demand. This interest is not confined to the large centers where the milk problem has been uppermost for several years, for the effort put forth under these last mentioned circumstances has made itself felt throughout the land, so that in the remote country districts the subject is not only discussed, but dealers and producers are found transacting business under improved conditions. These changes have resulted from the agitation which this matter has already received, and is a state of affairs begetting encouragement, as it points to increased future interest and a lessening of many of the present difficulties.

A few illustrations emphasizing growth in the sale of milk of the higher grades are worthy of mention. In a city of more than 700,000 inhabitants one firm commenced in 1909 the sale of milk equivalent to the inspected quality, handling at first one hundred quarts daily, and increasing at the end of the year to three hundred quarts per day. At the present time this concern is selling over five hundred quarts of this milk daily, despite the fact that since the beginning of this traffic the price has

been advanced two cents per quart. Another company in the same city began the sale of certified milk in 1909, delivering about 268 quarts each day. Since that time there has been a slow but steady growth in the sale of this commodity, until now 376 quarts are being sent out every day. This firm also commenced handling a milk of the inspected grade in 1904, and since then a business has developed which calls for a supply amounting to 1,885 quarts each day. Here also there has been an advance in price in recent years. These facts indicate a market, and one certain to increase, for milk of the higher types.

For the future, the inspection policies of this period should be at least continued, and they should be extended along lines which promise the best results. The consumer must be made to realize that clean milk production involves additional cost, and that for this service both producer and dealer are entitled to, and must receive, adequate compensation, if supplies of the "better" quality milk are to be provided. Furthermore, increased attention should be given to greater publicity of bacteriological and dairy inspection findings, and efforts put forth to interest the consumer in these results, so that each purchaser may have an opportunity to know the character of the product sold by the dealer whom he is patronizing. Health departments would be doing a great public service by placing this information within reach of the people, and frequent bulletins presenting these results seem to promise good returns, where the service afforded by newspapers is unavailable. This feature has already been undertaken in some cities, and appears to be worthy of further extension.

The physician is an important avenue through which much public support could be secured. Some members of this profession have done and are performing yeoman and unselfish work in this direction for the benefit of humanity, but this does not hold true with the majority who follow this calling. Efforts should be made to enlist the services of a larger number of the medical fraternity in this crusade. With this accomplished, an

agency of superior worth will be at hand for placing the clean milk issue before the consumer in a most beneficial manner.

Exhibits, dairy shows, lectures and other means of attracting public notice to the advantage of better milk can be utilized to a greater extent. With the energetic fostering and promotion of these principles, a fuller measure of success may be achieved than that which has been attained up to the present time. It should be felt that the good beginning already secured promises much for the future. In this way the "better milk" can be made to be the milk of the years to come.

*"The real thing that we have to conserve in America is the American people, their energy, their elasticity, their originative power, their capacity to hope and to achieve."—Woodrow Wilson.*





THE ERADICATION OF BOVINE TUBERCULOSIS  
FROM HERDS FROM WHICH THE MILK  
SUPPLY FOR THE DISTRICT OF  
COLUMBIA IS DERIVED.

By J. J. KINYOUN, M. D., L. V. DIETER, Ph. D., and HULBERT YOUNG, V. M. D., of the Health Department of the District of Columbia.

Since 1895, when an act to regulate the sale of milk in the District of Columbia went into effect, the Health Department of the District has made an earnest effort to eradicate bovine tuberculosis from the herds from which our milk supply is derived. One veterinarian was employed as an inspector of dairy farms from that date until 1900, two from 1900 until 1902, five from 1902 until 1907, and six since that time. These inspectors not only examined into the conditions under which the milk was produced and handled, but also made physical examinations of the cattle at the time of each inspection.

Cattle condemned on account of tuberculosis as shown upon physical examination.

No. of cattle on farms.	Condemned.	Year.
15,930	137	ending June 30, 1903.
17,733	95	ending June 30, 1904.
16,166	90	ending June 30, 1905.
16,250	69	ending June 30, 1906.

The fact that tuberculosis was found so frequently by this method of examination led to the belief that approximately 25 per cent of the cattle on farms in our milk producing districts were probably tuberculous.

During April, 1907, the officials of the Bureau of Animal Industry, United States Department of Agriculture, detailed a veterinarian to apply tuberculin tests to herds the owners of

which would agree to either effectually quarantine or kill under their inspection all reacting cattle, to have infected premises suitably disinfected, and to thereafter submit their herds to a test annually. During the six months following this offer, 941 cattle in 55 herds were tested in the manner above outlined with 159 reactions. Twenty-two of these herds were, however, found to be free from tuberculosis.

The offer of the Department of Agriculture was given the widest possible publicity by our inspectors of dairy farms and largely on account of that fact 79 herds were submitted for test during the next year, with the following result:

Cattle Tested.	Reacted.	Per cent tuberculous.
2,251	284	17

Of these, 670 were animals now undergoing their first annual retest, with a loss of but 22, or 3 per cent.

On November 26, 1909, an order of the Commissioners of the District went into effect which required the tuberculin testing of all cattle within said District, if kept for breeding or dairy purposes, under the direction of the Health Officer or the Chief of the Bureau of Animal Industry. The Department of Agriculture arranged for the compensation of the owners of condemned cattle, and during the year following the issue of this order all cattle within said District were tested, with the following results:

Cattle Tested.	Reacted.	Per cent tuberculous.
1,708	324	18.96

These animals were all slaughtered under inspection and visible lesions of tuberculosis were found in 98.36 per cent.

Partly by reason of the demand thus created for tested and passed cattle in a neighborhood where few animals were bred, partly by reason of the progressive spirit shown by many of the herd owners in the neighboring States, and lastly by reason of an amendment to the regulations for the government of dairies and dairy farms requiring that all cattle on farms

for which applications were received for permission to send milk into the District after October 1st, 1910, should be demonstrated to be free from tuberculosis by the application of an official tuberculin test, the number of cattle submitted to a tuberculin test during the next few years showed a remarkable increase. On June 30, 1913, 6,993 of the 18,294 cattle which supply milk for consumption in the District of Columbia were tested within the period of one year preceding that date, with but 4.7 per cent of reactions.

At the time of the promulgation of the amendment to the regulations above mentioned, October 1st, 1910, it was proposed to require all cattle on all farms to be tested. This was modified to require such test of new herds only on representations to the Commissioners that the legislatures of each of the neighboring States would not meet for a period of two years and that at that time an effort would be made to have appropriated a sum with which to reimburse the owners of reacted cattle. At this time, there still remained, however, a number of herds in which clinical cases of tuberculosis had been found all too frequently, and the owners of which refused to have their cattle tested under *any* conditions short of a full reimbursement for all reacting animals. Most of these herd owners were fully apprised of the existence of this disease in their herds and were willing to rid their farms of clinical cases by physical examination only. The Department was thoroughly convinced that there were many other infected animals in these herds which could not be apprehended by physical examination. Further, it could not require these herds to be tested under existing law, nor could it prohibit the shipment of their milk product into our District except upon the presentation of *absolute* proof of the exposure of said milk supply to infection by tuberculosis. Therefore, samples of the milk were collected, under proper precautions, from those herds in which clinical cases had been found with greatest frequency, and injected into guinea pigs.

Results of tuberculin tests of herds, the milk from which was found to contain living virulent tubercle bacilli, upon guinea pig inoculations.

Herd No.	Cattle Tested.	Reacted.	
(D. L. B.)	41	27	
(R. R. M.)	56	17	
(Mrs. S.) herd sold; not tested.			
(C. T.)	136	83	
(D. & C.)	26	13	
(J. B. D.)	57	11	
(L. R. C.)	68	58	
(P. Est.) herd sold; not tested.			
(J. H. R.)	62	31	
(G. A. W.)	47	41	
(C. G. W.)	50	36	
(T. L. J.)	25	1	
(C. T. H.)	26	1	
(J. B. O'S.)	43	1	
(R. O'S.)	17	5	
(A. & McD.) herd sold; not tested.			
(A. C.)	38	24	
(E. L. G.) to be tested Oct. 22-25.			
	692	349	Per cent of tuber- culous cattle. 50.4

#### SUMMARY.

In no case where living virulent tubercle bacilli were found in the milk from a herd did we fail to find tuberculous cattle in said herd by both the tuberculin test and post mortem examination.

These results of the inoculation of the milk from individual herds and the tuberculin tests which have followed positive results demonstrate, also, that even the careful clinical examination of cattle does not exclude all nor even a large percentage of the open cases of tuberculosis among the cattle so examined. Not only had all of the cattle which were subsequently tested on account of the presence of tubercle bacilli in the milk from the herd been repeatedly examined clinically, but in one instance the herd had been examined on the day preceding the test without finding a single clinical case. Possibly this was due to the fact that 25 cattle had been sold from the herd about two weeks previous to this examination on account of being unthrifty or unprofitable. The tuberculin test of this herd revealed the presence of 58 reactors of the 68 animals so tested. Fifty-one of these tuberculous animals were slaughtered under inspection within the week following the test, 44 cases of local and 7 of generalized tuberculosis being found, the carcasses of the latter being tanked.

The accuracy of the subcutaneous tuberculin tests was again demonstrated in that nearly all of the reacting animals in the herds mentioned were slaughtered under inspection within two weeks following the test, and in every such case visible lesions of tuberculosis were found.

In several cases, even where the tuberculin test subsequently showed the herd to be composed of 70 per cent or more of tuberculous cattle, as many as twelve consecutive inoculations were negative. In one case, although the first ten inoculations were all negative, the four following were all positive, nearly all of the pigs showing generalized tuberculosis. It is evident, therefore, that several successive negative results should not be accepted as evidence that the milk from a herd is free from virulent tubercle bacilli.

Naturally, as we desired to first eradicate tuberculosis from the herds thought to be most infected by that disease, all inoculation work was first confined to milk from such herds. A ref-



erence to the results of the tuberculin tests of these herds in the milk product from which tubercle bacilli were found, will show that nearly all of the badly infected herds were the ones which gave the first positive results. This table also shows that the percentage of tuberculous animals in the herds recently tested has decreased remarkably as compared to our earlier results.

The publicity given the work incident to a positive inoculation test, with the suspension of the permit to market the milk product in our jurisdiction, the tuberculin test of the herd, etc., has, in several localities, resulted in the voluntary tuberculin testing of several other herds on adjoining farms. In fact, in one instance, upon being apprised of the fact that we were collecting samples of milk from his shipment for guinea pig inoculation, the owner of a herd of nearly eighty cows requested an immediate tuberculin test, and lost, thereby, fifty-six animals.

*“The care of the public health is the first duty of a statesman.”—Lord Beaconsfield.*

## MILK AND THE PUBLIC HEALTH.

DR. W. A. EVANS, Chicago.

I will review some of the measures employed for the control of the milk supply, and in reviewing those measures will speak from the standpoint of experiences obtained in administering the Department of Health of Chicago.

Perhaps the best contribution to the milk subject that we have is Bulletin 56, the joint work of the Department of Agriculture and of the Public Health service, and the title of that bulletin is "Milk and Its Relation to Public Health." The greater part of that text is taken up by and is given over to a discussion of the reasons why milk is of importance to public health. That is probably the best reason why it is not necessary that I should now speak of that phase of the subject at any great length. Milk may be a transporter of certain types of contagion that affect at times the human subject. Probably the most important of these is typhoid fever. Also of importance are diphtheria and scarlet fever and septic sore throat. In this classification also we should group some part of the milk borne tuberculosis that affects the human subject and results from the infection of milk by human tubercle bacilli. In addition to that group of infections, we have those diseases of the cow that are at times conveyed to the human subject by reason of the use of infected milk. Of these there is no question at the present time as to the importance of the tubercle bacilli. A few years ago this subject was in controversy. There were a number of years in which it was possible for men who were well informed to hold the position that milk borne tuberculosis, particularly where the infection of the milk was from the cow, was of no particular consequence. Immediately after this position had been taken, a series of investigations were undertaken by different groups of investigators acting independently. One of those was the

German commission, another the British commission, and a third, the Health Department of New York City.

The conclusions arrived at by these three commissions are practically the same. For instance, it was found that tuberculosis in New York City in infants was of the pulmonary type, as is the case in adults, and under those circumstances that a large part of the infection was a human tubercle bacilli infection; that a considerable part of the tuberculosis in children somewhat older than infants was of glands and bones, and the great bulk of the glandular and bone tuberculosis was due to tubercle bacilli of the bovine type. As a collateral contribution to this evidence that the children who were fed on milk contracted bone and lymph gland tuberculosis, it was noted that the children who were at the breast were shielded from bovine tuberculosis, as also were the children who were on pasteurized milk.

Now as the result of this evidence and the experiences, in part clinical and in part laboratory, of the German investigators, of the English investigators, and of the groups of investigators in this country, particularly Park in New York City, I think it can be held to be well established that bovine tuberculosis is transferable to the human subject; that you have infections with both bovine bacilli and with human bacilli; that both types of infection are transported in milk and therefore from the standpoint of public health that milk borne tuberculosis is of consequence.

In addition to that group of conditions, there is the very much more important group of influences. By that, I mean those conditions of ill health that are brought about, not by reason of pathogenic bacteria that are being transported by milk, but by reason of chemical changes that are brought about in milk as the result of bacterial action. The group of deaths and the very large number of sick children that are made sick as the result of milk that is off quality, milk that is somewhat changed, makes this a very much more important aspect of the

subject than the conditions brought about by reason of the transportation of pathological bacteria in milk. The harm done by milk that is spoiled is infinitely greater than the harm done by infections introduced in or transported by milk.

I am aware of the fact that not all of the infant mortality rate or the infant morbidity rate is the result of bad milk. I am aware of the fact that there is need of critical analysis of the causative factors in infant mortality and infant morbidity; that there are a certain proportion of these sick babies that are sick by reason of the fact that milk is not a perfect food for that particular group.

There is a still larger group who are made sick by milk that is perfectly good, and good at the time that it is consumed, the fault resting not with the individual but rather with the quantity of milk consumed. We are likely to lose sight of the fact that in order to burn milk into tissue it is necessary to make a large amount of by-product; that when a baby is burning so much milk into tissue and is doubling or trebling its weight within twelve months, that it is incidentally making a great deal of heat and that it is not possible to convert this amount of nutriment into tissue without making a great deal of heat as a by-product; that during certain seasons of the year this heat fits very well into the physical or bodily economics and is quite an aid in maintaining bodily temperature. During the hot months the question of disposal of this great amount of heat with a relatively small radiating surface presented by the body of a baby becomes an important one, and it is seriously argued in certain quarters that a considerable part of infant mortality and infant morbidity is the result of heat stroke or some other form of heat manifestation and that, of course, for that group, the quality of the milk is in no wise responsible. But in addition to, and after you have subtracted from the sum total of infant morbidity and mortality, all of those sick babies and dead babies that particularly belong in these several groups, you have left behind so large a number of infants and so much

of harm occasioned that this division of the field is far more important than any other.

I am sure that you think the most important element in the control of the milk supply is inspection. There are objections to and limitations of the advantages to be had from milk inspection. In the first place, there is no question whatever but that the standardizing of inspection that came about as the result of the substitution of the score card for the old system was of material service, not only in advancing milk inspection, but in advancing or improving the quality of milk. There are, however, objections to that card. The objection that is generally urged is, that the card as it now stands puts too much stress upon the equipment side, which is given 40 points, and too little stress upon the method side, which is given 60 points. There is no doubt at all about the validity of that objection. There is no doubt at all but that a man can produce milk that is of a high quality, that will have a low bacterial count, and that will have good keeping qualities, with an equipment that would score quite low on that score card. And there is no doubt, on the other hand, but that a man might have a score that on the equipment side would be very high indeed and yet the milk as he marketed it from that plant would be milk of a poorer quality. There is no question whatsoever but that in the last analysis methods are of greater importance in the production of milk than is equipment.

Now that we will all admit as an academic proposition, but the difficulty comes in in this, it is exceedingly difficult to score methods. You have to take the word of the man for a great deal of the scoring on the method side, because with the limited funds that milk inspection services now have, it is not possible for the inspector to be present constantly or for any considerable length of time, and in consequence if he started in to score methods, he probably would have to record his estimate of the methods in part as the result of conclusions of his own. There isn't any wholly satisfactory method of scoring methods



without having a very much larger inspection force than health departments are able to command at the present time. I am in favor of tuberculin testing, and yet you gentlemen know better than I do the shortcomings of tuberculin testing. You know how difficult it is, aye, how impossible it is with a community situated as is the average community to secure reliable tuberculin testing. The proposal to have this as a requirement, as a means of protecting the milk supply as against milk borne bovine tubercle bacilli is an academic proposition; it is not a practical proposition in this part of the country. There are a few communities that I know of in the United States where conditions are quite exceptional, and yet in the communities that have to do with at least ninety-nine per cent of the population it is an academic proposition. We are for it. We are working for it because we know that in the long run it is all important from the economic standpoint of the milk producer, and that it has got to be worked out if we are to have any long continuance of the milk supply. Yet, as a proposed method of guarding a community at the present time, it is scarcely worthy of consideration. Common law ordinances that require tuberculin testing either require pasteurization also, or else they give some sort of alternative. We know very well indeed that where we give the milk producer the alternative of tuberculin testing or pasteurizing, that our ordinance is not fully comprehensive, that those who supply milk that comes from tuberculin tested herds are not giving the community milk that is thoroughly protected against other forms of milk borne infection. We are willing to put something of a premium on milk from tuberculin tested cows, because the man who is intelligent and careful enough to have his cows tuberculin tested will probably be fairly careful in his efforts to see that his milk is not infected with typhoid or scarlet fever or diphtheria or septic sore throat. We occasionally have some milk borne infection transported by or borne by milk that has been pasteurized, the infection having been subsequent to the time of pasteurization, or the pasteurization having been improperly done.

The percentage of infections in milk of this character is not quite so great as the percentage of infection in milk that comes from tubercular cows, milk that has not been pasteurized.

As the result very largely of the activities since 1898, the general consensus of opinion is that the most compelling procedure, the procedure that creates the greatest degree of safety, not only against milk borne infection but against spoiling milk and the effects of spoiled milk, including that very slightly spoiled milk that gives no warning of the danger that it carries, that the best guarantee against harm in this direction is pasteurization, and pasteurization properly done.

A number of years ago, the American Pediatric Society, as the result of hasty judgment adopted a resolution that pasteurized milk was harmful to the young infants that consumed it; that it was provocative of rickets and scurvy and perhaps certain other disorders. That resolution unquestionably represented the opinions of the clinicians present at the meeting, based upon feedings with pasteurized milk that had been pasteurized at a time when the study of the art was not nearly so advanced as at present; furthermore, their experiences had been with milk that had been pasteurized without competent control or supervision, pasteurized oftentimes by men who were pasteurizing over the protests of their departments of health. It was in those communities a sub-standard procedure, and any sub-standard procedure becomes an irregular procedure. That is to say, abuses of all sorts and kinds creep into every kind of sub-standard procedure.

When I came to study the question of a milk supply for Chicago, in the year 1907, it seemed to me to be impossible to secure a milk supply at a price that the people were able and willing to pay on any other basis than pasteurization. We undertook the fight for pasteurization at a time when the sentiment of the profession and that of the milk producers was antagonistic thereto. Those ordinances were passed in 1908, and practically every large city since 1908 that has taken a position

on the subject of milk has taken a position directly in conformity, with the provisions of that ordinance. I am aware of the fact that is not true of the small communities. It is not necessary that any such procedure should be adopted in a community where the milk is consumed before it is twenty-four hours old. It is not necessary that any such procedure should be adopted even in most communities where the milk producing farms are in such close proximity to the community that the consumer can easily supervise the production of his milk and supervision by the department of health is relatively easy. It is scarcely necessary that these methods should be adopted in those communities where it is consumed before it has obtained advanced age, and where there is a good deal of neighborly contact between the man who produces the milk, the man who markets it in town, and the consumer who makes use of it. Neighborly contact constitutes a very large element in the situation.

Proper pasteurization, it has been demonstrated, does not alter the chemistry of the milk, does not change its capacity to nourish an infant, does not result in the development of either rickets or scurvy. Investigations on this subject have been of two types. In the first place there have been laboratory investigations to determine the changes in the different constituents of milk brought about as a result of subjecting it to different degrees of temperature, and those have been supplemented by clinical observations on children fed on ordinary market milk of the usual character, market milk, some of which contained a good deal of dirt, some of which was fairly old, and some of which had been kept warm.

I remember when Dr. Park was talking on this subject in New York City that the papers the next morning contained enormous headlines that the health department of New York City had been poisoning the babies of that city by feeding them on low-grade, rotten milk. Now I don't know whether there is any newspaper man present in the hall tonight. For fear

that there should be, I am going to develop that side of it just a little. The milk that those babies received was milk of the quality that was customarily fed to babies by their mothers in those parts of the city from which those hospitals were drawing their babies. It is true it was pure milk. It is true that it was poisonous milk. But it was no purer and no more poisonous than the milk that was being fed to thousands of babies throughout the city of New York at the same time by the mothers of those babies.

Another group of babies were fed on pasteurized milk. The results of the clinical test were in conformity with the results of the laboratory tests. That is to say, the babies fed on pasteurized milk thrived better than those fed on the milk whose nutritive qualities had been lowered by the large bacterial count thereof.

There isn't any question, coming back now to my initial statement, but that the most effective of the procedures is pasteurization. I believe that I said enough to indicate that in my judgment, farm inspection, railroad inspection, and inspection of the plant in the town, however advantageous it may be, and it is enormously advantageous—from the standpoint of education of the farmer, from the standpoint of immediate improvement in the milk supply, it is advantageous and enormously advantageous—but after giving it credit for every bit of advantage that belongs to it, I believe that you are of the same opinion as myself, when I say it is not perfect enough and that with our present equipment of inspectors it will never be perfect enough to stand as the only procedure, to stand as the only method to be made use of by departments of health for the protection of the milk supply for the people in the city. It should be used, it should be developed infinitely beyond its present state of development, but I don't believe it will ever come to the point of development where it will be possible to use it as the only method of protecting the people of a community.



I have also said that I do not believe that tuberculin testing will ever be perfected enough to be the only method of procedure. I think the fact is self-evident and that it need not be developed further. I do not believe that pasteurization will ever be developed to the point where it can be safely relied upon as the only method of procedure. I think the majority of us who have lived in cities long enough have noticed that the injunction to the householder to boil the water has never sufficed to take the place of community protection of a water supply. I think that we are very generally of the opinion that the protection of a community water supply must be by community action and that individual advice and individual effort, however persistently it may be given and however carefully it may be followed out, has never sufficed to end typhoid fever or water borne diseases, or will ever suffice to end them. There are thousands who believe, and I think rightly, that milk is of infinitely greater consequence from the baby health standpoint than is water. When we by improving a water supply reduce the deaths from typhoid fever we reduce the deaths from other diseases at a rate three times as rapid. I think that this proportion as regards milk would be even greater still. There is no question about it when we compare the harm done by milk in transporting types of contagion with the harm done by milk that is somewhat off as a food, the harm done by milk indirectly with what you might call the harm done by milk directly, that the proportion is more than three to one. Those who argue along this line speedily arrive at the conclusion that if it has been demonstrated that the control of water or the merchandising of water is necessary for the protection of the public, and therefore is a proper exercise of the people's power, that it is just as true and more true of milk; and some have proposed that the merchandising of milk should be taken over in its entirety by the community; and then others have proposed that they should go to this length, that the milk should be gathered at central stations and that it should be pasteurized in those



central stations; or that in other words this procedure that experience has demonstrated to be so efficacious in the production of the milk supply should be a community procedure, that they should pasteurize in the bottle, and perhaps then leave the ordinary milk merchant to the prosecution of his trade. I don't know whether that will ever come about or not, but if it ever does, it will not be for a considerable length of time. Until it does come about, we will have a large number of individuals pasteurizing milk, some pasteurizing in the country, and some pasteurizing in the city; some pasteurizing by holding processes, and some by flash processes, some pasteurizing in the bottle, and some pasteurizing in bulk, and handling the bulk milk after it has been pasteurized. At least so long as these methods prevail, the pasteurization of milk, however great an advance it may be over the procedures that preceded it, will not be perfect enough to stand by itself, it must be supplemented by an inspection of the farm, and inspection of the carriers, an inspection of the premises of the dealer, the person of the milk merchant. There are, of course, other advantages that must not be lost sight of. We must not lose sight of the fact that the milk must be produced right on the farm even though it is to be pasteurized.

Now, I believe that I have gone far enough to develop the idea that is in my mind, and that is this: We have a number of methods of controlling the milk supply. Each has its advantages, and each has its particular field in the matter of milk control. Each has its limitation, and each has its shortcomings, and none of them is developed to the point, and in all probability none of them ever will be developed to the point where it can be used to the exclusion of all other methods.

It is impossible with our methods of inspection to properly supervise the man in the field, to properly take the results as they are recorded on his score card, or in other ways. It is impossible properly to take the man who does tuberculin testing in the field, and you gentlemen know a good deal better

than I do of the abuses that creep into tuberculin testing. It is impossible properly to control, to inspect pasteurization. In consequence it becomes necessary that we should add to each of these methods a method by which some man in the central office may cast his eye over the field, and may discover breaks with a view of running those breaks back to the point where they originated, and to the man who was responsible for the break. There is the requirement that the milk shall be produced clean, and one of the ways of determining that it has been produced clean is the dirt test, perhaps the most valuable of all tests that have been devised, but subject to a very serious objection, and that is that the dirt can be removed, leaving behind the bacteria that went into the milk with the dirt. In the prevailing methods of adjusting milk the dirt is commonly removed. It wouldn't be natural for that method to stop, however, with the dealer. The farmer who delivers the milk to the dealer and watches the dealer remove the dirt therefrom, when the can is transferred from the dealer back to the farmer will make use of the same method, or, in other words, when the dealer begins to work the dirt test at his factory, and to demonstrate the amount of dirt to each farmer who brings milk into the factory, it speedily follows that the farmer adopts the same method of removing the dirt that the dealer adopts at the factory. And that is a very great objection to the practical application of the dirt test in grading milk as the result of a dirt test or a series of dirt tests.

There is the requirement that milk shall be dated and that the container shall set forth the age of the milk; yet you know how exceedingly difficult it is to demonstrate that requirement and make it an administrative matter; how easy it is to shift the date label on a bottle of milk and how easy it is to have the milk appear younger than it really is.

Another requirement is that the milk shall be kept at a low temperature, chilled immediately upon being drawn from the cow and maintained at a low temperature on the farm. From

there it is transported to the depot, if it is being transported into town, and then it is sold by the milk merchant around the town, and yet you know how exceedingly difficult that is as an administrative measure. You know if you are to judge by the temperatures taken of milk how you would have to multiply manifold the number of inspectors that you now have. You all know before these things can be relied upon that you have got to come to the condition that prevails in the inspection of meat, conditions under which no milk producing plant of any sort or kind would be allowed to start operation until the milk inspector had taken his place at the side of the milk vat, that they could only run when he was there individually to see each operation, and that when he read the mercury he would put the Government seal on the milk vat; and how would you hang and draw and quarter anybody that broke that seal?

It is not possible and perhaps it never will be possible to reduce to a commercial basis milk inspection as meat has been reduced, to gather together the production of milk in centralized plants, and therefore it becomes necessary that to this group of procedures there should be added another procedure, and that procedure the bacterial count, by which the man in the laboratory might determine the experiences through which the milk has traveled. This proposition that a bacterial count should be adopted has met with opposition; the type of opposition and the source from which the opposition comes, neither of these differs materially from the type of opposition and the source of opposition when it was proposed to apply practically another standard to milk, and that was the chemical standard.

When the proposition was made that we should cease talking about yellow milk, that we should cease talking about rich milk, and that we should reduce our requirements and expressions to numerical instruction, when we should see that the amount of butter fat should be 3 per cent, or 3.2, or 3.5, as

the case might be, and that the amount of solids not fat should be something else, there was the same type of opposition. It was mentioned that it would work injustice on individuals, that it would ruin business, that the men who were producing milk were not chemists and that in consequence they would sell milk that was illegal in thorough good faith, believing that it was legal milk, that they had no way of tracing the milk back to the cow that had produced it, and that in consequence they had no way of knowing that the farmer would not the night before take off a little cream, and perhaps take off a little too much, and they had no way of knowing even that the cow was a producer of milk poor in butter fat; that in consequence of these circumstances and numerous other circumstances a man who intended to be honest, and who was trying to use intelligence to do just the right thing would fail; that it was not possible in justice and fairness to take this business that was an individualized business that was being conducted by large numbers of men, the great majority of whom had had no technical training, that it would not be possible to make them conform to hard and fast chemical lines, just as at present it is claimed that if we were to reduce this vague talk about cleanliness, if we were to reduce this somewhat vague talk about sanitary standards, if we would move the thing on from the equipment over here to the milk itself and reduce that to matters of mathematics, that we would work injustice. Now, I believe that this step is just as necessary, just as essential as was the step taken a few days ago when we set a hard and fast numerical standard for butter fat and for solids not fat. I believe it to be more essential from the standpoint of public health, and just as essential from the standpoint of the welfare of the industry. The industry will advance according as it is standardized. The great difficulty with the milk industry at the present time is that it is not standardized from any standpoint. It is not commercially standardized and it is not standardized from the health standpoint. It is not go-

ing to make any material advance from the commercial standpoint until it is standardized, and when it is standardized, and when the standards are laid down and men conform thereto, there will be a survival of the fittest. The great majority of men will remain in the business, but there will be a certain group of men who, as Whitaker used to say, have no business in the milk business, never can be made to conform, never will know enough to produce milk that is decent, or milk that should be merchantable. The operation of such a standard as that will remove this group and presently, gentlemen, within a very few years they will be supplanted by a group of men taking their place who will be able to conform. It will work no particular hardship in any direction except on this particularly small group, and I believe in the position taken by Whitaker a number of years ago, that it will be better for the business as it will be better for the consumer when that small group of people are eliminated from the business.

*“Here comes a man of comfort whose advice  
Hath often stilled my brawling discontent.”*



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