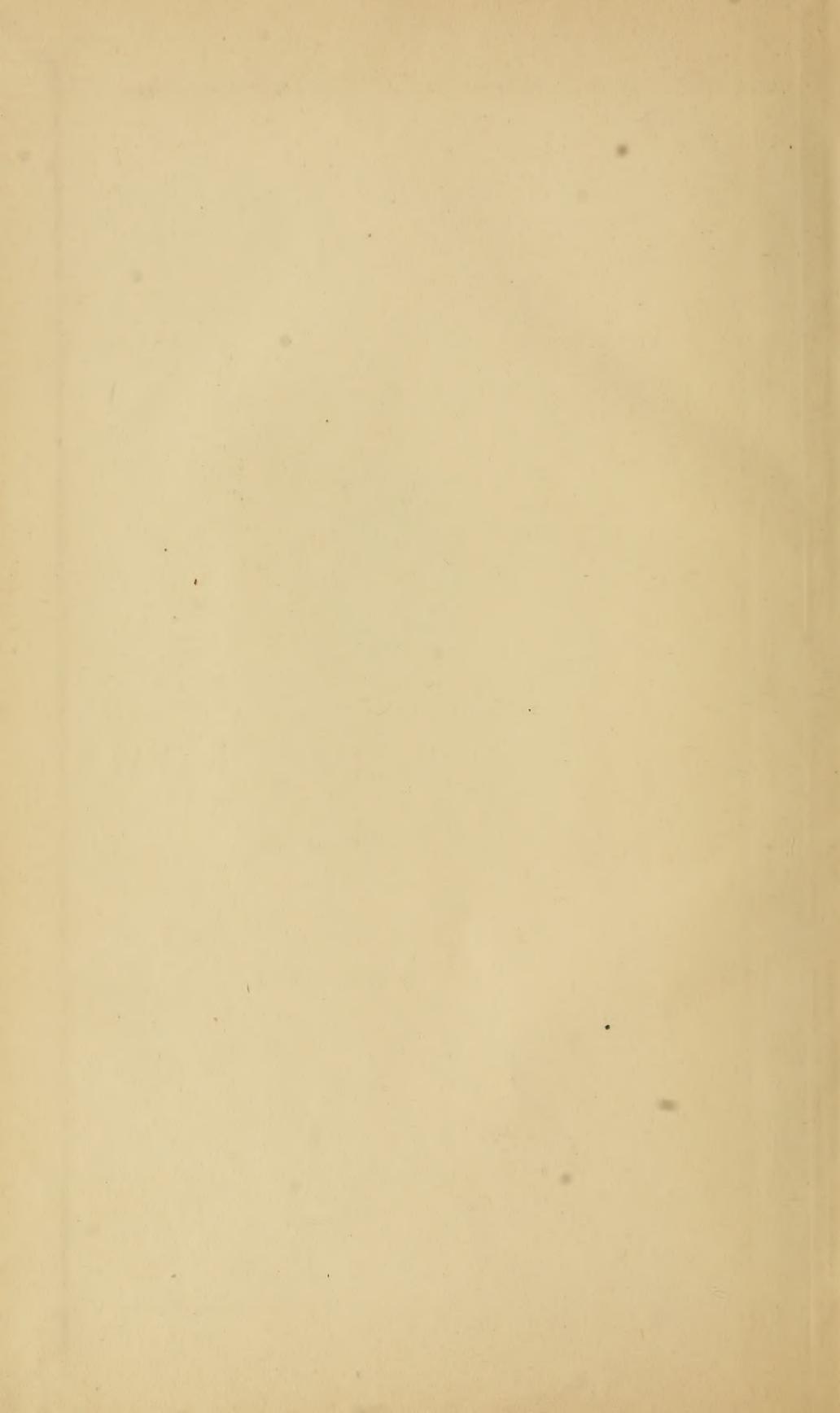


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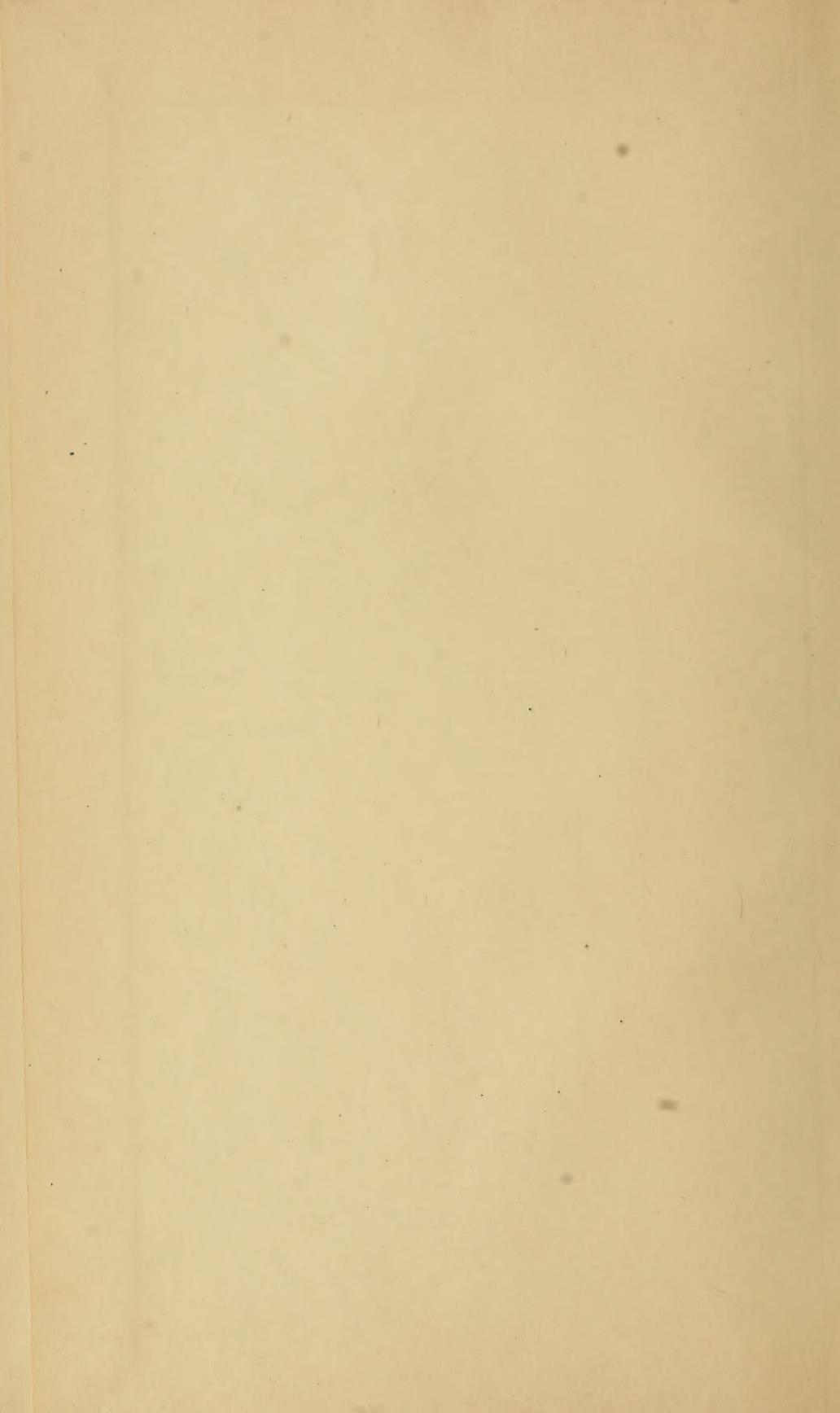
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REPORT OF  
A SPECIAL COMMITTEE

APPOINTED BY THE  
WASHINGTON CHAMBER OF COMMERCE

TO INVESTIGATE

THE MILK SITUATION IN THE  
DISTRICT OF COLUMBIA

---

PREPARED BY

J. LOUIS WILLIGE

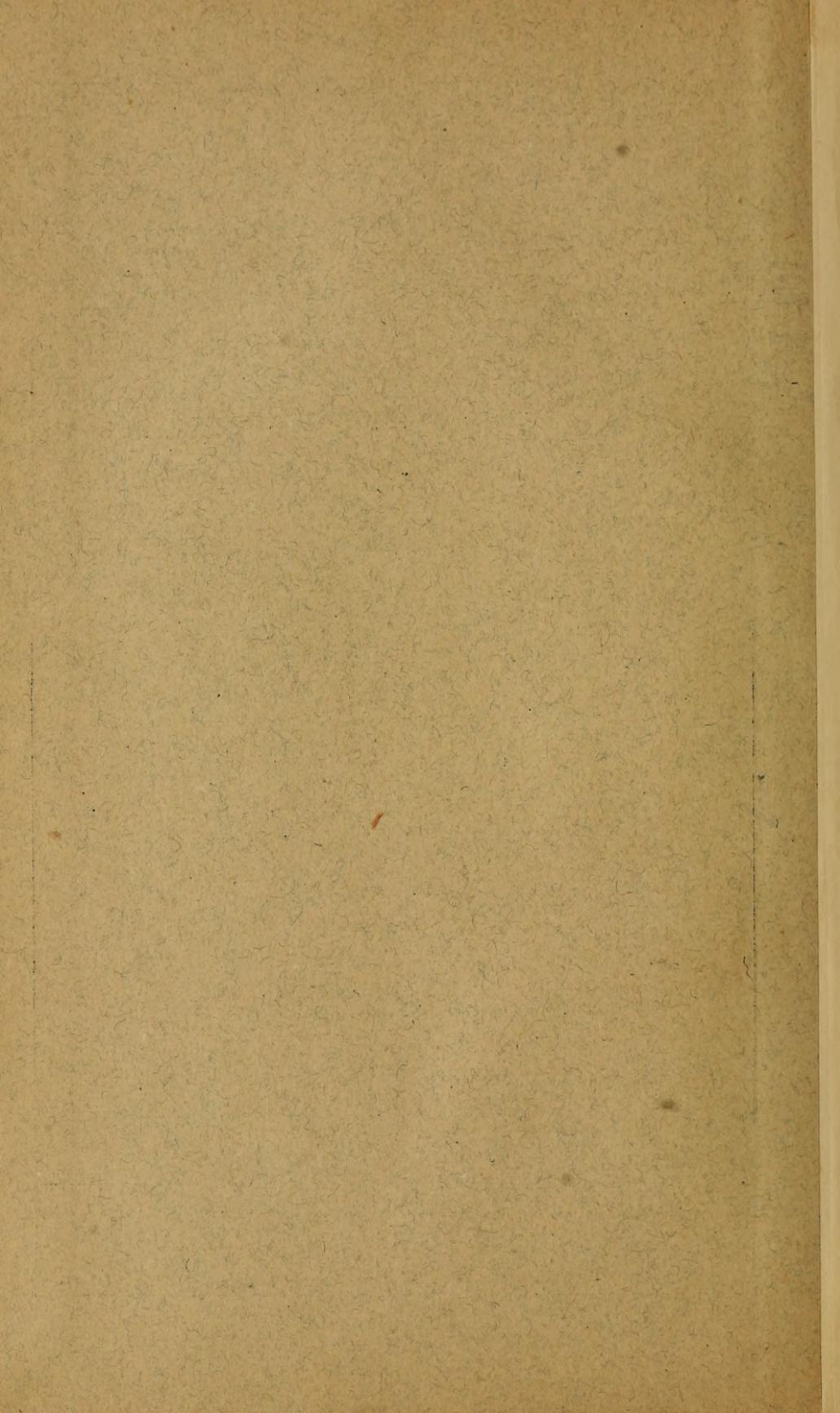


PRESENTED BY MR. GALLINGER

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MARCH 3, 1911.—Referred to the Committee on Printing

WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1911



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A SPECIAL COMMITTEE

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D.C.  
WASHINGTON CHAMBER OF COMMERCE

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TO INVESTIGATE  
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PREPARED BY  
J. LOUIS WILLIGE



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## LETTER OF TRANSMITTAL.

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THE WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C., January 31, 1911.*

SIR: I have the honor to transmit herewith the manuscript of a report submitted by a special committee appointed by the Washington Chamber of Commerce to investigate the milk situation in the District of Columbia.

The report was presented to the chamber at a special meeting held January 30, 1911, and received its approval.

In pursuance of a recommendation embraced in the report, it is transmitted herewith with the request that it be printed as a Senate document, and its recommendations, so far as applicable to the District of Columbia and pertinent to the Federal powers for regulating interstate commerce, embodied in suitable legislation.

In view of the comprehensive and valuable nature of this report, and its timely interest, it is hoped that steps may be taken for its prompt publication as an official document.

Very respectfully, yours,

THOS. GRANT,  
*Secretary.*

HON. JACOB H. GALLINGER,  
*Chairman Committee on the District of Columbia,  
United States Senate, Washington, D. C.*



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## REPORT OF SPECIAL COMMITTEE APPOINTED BY THE WASHINGTON CHAMBER OF COMMERCE TO INVESTIGATE THE MILK SITUATION IN THE DISTRICT OF COLUMBIA.

### I. INTRODUCTION.

At a meeting of the Washington Chamber of Commerce held October 11, 1910, the following resolution was adopted:

*Resolved*, That a committee of five be appointed by the chair to investigate the milk situation in the District of Columbia and report forthwith to the chamber.

Pursuant to the terms of this resolution, the following committee was appointed by the president of the chamber: J. Louis Willige (chairman), George W. White, Benjamin W. Guy, Thaddeus C. Dulin, and William D. Hoover. It was determined at the initial meeting of the committee to arrange for a series of public hearings, to which the representatives of the dairy and dairy-farming interests, the railway transportation companies, and the general public should be invited. Meetings for this purpose were held in the chamber rooms on October 21 and October 25, 1910. Mr. A. S. Trundle and Mr. Corbin Thompson appeared before the committee as special representatives of the Dairymen's Association of the District of Columbia, Maryland, and Virginia, and W. A. Hartranft, president of the association, and Messrs. W. A. Simpson and J. W. Castle, members, also gave testimony before the committee. Mr. John Thomas, president of the Milk Producers' Association of Maryland, Virginia, and the District of Columbia, was unable to be present at the meetings of the committee on account of illness. Dr. William C. Woodward, health officer of the District of Columbia, and Dr. G. Lloyd Magruder, a member of the Medical Society of the District, also appeared before the committee.

The committee, at the suggestion of the honorable the Secretary of Agriculture, held a conference with the officials of the Bureau of Animal Industry of that department on October 28, 1910, which was participated in by the following-named gentlemen in charge of the several divisions of the bureau, in addition to Dr. A. D. Melvin, chief of the bureau, whose patience and courtesy, as well as that of the other gentlemen named, is hereby acknowledged with the thanks of the committee:

- Dr. A. D. Melvin, Chief of Bureau of Animal Industry.
- Dr. A. M. Farrington, assistant chief of bureau.
- Dr. John R. Mohler, Chief of Pathological Division.
- Dr. R. W. Hickman, Chief of Quarantine Division.
- Dr. E. C. Schroeder, Superintendent of Experiment Station.
- Mr. B. H. Rawl, Chief of Dairy Division.

Mr. L. A. Rogers, in charge of research laboratories, Dairy Division.

Dr. George M. Whitaker, in charge of market-milk investigations, Dairy Division.

With a view to eliciting information from individuals qualified to speak with authority on the subject of milk production, transportation, and distribution, as well as with regard to the relation of milk to the public health, series of categorical questions were addressed to the health officers of the leading cities and towns of the United States; the Milk Producers' Association of Maryland, Virginia, and the District of Columbia; the Dairymen's Association of the District of Columbia, Maryland, and Virginia; large milk producers supplying the New York market; the Nathan Straus Pasteurizing Laboratory, New York City; the White Cross Milk Co., of New York, and of Baltimore and Washington; Dr. T. Alexander Geddes, of Kensington, Md.; certain local milk dealers; and the following-named specialists, eminent in their professions and of national and even international reputation, on the subject of sanitary milk production and the relation of the milk problem to the conservation of the public health:

Dr. Hermann M. Biggs, general medical officer, department of health, New York City;<sup>1</sup> Dr. Henry L. Coit, Newark, N. J.; Dr. Rowland G. Freeman, of New York City; Dr. Samuel McC. Hamill, Philadelphia, Pa.; Dr. Mazyck P. Ravenel, University of Wisconsin, Madison, Wis.; Dr. William T. Sedgwick, Massachusetts Institute of Technology, Boston, Mass.; Dr. Theobald Smith, Harvard University, Cambridge, Mass.; Dr. William H. Park, New York City; Dr. Samuel C. Prescott, Massachusetts Institute of Technology, Boston, Mass.; Prof. Victor C. Vaughan, University of Michigan, Ann Arbor, Mich.; Prof. Frank F. Westbrook, University of Minnesota, Minneapolis, Minn.; and Dr. C. E. A. Winslow, College of City of New York, New York City.

A similar series of questions was addressed to the following:

The Secretary of Agriculture; the Surgeon General United States Army; the Surgeon General United States Navy; the Surgeon General United States Public Health and Marine-Hospital Service.

Information in response to the same questions was solicited also, by correspondence, from Borden's Condensed Milk Co., New York City; Mr. Stephen Francisco, Montclair, N. J.;<sup>1</sup> the Sheffield Farms-Slawson-Decker Co., New York City; the Bureau of Municipal Research, Philadelphia, Pa.; Mr. George M. Oyster, jr.,<sup>1</sup> Mr. E. L. Cockrell, and the Walker-Gordon Laboratory, of Washington, D. C.

Among those to whom the committee is indebted for facilitating its investigations should be mentioned Mr. Oliver T. Newman, of the editorial staff of the Washington Times.

A copy of the series of questions is submitted herewith (Appendix A), as also a list of the individuals and establishments to which the inquiries were addressed (Appendix B).

Letters were also indited to the presidents of the steam railway companies entering Washington, and, for purposes of comparison, to the New York Central & Hudson River Railroad Co., asking for information concerning the possibility of installing adequate refrigerator-car service, the cost of refrigeration, and other information

<sup>1</sup> No response received.

concerned with the transportation of milk. Copies of these letters and the replies are subjoined (Appendix D).

Inquiries concerning the cost, etc., of pasteurizing machinery were addressed to the following concerns: Dairy Machinery & Construction Co., Shelton, Conn.; Creamery Package Manufacturing Co., Chicago, Ill.; A. H. Reid Co., Philadelphia, Pa.;<sup>1</sup> Miller Pasteurizer Co., Canton, Ohio.<sup>1</sup>

The committee appends a copy of its letter (Appendix E), addressed on November 28, 1910, to President Thomas, of the Milk Producers' Association of Maryland, Virginia, and the District of Columbia, inviting an expression of the sense of the association as to whether the dairy farmers supplying milk to the District are receiving their proper share of the proceeds of the sale of milk and milk products, and whether the adoption of a uniform standard throughout the year of prices to be received by the producers was feasible; also as to what effect compulsory pasteurization, the general application of the tuberculin test, and the insistence on a temperature below 50° F., would have on the prices asked by the dairy farmer for his product. No reply has been received in response to this inquiry.

A letter was addressed to the Chief of the United States Weather Bureau, asking authoritative information concerning the winter temperatures in this locality for some years past.

The committee has examined with scrupulous care the responses received to the letters of inquiry (Appendix C), and has scrutinized with diligence the publications presented to its attention by various persons interested in the subject under investigation. A list of these publications is annexed (Appendix F), also copies of laws, ordinances, rules, regulations, etc., concerning the production and distribution of milk in certain American municipalities (Appendix G).

The committee, in obtaining accurate and reliable data upon which to base its conclusions, has availed itself of the great advantage which Washington possesses in having in its midst the scientific staffs of the Public Health and Marine-Hospital Service, the Bureaus of Animal Industry and Chemistry, of the Department of Agriculture, and of the Offices of the Surgeons General of the Army and Navy. On these several staffs are many specialists and investigators who have attained universal recognition as the result, partially at least, of their studies upon the relation of milk to the public health. The committee has embraced with enthusiasm this exceptional opportunity for fixing its views on the many subjects included in its inquiry. Such men as Melvin, Mohler, Schroeder, Rogers, Wiley, Anderson, Trask, and Kastle have, through their labors, contributed immensely to the world's knowledge of this important field of scientific and economic research.

The committee is indebted to Dr. George M. Kober, of this city, for much fundamental information gained from his paper entitled "The study of milk in relation to health and disease," published as early as 1896 under the auspices of the California State board of health, in which the subject is treated in an especially elucidatory manner. This article is elaborated by Dr. Kober in a communication<sup>2</sup> addressed by him in 1902 to the chairman of the Senate Com-

<sup>1</sup> No response received.

<sup>2</sup> Printed as Senate Document No. 441, first session Fifty-seventh Congress.

mittee on the District of Columbia, urging the necessity for the enactment of legislation to regulate the production and sale of milk and cream in the District of Columbia.

The committee has been favored with invitations from Mr. Nathan Straus to inspect the Straus Laboratories in New York City; also from Mr. S. M. Shoemaker, proprietor of the local Walker-Gordon Laboratory, to inspect his model dairy farm near Baltimore, Md.; and from Mr. Loton Horton, of the Sheffield Farms—Slawson-Decker Co.; and Mr. Herbert P. Carter, proprietor of the Manor Farm Dairy, at Arlington, Va., to visit their respective establishments. While it has not been feasible to avail of these invitations, the committee has profited by the valuable information and advice tendered by the gentlemen named.

The committee has been favored with several communications (Appendix H) from Mr. Carter, setting forth with intelligent detail the feasibility of establishing, by private subscription, a large dairy farm to be located, preferably, adjacent to the banks of the Potomac River near Mount Vernon, Va., with a view to supplying milk (raw, pasteurized, and modified) in large quantities for the Washington market. While the project may be a praiseworthy one and calculated to yield a satisfactory profit to its supporters, the committee feels that the consideration of this proposal is without the proper scope of its investigations.

An inspection of the White Cross milk plant, at Frederick, Md., was made by the committee, through the courtesy of the company. The committee was most favorably impressed with the cleanliness and orderly manner of the operations of this plant and with the enterprise of the company in installing the latest ingenious labor-saving and sanitary devices for the pasteurization, concentration, bottling, and transportation of milk.

The committee has also inspected the local pasteurizing plants of Mr. George M. Oyster, jr., and of the Straus Laboratory, and is firmly convinced of the excellent results achieved by these establishments.

At a public hearing before the Commissioners of the District of Columbia, held at the Municipal Building on October 20, 1910, there appeared, in addition to the representatives of the local milk dealers, Dr. A. D. Melvin, Chief of the Bureau of Animal Industry of the Department of Agriculture; Dr. John R. Mohler, chief of the Pathological Division of the Bureau of Animal Industry; Dr. E. C. Schroeder, superintendent of the Bethesda, Md., experiment station of the Bureau of Animal Industry, and Dr. John F. Anderson, chief of the Hygienic Laboratory of the Public Health and Marine-Hospital Service; also Mr. Herbert P. Carter, an independent milk producer and proprietor of the Manor Farm Dairy near Arlington, Va. Copies of the statements of these gentlemen at the hearing are appended (Appendix I). The testimony of the experts mentioned, which embraces the views of these recognized authorities down to the very date of the hearing, will be discussed in this report under the separate headings to which their remarks relate.

It may be stated that the Milk Producers' Association of Maryland, Virginia, and the District of Columbia was organized in 1903. It is an incorporated body, with a present membership of approxi-

mately 300. The number of dairy farmers engaged at present in the furnishing of milk to the District is reported to be 1,142.

The Dairymen's Association of the District of Columbia, Maryland, and Virginia was organized in 1895 under the designation of "The Milk Dealers and Producers' Association of the District of Columbia, Maryland, and Virginia." It is an unincorporated body, with a present membership of 22. It is estimated that there are engaged at this time exclusively in the dairy business in the District about 80 individuals, firms, and corporations, and that this number has diminished in recent years is accounted for elsewhere in this report (p. 20) by the fact that milk is now very generally sold by grocers and other storekeepers, and by the additional circumstance that the small dairyman with one or two cows has in many instances retired from business.

The committee avails of this opportunity to express its acknowledgments and its appreciation of the kindly reception of and hearty response to its inquiries, and the uniform courtesy shown the committee in conducting its investigations.

After full deliberation, your committee respectfully presents the following report of its investigations.

It may be prefaced that the committee in its deliberations has recognized the responsibility devolving upon it to exert its efforts as an integral part of the chamber of commerce toward giving the fullest consideration and protection to the mercantile interests represented, as affects not only individual members of the chamber itself, but also in general terms the commercial development of the District of Columbia, with the idea constantly in mind, however, that the considerations of public health are paramount to all others, and that the advancement of the material interests of the District in its civic aspects is equally a charge upon the committee by reason of a fundamental provision in the constitution of the chamber of commerce, which outlines, among the purposes of the organization, the promotion of "the general welfare of the citizens of the District of Columbia."

The committee has felt, furthermore, that it could not treat intelligently the complaints of the milkmen and the local milk situation generally without going somewhat fully into the consideration of conditions affecting the local milk supply and suggestions for its improvement. It has elaborated, somewhat at the risk of prolixity, the statement of its conclusion, being impelled to this course by the many ramifications of the subject, and by its appreciation of the lack of proper knowledge on the part of laymen generally not only of the dangers to be apprehended and avoided in the use of milk, but of the sanitary measures which are available for the purpose of eliminating these dangers and reducing materially the distressing and needlessly high rate of mortality resulting from milk-borne diseases. The committee feels ample justification, therefore, in presenting, as intimated, a somewhat more lengthy report than is customarily submitted to a business body, narrating in succinct form all the information of importance concerning milk which has come to it in the prosecution of its inquiry.

In presenting this information to the public the committee has, as a rule, refrained as far as practicable from incorporating technical matter and from rendering its report perhaps somewhat tedious by

the embodiment of statistical tabulations and detailed comparative statements. No attempt has been made, furthermore, to furnish illustrations, this desideratum being in its judgment adequately satisfied by consulting the splendid series of illustrations accompanying in most instances the publications referred to in Appendix F of this report.

## II. COMPLAINTS FILED AGAINST HEALTH DEPARTMENT, DISTRICT OF COLUMBIA.

### ITEMS OF COMPLAINT.

It has been charged by the representatives of the milk producers and dealers before the committee that the administration of the health department of the District of Columbia under the supervision of Dr. William C. Woodward, health officer, has been inefficient and unsatisfactory; that the regulations have been enforced without proper consistency and without the exercise of uniform courtesy and consideration on the part of inspectors of the department; that the inspectors of the department have not only been abusive in their conduct toward the dealers but have persecuted them and haled them into court without just reason; that a number of local grocers and other dealers have been permitted to dispense milk without license with the full knowledge and assent of the health officer; that the farmers of Pennsylvania, New York, and even of Maryland and Virginia, have been permitted, without license, to ship into the District of Columbia milk from farms which have not been subjected to inspection or other surveillance by the local health department; that the requirements of law with regard to the standards of milk, cream, and other dairy products are unnecessarily stringent and impossible of observance generally by the producer and purveyor of milk; that certain regulations promulgated by the health department, with the approval of the District Commissioners, are without authorization of law; that the contemplated insistence on the tuberculin test, the maintenance of temperatures not exceeding 50° F. from time of milking to delivery to the consumer, a prescribed bacterial content, and the compulsory pasteurization of milk derived from cows which have not been subjected, without reaction, to the tuberculin test, is entirely without legal justification and would result in a permanent milk famine in the District; that the requirements of the health department as to the amount of space, light, and ventilation in barns where cows are stabled should be amended so as to be less exacting where a small number of cows are maintained on the dairy farm; that the specification of concrete and granolithic floors for cow stalls is unreasonable and causes rheumatism among animals stabled in such manner; that many items in the score cards for rating dairy farms and dairies are unjust to the small producer or dealer and unnecessary (as, for example, the ratings allowed for the items of convenience and for washing, bottling, and capping machines); that the contemplated additional regulations, if put into execution, will greatly increase the wholesale and retail prices of milk, both in winter and in summer, causing a manifest hardship to the poor classes, who can not afford to pay the increased prices demanded, and consequently compelling the use of powdered milk and

other substitutes for raw milk, besides incidentally driving the small producer and dealer out of business; that the present and proposed regulations of the health department have, on account of their rigidity, served to greatly reduce the number of licensed dealers selling milk in the District of Columbia; that the infant-mortality statistics of the District are inaccurate and unreliable, the records showing in some instances a greater number of deaths than births within certain specified periods; that the health officer has, in violation of law, refused to issue permits to ship milk into the District, although the sanitary requirements have been complied with; that he has, without a scintilla of authority, cited members of the Dairymen's Association to appear before him and explain why milk claimed to have been sold by them contained excessive numbers of bacteria (this in the absence of any law or regulations specifying a given number of bacteria as allowable), and has threatened to have them summoned to court; that he has made misleading statements to the District Commissioners, as determined by the replies of the latter to complaints offered by the dairymen; that the policy of refusing to issue permits and summoning dairymen to court for having excessive numbers of bacteria in milk sold by them and the requirement of a compulsory tuberculin test will, if proceeded with, drive producers and dealers alike out of business or result in their shipping to other markets; and that the recent attempt on the part of the health officer, with the approval of the commissioners, to compel the application of the tuberculin test to all cattle (not only those within the District boundaries) from which milk is derived for local consumption, which contemplation has been deferred after recent conference with representatives of the producers, was without justification in law.

The complaints of the Dairymen's Association are partially set forth in the appended letter from A. S. Trundle, chairman, dated November 20, 1910 (Appendix J).

#### FINDINGS OF COMMITTEE.

Referring specifically to the complaints lodged by the representatives of the Dairymen's Association, the committee finds that the administration of the health department, under the supervision of Dr. Woodward, health officer, has been unusually efficient and satisfactory; that the inspectors appointed to the service have been competent and capable of discharging their duties with satisfaction; that any lack of patience or courtesy on the part of inspectors has been quite exceptional, and that tact and diplomacy have been customarily exhibited in the execution of their responsible duties; that dealers have not been persecuted by the health department or summoned to court without reasonable cause; that local grocers and other merchants are neither required nor expected under the present law, which is expressly applicable to dairies only, to obtain a permit from the health department as a prerequisite to dispensing milk in the District; that the present and proposed requirements of law with regard to the standards of milk, cream, and other dairy products offered for sale in the District of Columbia are not unreasonable and impossible of observance, but tend, in the judgment of the committee, to afford that full degree of protection which should be provided for the public health; that such regulations as have been promulgated

by the commissioners with respect to the production and sale of milk are, in the opinion of the committee, clearly within the authority vested by law; and that the regulations, as at present in force, recognize a distinction in the amount of space, light, and ventilation to be provided in barns according to the number of cows stabled therein.

On the other hand, the committee is clear in its belief that, unless washing, bottling, and capping machines and other apparatus be uniformly insisted upon, no demerit should be recorded against the small dealer not possessing these appurtenances.

#### USE OF CONCRETE FLOORS.

In order to arrive at an intelligent conclusion on the subject of the use of concrete floors in stabling cows the committee invited an expression of opinion from health officers throughout the country. Approximately 75 per cent of those responding to its inquiry consider the stabling of cows in this manner practicable, though in several cases the necessity of this requirement is questioned. Since, according to Dr. Woodward, there is no objection to laying a wooden or other floor over the concrete and of using such clean bedding as may be desired, the committee perceives no proper objection to the sensibleness of this sanitary precaution, and is supported by the authorities consulted by it in the view that stabling in this manner does not tend to cause rheumatism in the animal. Dr. Levy, chief health officer of Richmond, Va., observes that there is no tendency to cause rheumatism if proper bedding be used. He states:

We have concrete floors in nearly every cow barn in Richmond and have had no complaint whatever of injury to the cow.

The health officer of Seattle, Wash., adds:

We have as healthy stock as there is in the world, and many of our stables have concrete floors.

#### EFFECT OF PROPOSED CHANGES ON THE PRICE OF MILK.

In regard to the claim adduced by the producers and dealers that the proposed changes in existing regulations, including the insistence on the tuberculin test, the maintenance of low temperatures and pasteurization, would greatly increase the price of milk, both in winter and in summer, rendering the purchase of this commodity impossible by the poorer classes, the committee is of the opinion that an increase beyond 10 cents per quart is not likely to ensue, which price, in the judgment of the committee, will not prohibit, nor even curtail to any considerable degree, the liberal and abundant use of milk by the poorer classes. The committee is confirmed in this belief by the fact that milk answering all of these requirements is now furnished at less than 10 cents per quart by at least one local concern, apparently at a profit, and by at least two others at that figure, and there is no reason to believe that a maximum price of 10 cents per quart for milk ordinarily supplied will not suffice to effect such an increased compensation per gallon or per pound to the farmer as will enable him to meet the added requirements of the health department, not only without loss to himself, but with a fair profit.

The effect which may be anticipated on the price of milk is, it can not be gainsaid, a most important consideration in the solution

of the problems affecting our milk supply, for while the conservation of the public health is a prime desideratum, the committee must, as practical men representing the material interests of the community, give heed to the necessity of keeping milk within such limits of price as will not make its use prohibitive and result in greater distress and mortality from starvation, especially of infants, than may fairly be estimated to ensue from disease-breeding contamination of the milk. Careful scrutiny has, therefore, been exercised by the committee in ascertaining so far as practicable in advance, the likely effect upon the sale price of milk of insistence on the various requirements conducing to the establishment of a pure milk supply. A detailed analysis of this item by Dr. Woodward, our local health officer, leads to the conclusion that, viewing the matter in the light most favorable to the producer, the increased cost of providing milk from tuberculin-tested cows should not amount to more than a small fraction of a cent per quart. The Chief of the Bureau of Animal Industry ventures the assertion that such requirements should not actually increase the cost, adding that in the city of Washington milk which practically conforms to these specifications is now being sold at only 1 cent per quart over the price of common market milk. Dr. Goler states that, except with regard to pasteurization, the carrying into effect of these restrictions has had no influence on the price of milk in Rochester, and ought to have none anywhere. President Thomas, of the Producers' Association supplying milk to the District, maintains that there would probably be a raise of 50 per cent in the retail price of milk. In the opinion of some authorities, any increase would be of only a temporary nature, while Dr. Wells, health officer of Montclair, N. J., offers the thought that "in any trade, a good article brings more than a poor one."

According to Dr. Woodward, the price paid to the dairy farmer for milk sold in the District of Columbia during the past five years has been practically unchanged at from 14 to 16 cents per gallon for the summer months and 20 to 22 cents per gallon for the winter months. During this period the consumer has paid 32 cents per gallon in the summer time and from 36 to 40 cents per gallon in winter. Certain milk regarded as "special" is sold at 40 cents per gallon throughout the year.

Dr. Woodward expresses the belief that the farmer is probably not receiving his proper share of the retail price obtained for milk. It may be presumed, however, he states, until evidence to the contrary is shown, that as long as farmers continue to produce and sell milk they are finding it profitable to do so.

Dr. Woodward is of the opinion that the elimination of diseased cows from dairy herds resulting from the application of the tuberculin test, and the necessity for purchasing sound cows to replace them, would doubtless for a while justly result in an increase in the cost of milk, though not a substantial increase. He reasons that the only item in the cost of milk production which would be affected would be the amount disbursed for healthy cattle to replace diseased stock. It is essayed by him that it costs no more to feed, house, and care for a well cow than for a sick one.

In view of representations by producers before the committee to the effect that they are not receiving under present conditions a

fair share of compensation for their product, the committee has discussed the feasibility of establishing a uniform standard of prices to be paid to the dairy farmers, similar to the arrangement which obtains generally for retail milk in this locality. It is believed, however, that, owing to the marked competition and to the importance attached in recent years by dairy farmers to securing ratings exceeding those reached by their competitors and the consequent premiums customarily paid for milk conforming to such higher standards, it is not practicable to endeavor to fix a uniform scale of prices which would be acceptable to the farmers and which would in practice be adhered to by them. Health Officer Woodward doubts very much whether the farmers in this vicinity are sufficiently well organized to render the fixing of a uniform standard for the wholesale price of milk feasible.

#### AUTHORITY FOR HEALTH REGULATIONS.

It has been contended, as previously stated, by the representatives of the Dairymen's Association that the attempts on the part of the District Commissioners to issue regulations governing the production and sale of milk in and for the District of Columbia, in the absence of specific legislation, have been without authority of law. As already set forth, the committee believes, as the result of its examination into this phase of its investigations, that such regulatory orders as have been issued have been entirely within the rights of the commissioners, and the courts have uniformly sustained this view. The committee is inclined to the opinion, however, that in order that there may be no question as to the authority back of regulations promulgated by the health department, it would be well to secure the specific approval by Congress of such modifications of large importance as may be regarded by some as perhaps revolutionary in their effect upon the local milk industry. The committee refers especially in this connection to the proposed enforcement of the tuberculin test, compulsory pasteurization, and the maintenance of temperatures below 50° F.

The committee has not deemed it requisite to expend any considerable amount of energy in considering the legal aspects of local milk regulations, for it may be assumed that the Congress will, in its wisdom, provide by suitable legislation such safeguards as may be required for insuring to the residents of the National Capital a clean and wholesome milk supply.

It may be observed in passing that the reasonableness of the ordinary requirements advocated in recent years for the regulation of the milk supply of communities throughout the United States has been the subject of litigation, notably in Minneapolis, Minn., and Milwaukee, Wis., in both of which jurisdictions the courts have recognized the reasonableness of the tuberculin test and have upheld the contention that bovine tuberculosis is communicable through milk contamination to human beings.

#### DELAY IN ISSUANCE OF PERMITS.

In defense of the objection that the health officer has been dilatory and has discriminated in the issuance of permits to dairy farms operating under the temporary authority conferred by the act of March 2,

1895, pending action on formal applications for license to ship milk into the District of Columbia, Dr. Woodward explains that such delays have been due to the fact that it has come to be clearly demonstrated and generally recognized that milk from any herd that has not been tuberculin tested is dangerous to the public health unless effectually pasteurized, and that while, in his judgment, the applicants in such cases have complied substantially with the requirements of the District laws and regulations, he does not feel, in the absence of authority and means to apply such tests, that the applications should be rejected, but has taken the position that action thereon should be suspended pending the adoption of some general measure looking toward the compulsory tuberculin testing of all cows supplying milk to the District, and the alternative compulsory pasteurization of milk from all cows not so tested.

The appended statement, furnished by the health department (Appendix K), shows that the number of permits in force June 30, 1905, for maintaining dairies in the District of Columbia was 285; 179 applications having been received since that date to the end of the fiscal year closing June 30, 1910, and 95 permits having been granted in response to these applications. The number of licensed dairies (not dairy farms) in the District on June 30, 1905, was 140,<sup>1</sup> as opposed to 58 at the close of the fiscal year ending June 30, 1910. On the same date, namely, June 30, 1905, 102 permits for maintaining dairy farms in the District were in force, 80 applications for this purpose having since been received, 28 of which were approved. The number of licensed dairy farms located within the boundaries of the District on June 30, 1905, was 102, as compared with 52 on June 30, 1910. On June 30, 1905, 974 permits were in force for bringing milk or cream into the District, 1,485 additional applications having been received during the subsequent five-year period and 325 permits granted.

By referring to the health officer's letter of November 23, 1910 (see Appendix K), it will be observed that milk was produced and shipped into the District of Columbia from 918 farms during the fiscal year 1905-6, as opposed to 1,091 farms in the fiscal year 1909-10, showing an increase of 178 farms, a percentage of 18.8 in five years. The number of licensed dairy farms at present furnishing milk to the District of Columbia is 1,142.

In addition to the farms in Maryland, Virginia, and the District of Columbia furnishing milk for local consumption, some shipments, particularly of cream, are received from farms in Pennsylvania, New York, and New Jersey. The dairy farms in Maryland and Virginia shipping milk to Washington are under the direct surveillance of the District health department, and are subject to periodic inspection. It has not been possible, however, with the funds available for the purpose to inspect farms in Pennsylvania, New York, and New Jersey, which latter are, however, supplying milk to the District without license, by virtue of a provision in the act of March 2, 1895,

<sup>1</sup> From the number of 285 licenses extant on June 30, 1905, should be deducted those issued to 102 dairy farms (it being customary to issue dairy licenses also to dairy farms) and 43 importers' permits (which were similarly included at that time)—that is to say, permits issued to dairy farmers outside the District of Columbia for shipping milk into Washington. From the remaining number of 140, stated in the text, should be deducted also a number of grocery and other establishments which have since surrendered their permits, an interpretation of the act of March 2, 1895, allowing such establishments to dispense milk without permit or license.

which authorizes the shipment of milk upon the filing of an application with the health department and pending action thereon.

It may be observed, therefore, that the proposed amendments to the regulations governing the production and sale of milk have not tended to reduce the number of dairy farmers shipping milk into the District. The decrease in the number of local dairies (not dairy farms) operated under permit from the health department is attributable to the fact, stated by Dr. Woodward in the hearings before the committee, that milk is sold at present much more extensively than before by grocers and other storekeepers, who are not required under the law to secure a license or permit for this feature of their business. The health department maintains no record of the number of merchants (not dairymen) purveying milk in the District of Columbia. It is estimated, however, by Dr. Woodward, that milk is sold at 2,000 establishments.

#### EXTENT OF DISTRICT MILK SUPPLY.

According to the estimate of Health Officer Woodward, 19,000 gallons of milk are sold daily in the District of Columbia. It is reported by him (see Appendix K) that the number of cows on dairy farms supplying milk to the District of Columbia for the fiscal year 1905-6 was 16,250, which number had increased for the fiscal year 1909-10 to 17,688.

#### REASONABLENESS OF RAILWAY TRANSPORTATION CHARGES.

So far as the committee has been able to ascertain, the existing rates charged for transporting milk and milk products to the Washington market are reasonable, and are not the subject of complaint on the part of producer, dealer, or consumer.

#### USE OF PRESERVATIVES.

It may be noted with satisfaction that the use of preservatives has seldom been detected in the examination of milk supplied locally to the District of Columbia, and it is believed that this pernicious practice is rarely, if ever, indulged in by our local dealers.

#### FEEDING OF BREWERY AND DISTILLERY BY-PRODUCTS.

With regard to the feeding of wet malt and other brewery products to dairy cows, Dr. Woodward states that effort has been made to restrict such feeding. The only brewery product, however, that is locally used for feeding milch cows, to the knowledge of the health department, is wet malt. This, it is believed, can be safely fed until it has begun to sour. The committee is cautioned by the health officer to bear in mind the difference between wet malt and other brewery products on the one hand and distillery waste on the other. Dr. Woodward is of the opinion that it has not yet been demonstrated that the feeding of fresh, sweet, brewers' grains has a prejudicial effect upon the milk of animals.

According to the testimony of officials of the Bureau of Animal Industry, the feeding of wet malt to cows has a deleterious effect upon the milk derived from them, though under certain prescribed condi-

tions this may be safely used to a limited extent. Brewery products other than wet malt are not believed to be injurious to the milk, especially if they are fed in dry form.

#### POSSIBLE MILK FAMINE IN DISTRICT OF COLUMBIA.

The fear expressed by certain interests represented before the committee that the insistence upon the tuberculin test, pasteurization, a prescribed bacterial count, and a temperature below 50° F. would have the tendency to create a temporary or permanent milk famine in the District is discounted by the statement on the part of most of the authorities consulted by the committee that, so far as the tuberculin test is concerned, if the movement be locally confined to the jurisdiction from which milk is presently supplied or if the test be gradually introduced there is no sensible reason for anticipating such an outcome from this source. The officials of the Department of Agriculture premise that if the test be suddenly and injudiciously enforced a temporary shortage in the milk supply would probably be caused. Ravenel proposes that time should be allowed for the farmers to adjust themselves to the new conditions. The District health officer is convinced that, under ordinary conditions, if the application of the test in the first instance be extended over a reasonable length of time, its enforcement would not diminish the local milk supply. This position is corroborated by the health officer of Atlanta, Ga., who informs the committee that such requirements are now being insisted upon in that city without an observable shortage in the supply. The State and municipal officers at Jacksonville, Fla., share the view that these requirements, if enforced slowly and with judgment, will result, if at all, in a milk famine of the most transitory character.

Dr. Hamill observes that the insistence upon the proposed requirements for the further regulation of milk production will not result in a famine, either temporary or permanent, unless the producers and dealers combine to create it. The chance of such a famine would, he states, be lessened by requiring the same standards for milk used for making butter as are prescribed for milk for general consumption in its raw state.

Dr. Woodward states that he can conceive of no reason why compulsory pasteurization should reduce the amount of milk daily supplied to the District.

It has been suggested before the committee that the extra feeding of animals, in addition to pasturing, during the periods of scarcity of milk, would serve to obviate, or at least to diminish substantially, the shortage resulting annually from drought and other perhaps natural causes toward the end of the summer months. The committee has not been able to obtain sufficiently definite information on which to base an intelligent conclusion regarding this suggestion.

It has, furthermore, been suggested in the hearings before the committee that the practice of farmers in this vicinity of breeding their cattle at a certain specified period of the year, with a view to providing calves for the market at a time when advantageous prices may be commanded for veal, is also responsible, to a limited extent, for the shortage in the local milk supply. The committee has not been able to establish that this practice is a material factor affecting the paucity of the milk supply.

Mr. Trundle, in his statement before the committee, ascribed the shortage of the local milk supply during the past few months to the unnecessary oppressiveness of the regulations of the health department and the expense of meeting its requirements (with the exception of the enforcement of the tuberculin test); to the harassment of shippers, the odiousness of inspection, and the unusually protracted period of drought.

As referred to elsewhere in this report (p. 20), it will appear, from an examination of the accompanying statement (Appendix K), furnished through the courtesy of Dr. William C. Woodward, health officer, that the number of cattle supplying milk on June 30, 1910, for consumption in the District of Columbia was estimated to be 17,688, and that upward of 19,000 gallons of milk and cream are daily consumed by the Washington public. The statement of the health officer, which embraces a compilation of the best available data on the subject, shows a gradual increase in the number of milch cows furnishing the District milk supply, though it must be admitted that the increment does not correspond with the increase in population. Suffice it to say, however, that the amount of milk furnished daily for local consumption has, with the exception principally of the period of exceeding drought prevailing in this section of the country during July, August, and September, 1910, been adequate to supply the normal demand, and this without an increase in price beyond 9 cents per quart.

#### MILK-INSPECTION SERVICE.

Mr. W. A. Simpson, in his remarks before the committee, criticized the health department for the method employed by one of its inspectors in using a long glass tube in withdrawing, by suction with his mouth from tanks or bottles, milk for purposes of examination, and contended that such method was not germ proof. The department, in response to this complaint presented in correspondence under date of May 12, 1910, explained that the method stated is used only when special circumstances call for it, and that as a general rule atmospheric pressure is relied upon to fill the tube and gravity to empty it. The department questioned the contamination, by the method complained of, of milk collected by a reasonably skillful inspector.

As an evidence of the tact and considerate treatment evinced by inspectors of the health department, it may be stated that during the fiscal year ending June 30, 1910, approximately 10 complaints were filed against inspectors in the dairy-farm and milk-inspection service, which latter service embraces 10 inspectors, showing an average of one complaint a year against each inspector, and even this remarkably small number of complaints has proved, upon investigation, to be based on insufficient grounds.

Dr. Woodward recommends that provision be made for a more general supervision, from a bacteriological standpoint, of the milk supply of the District, by allowing from one to four minor assistants in the bacteriological laboratory, together with necessary additional equipment. There should, he asserts, be provision for an assistant bacteriologist, with salary and prospects sufficient to command the services of a generally trained bacteriologist. An initial salary of

\$1,500 per annum is suggested by him. He strongly urges, in this connection, the provision of a competent officer of the health department to devote his entire time to the supervision of the food-inspection service, the salary of \$1,200 per annum available at present for this purpose being quite inadequate, in his judgment, to command the services of a properly qualified official.

With regard to the number of additional inspectors that could be utilized to advantage by the health department in connection with the proposed new regulations for the improvement of the local milk supply, Health Officer Woodward suggests that two additional employees would suffice to supervise from a bacteriological standpoint the milk supply. If all tuberculin testing is to be done by employees of the District government, three additional veterinary inspectors should, in his judgment, be provided, for the present at least. The number of inspectors required to supervise properly the pasteurization of milk would depend largely upon the number of pasteurizing plants to be established. The insistence upon all the requirements proposed in this report would necessitate from 6 to 10 additional inspectors to properly supervise the work.

The present force of inspectors of the health department assignable to dairy-farm and milk inspection is not adequate, according to Health Office Woodward, to compel proper compliance with existing regulations, and should the tuberculin test be mandatorily applied to dairy herds outside the District furnishing milk for local consumption, the capacity of the present force to effectually compel observance of the regulations would be still further diminished. It is understood that, with the present force of inspectors, each local dairy (not dairy farm) is subjected to official examination on an average of once in two weeks, the inspections being made purposely at irregular intervals. To be exact, the dairies in the District of Columbia (independently of those located on dairy farms) were inspected on an average 23.6 times during the fiscal year ended June 30, 1910. The dairy farms supplying milk to the District were, during the same period, inspected on an average 3.79 times each. The committee heartily recommends, therefore, that Congress provide a suitable increase in the number of inspectors to fully answer the requirements of this important public service.

#### FAILURE TO PROSECUTE CONSUMERS RETURNING UNRINSED BOTTLES.

It was further offered in evidence that the department has not prosecuted consumers returning bottles to milk dealers unrinsed, the bottles in many cases giving absolute evidence of having been employed for retaining coffee, tea, molasses, vinegar, paint, coal oil, gasoline, preserves, and other articles. In Appendix K to this report Dr. Woodward explains clearly and satisfactorily the reason why the health department has failed to prosecute persons other than dealers who have not rinsed receptacles for milk or cream before returning them to the dairymen. The regulations of the commissioners, dated April 21, 1903, expressly restrict their operation in this particular to persons who receive milk or cream for sale. The further circumstance is related by him that milk dealers having knowledge of such offenses have never appeared before the department to enter complaint against their customers. The department states that every

effort is being made to induce the consumer to return clean bottles to the dairymen.

#### LABORATORY FACILITIES OF HEALTH DEPARTMENT.

The committee is clear that the laboratory facilities of the health department should be such as to enable the making of analyses of samples of milk offered by producers and dealers or by consumers, a reasonable fee being charged for the purpose. In this way the dealer or consumer will be able to ascertain from time to time whether milk offered for sale is up to the standards prescribed by law and regulations.

It is understood from Health Officer Woodward that by virtue of authority newly contained in the appropriation act for the current fiscal year (approved May 18, 1910) the District laboratory is permitted to undertake the bacteriological examination of milk and other dairy products and of the water supplies of dairy farms. The appropriation act in question carries \$500 for the equipment and maintenance of this laboratory during the year ending June 30, 1911.

Though the lack of funds and adequate laboratory accommodations has greatly handicapped the work, the committee is convinced that the District health department has made an excellent showing with the limited facilities at its disposal. An examination of the present conditions of dairy farms contributing to the Washington milk supply affords ample evidence of this. Barns have been planned and located with forethought and consideration for the health of the cows and precautions against the pollution of the milk. Whitewash has been liberally applied, both interiorly and exteriorly, cement floors have been laid, and system has been observed in the milking and the subsequent handling of the product. A number of dairy houses have, at the suggestion and through the influence of the health department, been equipped with appropriate hot-water appliances and facilities for rapid cooling of the milk.

#### REPORTING OF COMMUNICABLE DISEASES.

No routine has ever been established by the local health department for procuring reports of communicable diseases among dairy farmers and their assistants shipping milk to Washington. The reporting of all cases of this nature occurring within the District of Columbia is, with but few exceptions, already required by law. Outside the District, however, cases of communicable disease are not reported to the health officer, whether occurring on dairy farms or otherwise. The employment in and about dairies and dairy farms of anyone who has been exposed to diphtheria, scarlet fever, erysipelas, smallpox, or other dangerous contagious diseases is, however, forbidden by law.<sup>1</sup>

#### SCORE-CARD SYSTEM OF RATING DAIRY FARMS AND DAIRIES.

The score card devised by the present health officer of the District, and which has been so generally adopted throughout the several States, represents the first systematic attempt to record in graphic

<sup>1</sup> See section 3, "An act to regulate the sale of milk in the District of Columbia," etc., approved March 2, 1895.

form the merits of the farms and dairies concerned with the Washington milk supply. The use of these cards has not been confined to our own country, the provincial board of health of Ontario, Canada, having, for example, recommended their adoption by all of the local boards of health in its jurisdiction.

The score-card system of dairy inspection, which has been objected to in some respects by the representatives of the local dairymen's association, is not new, this method of rating dairies and dairy farms having been introduced by Dr. Woodward as early as January 9, 1904, and having since, as stated, met with very general acceptance throughout the country. The system of scoring received the indorsement of the Dairy Division of the Department of Agriculture, which believed it to be useful in the improvement of the milk supply. A somewhat modified form of score card was prepared by the Dairy Division on July 1, 1906, having in view its general adaptability to all sections of the country. This form has been introduced and adopted in a number of cities, improvements having been made in the card from time to time, as indicated by practical experience. There is abundant proof that the score-card system produces immediate and permanently beneficial results wherever it is put in practice, it having been demonstrated, for example, during a period of six months at Richmond, Va., that the average score of 20 dairy farms increased from 33.4 to 56.8, showing an improved percentage of 23.4 in six months and furnishing an indication of the possibilities of improving dairy conditions through the score-card system. Copies of the score cards in current use by the District health department and those recommended by the Department of Agriculture are appended (Appendix L).

The score-card system of dairy-farm inspection has, since 1904, been introduced into 131 cities, the Department of Agriculture having even extended the use of the card to the rating of the sanitary conditions of renovated-butter factories throughout the country.

The relative importance attached to the items of equipment and methods prevailing on dairy farms and in dairies connected with the production and distribution of the local milk supply appears to the committee to be reasonable and calculated to stimulate diligent cleanliness and care in the handling of milk in its journey from the cow to the consumer. While the items embraced in the cards and the ratings assigned appear to the committee to be generally reasonable and appropriate, the committee is impelled to believe that the deduction from the score of the smaller producer and dealer on account of his inability or failure to provide certain machinery (such as bottling and capping machines) and to set apart in the perhaps limited space occupied by his establishment a separate room as a salesroom is unreasonable, and that unless these appurtenances be expressly required by law or regulation the system of scoring should be amended in this respect so as to rate the producer or dairyman according to the cleanliness of his actual equipment and of the methods which obtain in his handling of the commodity.

Since the adoption of the score card for rating dairies and dairy farms, there has been considerable diversity of opinion as to whether the rating should be based on an ideal condition which each dairy or farm might be hoped to approximate, or whether the rating should coincide with such a reasonable standard as might be expected to be

capable of actual attainment, considering the present status of the dairy industry. The committee is disposed without hesitancy to commend the present practice of our local health department, which fixes a reasonable standard, as opposed to an ideal standard of perfection. This attitude is assumed by the committee not only on account of the embarrassment and dissatisfaction which must obviously attend any endeavor on the part of the dairyman or producer to maintain his dairy or farm in accordance with idealistic requirements, but also the prejudicial effect upon the business of the shipper or dealer, and indeed the deception instilled in the public mind, when a relatively low rating is shown based on an ideal standard. It is, in the judgment of the committee, manifestly unfair to the farmer and to the city dealer that practically unattainable standards should be fixed.

#### PROPOSED INVESTIGATION OF HEALTH DEPARTMENT, DISTRICT OF COLUMBIA.

The committee takes pleasure in reporting that no valid reasons have been presented before it, nor has it been able to observe the necessity, for an investigation of the administration of the local health department as proposed by the Dairymen's Association. The department has, in its view, not only been conducted with the single aim of jealously guarding the health of the residents of the District of Columbia and lending an educational influence toward improved sanitary methods throughout the whole country, but it has, in the unanimous judgment of the committee, attained a remarkably high standard of efficiency under the unusually intelligent and energetic supervision of the present health officer.

#### ALLEGED EVIDENCES OF MILK TRUST.

Referring to the contention of the representatives of the milk dealers, both at the hearing before the District commissioners and before this committee, that a vast milk trust, backed by \$30,000,000 of capital, was endeavoring to gain control of the raw milk product of the country, the committee begs leave to state that it has been unable to find any evidence whatsoever of such a combination, nor has it transpired, as the result of its investigations, that any of the officials of the Federal or District Governments or others appearing in a private capacity before the committee have been controlled or influenced in any manner by the manufacturers of pasteurizing machinery or by other commercial interests. Dr. Melvin, chief of the Bureau of Animal Industry, perhaps facetiously remarks in this connection that the local milk dealers have an organization, but that this is not regarded as a trust or combination in the usual sense of those terms. Freeman may be quoted as saying that the Milk Exchange in New York fixes the price paid to the producer, and Winslow observes that there is some indication of such a combination in Boston.

Borden's Condensed Milk Co., which has been charged with perhaps monopolizing the condensed milk output, argues that a combination to control the raw-milk production or supply would be an impossibility by reason of the economic conditions surrounding the

production of milk, as each man producing milk is a unit in himself, and must therefore be reckoned with individually. The health officer of Seattle, Wash., expresses himself as follows on this score:

He sent one gentleman to jail for two months for conspiring with others to raise the price of milk some two years since; we believe that the milk trust collapsed at that time.

Dr. McNutt, health officer of San Francisco, Cal., reports that an attempt was made to control the raw milk production and supply of that city, but without success.

With regard to the attempted monopolization of the market for forms of milk other than raw milk, Dr. Melvin understands that one concern is believed to control a large part of the output of condensed milk, but states that the department is unable to furnish particulars, referring at the same time to the fact that other brands of condensed milk are also to be found on the market. The latter consideration does not, however, necessarily preclude the possibility that the various brands are controlled by one central agency. It is obviously, though, much more likely as a general proposition that condensed, evaporated, powdered, or other compositions of milk may be the subject of centralized commercial control than that raw milk might be so monopolized, it being quite as feasible in the judgment of the committee to combine the entire population of our country into a trust against the interests of the individual, as to attempt a control nationally of the output of raw milk.

#### CLASSIFICATION OF MILK FOR LOCAL MARKET RECOMMENDED.

An examination into the local demands for milk convinces the committee that the classification of market milk, proposed by Dr. A. D. Melvin, chief of the Bureau of Animal Industry, United States Department of Agriculture, and recommended by the Washington milk conference of 1907, is best calculated to answer the purposes for which milk is used in this community.

The classification referred to embraces (1) certified milk, (2) inspected milk, and (3) pasteurized milk. The requirements affecting these three grades of milk are set forth as follows:

##### CLASS 1. CERTIFIED MILK.

The use of this term should be limited to milk produced at dairies subject to periodic inspection and the products of which are subjected to frequent analyses. The cows producing such milk must be properly fed and watered, free from tuberculosis, as shown by the tuberculin test and physical examination by a qualified veterinarian, and from all other communicable diseases, and from all diseases and conditions whatsoever likely to deteriorate the milk. They must be housed in clean, properly ventilated stables of sanitary construction, and must be kept clean. All persons who come in contact with the milk must exercise scrupulous cleanliness and must not harbor the germs of typhoid fever, tuberculosis, diphtheria, or other infections liable to be conveyed by the milk. Milk must be drawn under all precautions necessary to avoid infection, and be immediately strained and cooled, packed in sterilized bottles, and kept at a temperature not exceeding 50° F. until delivered to the consumer. Pure water, as determined by chemical and bacteriological examinations, is to be provided for use throughout the dairy farm and dairy. Certified milk should not contain more than 10,000 bacteria per cubic centimeter, and should not be more than 12 hours old when delivered. Such milk should be certified by public health officers or by some other properly constituted authority.

## CLASS 2. INSPECTED MILK.

This term should be limited to clean raw milk from healthy cows, as determined by the tuberculin test and physical examination by a qualified veterinarian. The cows are to be fed, watered, housed, and milked under good conditions, but not necessarily equal to the conditions prescribed of class 1. All persons who come in contact with the milk must exercise scrupulous cleanliness and must not harbor the germs of typhoid fever, tuberculosis, diphtheria, or other infections liable to be conveyed by the milk. This milk is to be delivered in sterilized containers and is to be kept at a temperature not exceeding 50° F. until it reaches the consumer. It should contain not more than 100,000 bacteria per cubic centimeter.

## CLASS 3. PASTEURIZED MILK.

Milk from dairies which do not comply with the requirements specified for classes 1 and 2 should be pasteurized before being sold, and should be sold under the designation "pasteurized milk." Milk for pasteurization should be kept at all times at a temperature not exceeding 60° F. while in transit from the dairy farm to the pasteurizing plant, and milk after pasteurization should be placed in sterilized containers and delivered to the consumer at a temperature not exceeding 50° F.

All milk of unknown origin should be placed in class 3 and subjected to clarification and pasteurization. No cow in any way unfit for the production of milk for use by man, as determined upon physical examination by an authorized veterinarian, and no cow suffering from a communicable disease should be permitted to remain on any dairy farm on which milk of class 3 is produced, except that cows which, upon physical examination, do not show physical signs of tuberculosis may be included in dairy herds supplying milk of this class.

This milk is to be clarified and pasteurized at central pasteurizing plants, which should be under the personal supervision of an officer or officers of the health department. These pasteurizing plants may be provided either by private enterprise or by the municipality, and should be located within the city.

By the term "pasteurization" as used herein is meant the heating of milk to a temperature of 150° F. or 65° C. for 20 minutes, or 160° F. or 70° C. for 10 minutes, as soon as practicable after milking, in inclosed vessels, preferably the final containers, and after such heating immediate cooling to a temperature not exceeding 50° F. or 10° C.<sup>1</sup>

In addition to the requirements particularized, the committee indorses as appropriate the further precaution that no milk should be regarded as pure and wholesome which, after standing for two hours or less, reveals a visible sediment at the bottom of the bottle.

It has aptly been said that, while the primary object is to exclude all milk which may be harmful to the consumer and to provide milk that will be wholesome and nutritious, the restrictions imposed should not be more burdensome than is necessary to accomplish this result, and should be considered especially with reference to their effect in possibly so reducing the quantity of milk as to preclude its use as an article of diet by the poorer classes.

The committee strongly recommends that, in the case of hospitals, founding asylums, and other charitable institutions located within the District of Columbia, wholly or partly supported by public funds, the milk supplied for their use comply strictly with the specifications in the foregoing classification.

## III. GENERAL CONSIDERATIONS.

Since the functions of the committee were understood to embrace, in addition to a specific examination into the matters of complaint offered by the local Dairymen's Association, an inquiry generally

<sup>1</sup>Bulletin No. 56, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service, pp. 608 and 609.

into the conditions affecting the milk supply of the District of Columbia, the committee has proceeded to secure and to incorporate herein for the enlightenment and benefit of the Washington public such information concerning the subject of its investigations as may be deemed of practical importance in the solution of the great problem of providing an ample supply of clean, pure, and wholesome milk for this community.

#### IMPORTANCE OF MILK AS AN ARTICLE OF FOOD.

Cow's milk, next to bread, states Dr. Mohler, is the most important foodstuff of the people of the United States, and is used perhaps to a greater extent in this than in any other country. This general use is not confined to milk in its raw state and its almost universal employment as a substitute in the feeding of infants, but extends to its varied combination in cooked foods. This abundant use is perhaps due to the fact that milk contains all the essentials of a perfect ration, namely, proteids, carbohydrates, fats, inorganic salts, and water, and to the further fact that its facility of ingestion and comparative ease of digestion render it an important food for the sick and convalescent.

The essential importance of insuring to the community a supply of pure and wholesome milk is readily realized when we consider the fact that milk is more extensively used as an article of food than any other animal product. It constitutes a portion of the food of almost every person on practically every day of the year, and while, unlike many articles of diet, it is consumed in most cases in an uncooked state, it, as above indicated, enters very largely also into the cooked foods, in many of which it constitutes the principal ingredient. Milk should, therefore, when furnished for consumption in its raw or cooked state, be of good composition and free from adulterants and from artificial coloring matter.

Dr. Wiley, Chief of the Bureau of Chemistry, United State Department of Agriculture, takes exception to the expression "raw" milk, contending that the term "milk" means pure, fresh, clean, and properly handled milk, and that the prefix "raw" is unnecessary and discriminatory. It should be explained that the committee in preparing this report has made use of the term as a matter of convenience, to indicate milk in its natural state not subjected to pasteurization, condensation, modification, or other treatment. It will be understood, furthermore, that references to milk apply equally to cream, save where such construction is obviously inadmissible.

#### DEFINITIONS OF MILK AND CREAM.

The only regulations governing the production and distribution of milk and cream, under the power conferred by the Federal Constitution for regulating commerce with foreign nations and among the several States and with the Indian tribes, are those contained in the Standards of Purity for Food Products,<sup>1</sup> issued by the Department of Agriculture in pursuance of authority conveyed by Congress in the food and drugs act of June 30, 1906, as follows:

(1) Milk is the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture,

within 15 days before and 10 days after calving, and contains not less than 8.5 per cent of solids not fat and not less than 3.25 per cent of milk fat.

(2) Blended milk is milk modified in its composition so as to have a definite and stated percentage of one or more of its constituents.

(3) Skim milk is milk from which a part or all of the cream has been removed and contains not less than 9.25 per cent of milk solids.

(4) Pasteurized milk is milk that has been heated below boiling, but sufficiently to kill most of the active organisms present, and immediately cooled to 50° F. or lower.

(5) Sterilized milk is milk that has been heated at the temperature of boiling water or higher for a length of time sufficient to kill all organisms present.

(6) Condensed milk, evaporated milk, is milk from which a considerable portion of water has been evaporated, and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat.

(7) Sweetened condensed milk is milk from which a considerable portion of water has been evaporated and to which sugar (sucrose) has been added, and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat.

(8) Condensed skim milk is milk from which a considerable portion of water has been evaporated.

(9) Buttermilk is the product that remains when butter is removed from milk or cream in the process of churning.

(10) Goat's milk, ewe's milk, etc., are the fresh, clean, lacteal secretions, free from colostrum, obtained by the complete milking of healthy animals other than cows, properly fed and kept, and conform in name to the species of animal from which they are obtained.

#### CREAM.

(1) Cream is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains not less than 18 per cent of milk fat.

(2) Evaporated cream, clotted cream, is cream from which a considerable portion of water has been evaporated.

#### CERTIFIED AND INSPECTED MILK.

The terms "Certified" and "Inspected" have been aptly suggested (the former by Dr. Henry L. Coit, whose valuable work in promoting sanitary milk production is referred to elsewhere in this report) to describe grades of milk produced under special requirements intended to insure the greatest degree of purity and cleanliness.

Requirements for "Certified" and "Inspected" milk are set forth somewhat at length in a scheme of classification proposed by Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, United States Department of Agriculture, and heartily recommended by the Washington milk conference of 1907.<sup>1</sup> These requirements, especially as to "Certified" milk, have met with general acceptance throughout the United States, with some differentiation, however, as to the maximum number of bacteria allowable in various jurisdictions.

#### SOURCES OF CONTAMINATION OF MILK.

It is evident that in nature's scheme for the nourishment of the young milk was never intended to see the light of day, and that if suckled from the normal, healthy gland it is the perfect food for the offspring. In this natural method of nourishment, observes Mr. E. H. Webster, chief of the dairy division of the Bureau of Animal Industry,<sup>2</sup> there is little possibility of contamination from outside

<sup>1</sup> See page 27 of this report.

<sup>2</sup> Bulletin No. 56, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, March, 1909, 559.

sources, but as soon as the artificial method of drawing milk is resorted to there enters a set of conditions entirely new and different. The milk then comes into contact with the air, the vessel into which it is drawn, and with particles of dirt from many sources. The problem of securing milk corresponding as nearly as possible to its condition as it exists in the udder is the problem of dairy sanitation.

Since bacteriology teaches us that every particle of dirt introduced into milk carries with it great numbers of bacteria which neither strain nor clarify from the milk, the necessity of keeping the dirt out in the first instance, instead of attempting to strain it out, is apparent. From the time of milking to the final consumption of the milk, every object that comes in direct contact with it may be a source of contamination. If the udder and flanks of the cow are covered with dirt of the yard or stable, the process of milking is bound to dislodge a greater or less portion of this filth, causing it to fall into the pail. It is easily conceivable how the animal in wading in filth and sewage polluted water may infect the udder and through it the milk with the germs of typhoid fever. We can also appreciate how infected water may convey the germs when used for washing utensils or in adulteration of the milk. Clothing worn by milkers often, unless special suits be reserved for use in milking, contains dirt from the hogpen, the chicken coop and horse barn, or even the swill pail, and there is great danger of contamination from these sources. The importance of regulations requiring clean cows, clean milkers, and clean methods of milking and handling must therefore be apparent.

Not only is milk a very stable medium for almost every description of germ life which may gain access to it in its journey from the cow to the consumer, but it may even become contaminated while still in the udder through infectious or poisonous material present in the cow herself. It should be understood, therefore, that milk while in the udder of a healthy cow is rarely sterile (that is to say, free from germ life), and can only occasionally be removed in small quantities free from micro-organisms. Commercial milk from healthy cows may contain organisms not only while still in the udder, but may become contaminated in its passage through the ducts of the animal's teats, and at every point in its 12 to 48 hour journey to the consumer may receive and proliferate additional bacteria.

While it is not practicable by any known method to completely eliminate the prejudicial qualities of milk, it is obviously feasible to reduce to a minimum the multiplication of bacteria and the consequent danger of infection with disease. The principal requirements to this end are that the cow herself be free from disease, that cleanliness, low temperatures, and speedy transportation from the cow to the consumer be observed, and that in order to accomplish this the dairy farmer and distributor of milk be imbued with an intelligent interest in safeguarding the product from deterioration up to the time of actual consumption.

It should be asserted in fairness to the dairyman that he is not always to blame for the furnishing of impure milk. As a rule he attempts to supply a pure grade of milk to his customers and is not conscious of impurities and infections in the article he is distributing.

## DISEASES RESULTING FROM CONTAMINATED MILK.

The important part played by milk in the spread of certain diseases has been realized for many years, principally in connection with typhoid fever, scarlet fever, diphtheria, tuberculosis, dysentery, and other gastro-intestinal disorders. The colon bacillus has, besides, often been found to be the actual cause of appendicitis, chronic peritonitis, and abscesses of the liver.

Park is authority for the statement that certain pathogenic bacteria, known as streptococci, which excite tonsillitis (a single epidemic of which involved 600 cases of sore throat in Stockholm), are probably the cause of septic inflammation of the udder. Many leucocytes and streptococci are present in the normal milk of a healthy cow, these bacteria being more numerous, though, in the milk of diseased than in that of healthy cows. No satisfactory method has yet been devised for distinguishing the pathogenic from the nonpathogenic streptococci in milk.<sup>1</sup>

As has already been set forth, milk, not only while in the cow's udder but up to the time of its delivery to the consumer, receives from its surroundings bacteria of various kinds. These organisms come from the teats of the cow, from the uncleanly condition of the exterior of its body, from the dust and dirt of the stable, from the hands of the milkers and others handling the milk, from the pails and cans used in milking, storing, and transporting the product, the bottles and other receptacles employed in its delivery to the consumer, and from various other sources.

Evidence has, furthermore, been accumulated during the last 50 years tending to show that milk may receive from man the specific organisms of certain infectious diseases, and that these organisms may produce the disease in susceptible individuals drinking the raw milk.

While cows are known to be exempt from typhoid fever, and these germs are not customarily found in milk freshly drawn, the typhoid bacillus may reach milk in unexpected ways, notably by the milk coming into contact with persons who are in the first stages of typhoid fever or convalescing from the disease, and very frequently through the agency of "bacillus carriers"—that is to say, persons who are shown to be entirely healthy, but who, having experienced a precedent attack of typhoid fever, or through contact with patients, are known to be expelling typhoid germs. Persons who have had the disease continue, as has been definitely shown in certain instances, to discharge great numbers of the bacilli for months, and, remarkable as it may seem, in some cases for years after apparent recovery. This emphasizes the importance of having as few persons as possible come in contact with the milk, and of insuring that those who actually handle the milk shall exercise scrupulous cleanliness and be under strict medical supervision. In view of the numerous epidemics from milk-borne diseases which have been recorded, the necessity for compulsory notification of all infectious and contagious diseases is so apparent that milk should not be permitted to leave a farm dairy, or be shipped therefrom, during the existence of any of these diseases

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<sup>1</sup> The Significance of Leucocytes and Streptococci in Milk, by William Whitfield Miller, assistant surgeon, Public Health and Marine-Hospital Service, Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service, March, 1909, page 498.

among employees or other persons associated with them, nor should any such persons be permitted to reside in or visit infected houses while engaged in the milk traffic.

Dr. Hermann Biggs, of the New York City department of health, like many others, considers it almost impossible to secure a safe milk supply without repeated inspection, including complete and repeated bacteriological examinations of every person connected with the production and handling of milk. As a result of his report, the New York City board of health has promulgated an order requiring satisfactory pasteurization of all milk used for drinking purposes.

When we point to the appalling death rate due to typhoid fever, scarlet fever, diphtheria, tuberculosis, and other diseases induced by infection from contaminated milk, we are prone to overlook the vast number of cases in which these attacks of disease do not result fatally. If the mortality which ensues from the lack of proper attention to our milk supply is alarming, how much more so is the enormous amount of illness and distress inflicted by these preventable diseases, and the even more widespread indisposition, exhaustion, and fatigue which should be reckoned as a portion of the awful penalty paid by the community for its lack of prudent care and precaution in the use of milk. In this day of increasing artificiality in our mode of living, when the refinements of civilization are creating greater and constantly increasing demands upon our physical and mental energies, every safeguard should be availed of to protect the impaired constitution of the individual from the ravages of these ever-portending diseases. Why not, then, instill into every citizen the prime necessity of improving our milk supply (which admittedly plays so important a part in the transmission of disease) until it reaches that standard of practical perfection which will eliminate entirely its character as a destructive agency, and which will insure to the consumer the beneficent advantages of this world-wide product?

It is earnestly hoped that, through the process of popular education, the prevailing indifference of the average householder to the care of milk will be converted into a proper recognition of the importance of continuing from the hour of its receipt on the threshold to the actual moment of consumption the same degree of cleanliness and maintenance at a lower temperature while in the house that is now being demanded of the dairy farmer and milk dealer in its production, transportation, and delivery.

#### NUTRITIVE VALUE OF MILK.

A prejudicial circumstance in the development of the milk industry is the fact that the dairy business has been largely built up on a cheap basis, with cheap cows, cheap feed, cheap stables, cheap labor, and cheap prices for the product. When we compare the price of milk with that of other perishable human foods it is remarkable that so much value is given for so little money, not only from the viewpoint of the abnormal amount of labor and attention necessarily bestowed in the production and distribution of milk and milk products, but from the standpoint of the amount of nutrition supplied in milk. In other words, if the dairyman could sell the nutrients in his milk for the same price per pound that the butcher receives for the nutrients

in his meat, or the poultry dealer for his eggs, the price of milk would be immensely higher and dairy farming would probably soon result in the accumulation of swollen fortunes. It is a significant fact, however, that although the prices for beef and other commodities are arbitrarily advanced from time to time without serious, active opposition on the part of the consumer, there is a concerted protest of the most vigorous nature when endeavor is made to increase the price of milk a single cent per quart, and that, even, at the season of the year when it is generally admitted that the farmer is put to extra expense in supplying silage, hay, and other feed not demanded in the warmer months, when pasturing is almost exclusively depended upon.

It is of interest to note in this connection that a quart of milk supplies practically as much of both protein and energy as three-quarters of a pound of beef of average composition or eight average eggs. When we compare the price of milk with the prevailing prices of beef and eggs, the cheapness of milk as a food may therefore readily be recognized. It may be said even in favor of skim milk that so far as its nutritive value is concerned it is a trifle more potent, volume for volume, than whole milk. As a wholesome and nutritious food buttermilk is also valuable, since it has 3 per cent of proteids, and a quart contains one-quarter as much proteid as a man needs in a day, even when the most liberal estimate of his requirements is considered.

#### IMPROVEMENT IN SANITARY DAIRY CONDITIONS.

In all sections of the country great improvement is being made in dairy conditions, resulting from the agitation of the necessity for a cleaner and safer milk supply, and the public is gradually awakening to the extreme importance of insuring that the milk furnished for consumption by the community shall be initially as free from contamination as possible and so handled as to reduce to the utmost minimum, so far as compatible with economic considerations, the possibility of subsequent infection from this abundant factor in its food supply.

It should be borne in mind that the meeting of these requirements for safeguarding the public health necessarily entails an additional expenditure all along the line, and especially at the point of production, and it would not be dealing fairly with the producer if some adequately increased compensation were not received by him in reimbursement for this necessary additional outlay. The committee is inclined to the opinion that the dairy farmer has, on the whole, been receiving a smaller price for his output of milk than is proportionately due him, and it is recommended that steps be taken with a view to readjusting existing conditions so as to effect a more adequate remuneration for the important services rendered by him to the community.

#### UNWHOLESOMENESS OF CITY MARKET MILK.

In order to correctly convey to the public mind the unusual amount of contamination in milk ordinarily produced for the market, it may be stated that nearly every city throughout the world has to contend with the problem of dirty milk. According to some authorities the residents of Berlin consume 300 pounds of cow dung in their milk daily, and the inhabitants of New York City consume half a ton of

filth and refuse in the same manner. Many medical authorities take the position that the question of dirt and the bacterial contamination of milk is of infinitely greater importance from the standpoint of health than a high chemical standard governing the composition of milk, for the reason that very poor milk (that is to say, that which is low in proteids, fat, and milk sugar) is still very valuable as a food and contains a great deal of nutriment, providing it is sufficiently clean to be consumed with safety, while, on the other hand, it is well understood that dirty milk and milk bacterially contaminated is not only responsible for the high death rate prevailing among young children from cholera infantum, but that polluted milk is also responsible to a large degree for the spread of such infections as diphtheria, scarlet fever, typhoid fever, and tuberculosis, and for acute cases of milk poisoning, which are by no means uncommon.

The investigations of the market milk of Washington,<sup>1</sup> made in 1907, demonstrated that the milk was for the most part old, stale, and dirty, its bacterial content averaging in 1907 over 22,000,000 per cubic centimeter and in 1908 over 11,000,000. It was further established that at least 11.3 per cent of the cases of typhoid fever occurring during the summer of 1906 in Washington were certainly attributable to contaminated milk, while in 1907 9.18 per cent and in 1908 approximately 10 per cent of the typhoid cases were absolutely traced to infected milk. In fact, it may be stated without hesitancy that the average commercial milk of large cities is not a safe food.

In an interesting article on "The future of milk supplies of large cities from a sanitary standpoint," by Dr. Ernst J. Lederle, health officer of the city of New York,<sup>2</sup> published under date of March 19, 1910, the writer refers to the fact that the milk dealer of to-day occupies a unique position in the commercial world, trafficking in a product which is one of our most important foodstuffs, bringing blessings to millions of people when properly produced and carefully handled and distributed, but which, when coming from unhealthy and insanitary sources and when carelessly handled, is capable of spreading disease and misery. It is clearly the duty of the milk dealer, he states, to supply the quality of milk which is approved by those disinterested physicians and sanitarians who have made a special study of the requirements of infants and invalids, and who are familiar with public-health problems in their broadest application. In the light of present knowledge on the subject, he says, it would appear that the dealer should not be satisfied to offer the public any milk unless it be clean and safe—either a clean, high-grade market milk, a scientifically pasteurized, or a clean, raw milk of low bacterial count from healthy animals. Under existing conditions no large dealer, he continues, can afford to supply milk in large cities unless it be either of the certified type, guaranteed or inspected, or scientifically pasteurized. New conditions, he continues, are forcing great changes in the character of conducting a large milk business.

The dealer, to be successful and progressive, requires the services of veterinarians to inspect the cattle from which his supply is received and to assist in the elimination of diseased animals, and of the

<sup>1</sup> Rosenau, Lumsden and Kastle, *Bulletins* Nos. 35 and 44, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service.

<sup>2</sup> *Journal of American Medical Association*, Vol. LIV, No. 12.

chemist and bacteriologist to supervisorily control the supply by constant tests of quality and of cleanliness. The high standards set, including restrictions as to the types of buildings, the cleanliness demanded in every step of production of the milk from the washing of the udders of the cows to the sterilization of the utensils, the outlay entailed, and the increase in running expenses, while having a markedly beneficial effect on the whole dairy industry, is rather discouraging, he observes, to the small producer of market milk; it all seems so impossible to him, considering the small value placed on his product. In conclusion, he asseverates that the public must be educated to an appreciation of the value of these new conditions, which will inevitably result in higher prices paid to the farmer and a general advance in the cost of milk to the public.

#### FEDERAL INVESTIGATIONS OF SANITARY MILK PRODUCTION.

Although it is conceded that milk, up to the moment that it leaves the cow (except, perchance, through contamination from germs entering the teat from the outside), is not possibly contaminated with diphtheria, typhoid, or scarlet fever bacilli, since cows are not susceptible to these diseases, milk is coming to be recognized more and more as a most important factor in the spread of these diseases. Interesting charts illustrating the potency of milk as a medium for disseminating these and other ailments are presented in Bulletin No. 56 of the Hygienic Laboratory of the Public Health and Marine-Hospital Service.<sup>1</sup> This subject has been the basis for long-continued and thorough investigation on the part of this branch of the Federal service, several bulletins being devoted to publishing results regarding the influence of milk in the transmission of typhoid fever, diphtheria, scarlet fever, and tuberculosis.<sup>2</sup>

Most valuable information concerning milk in its relation to the public health has also resulted from the active, energetic work of the Bureau of Animal Industry, United States Department of Agriculture, the contents of whose important publications on the subject are fully discussed in the pages of this report.

#### FLIES A POTENT FACTOR IN CONTAMINATION OF MILK.

A most important contributing factor in the contamination of milk, and one which has, until the past few years, been almost universally regarded as negligible, is the effect produced by flies coming into contact with milk, either at the dairy farm, the city dairy, or at the home of the consumer. It has been recently demonstrated beyond peradventure that a single fly may contaminate sterile water, for example, to the extent of 1,500,000 bacteria, a fly captured in Brooklyn in the summer of 1907 having been found actually to carry in its mouth and upon its legs over 100,000 fecal bacteria which it had collected in walking over human excreta and which it was probably intending to transmit to the nearest milk pitcher. This observation emphasizes not only the importance of keeping manure piles, pigpens, and other possible breeding places for flies (and likewise for the con-

<sup>1</sup> See pages 25 et seq.

<sup>2</sup> Bulletins Nos. 35, 44, 52, and 65, Hygienic Laboratory, Public Health and Marine-Hospital Service, U. S. Treasury Department.

tamination of the latter with bacteria) removed to a safe distance from cow barns and milk houses, but points to the advisability of the exercise of extreme care and caution on the part of the householder to keep the home free from flies, and especially on the part of handlers of milk to be watchful that flies be not permitted to drop into the milk at any stage of its transport from the barn to the table. It is important that barns and milk houses be screened from flies, and that greater diligence be exercised in keeping these dangerous, though heretofore generally regarded as harmless, insects away from milk and milking utensils. Great credit is due in this connection to Dr. George M. Kober, of this city, whose laborious investigation in 1895 developed for the first time a recognition of the potency of flies in the communication of typhoid fever and other diseases, and whose comprehensive task in collating data regarding epidemic diseases resulting from contaminated milk and other causes is elsewhere referred to in this report.

#### IV. HISTORY OF FEDERAL AND LOCAL REGULATION OF MILK SUPPLY.

##### FEDERAL SURVEILLANCE OF MILK PRODUCTION.

Prior to the establishment of the Dairy Division of the Bureau of Animal Industry, United States Department of Agriculture, on July 1, 1895, very little attention had been bestowed by the Federal Government upon the subject of milk production, but at this juncture actual steps in promoting the sanitary production and distribution of milk were taken; and in 1900 a paper entitled "Market Milk: A Plan for Its Improvement," was issued in order to meet the frequent requests received by the Bureau of Animal Industry for advice regarding the improvement of the milk supply of cities and towns. This plan comprised, in brief, recommendations for the organization in each community of an unofficial milk commission to inspect dairies and methods of producing and handling milk, and to prescribe requirements therefor. In recent years the bureau has worked in various ways to bring about improvement in the wholesomeness of the milk supply of various communities. It has made scientific investigations regarding tuberculosis, pasteurization, and other subjects; has studied practical methods of dairying, with a view to helping dairymen to improve their methods, for the benefit of both producer and consumer; has cooperated with numerous cities and towns in the matter of their milk supply, and has studied their methods of producing, transporting, handling, and delivering milk; has promoted competitive exhibitions of milk and cream and encouraged the production of wholesome products; has furnished tuberculin to public-health officers, and has applied the test to a large number of cows; has given numerous lectures and addresses at public meetings; and has prepared and distributed a large quantity of literature relating to the various phases of the milk question.

No attempt has thus far been made by the Federal Government, in pursuance of authority vested by the Federal Constitution for the regulation of interstate commerce, to prescribe the application of the tuberculin test, pasteurization, a maximum bacterial content, a fixed maximum temperature, or analogous restrictions to govern milk produced in one State and transported into another, the jurisdiction of the Federal Government being exercised in this regard only so far

as it has been endeavored by the Bureau of Animal Industry to prevent the interstate shipment of tuberculous animals and to prohibit the adulteration, artificial coloring, or misbranding of milk concerned in interstate commerce.

#### NATIONAL FOOD AND DRUGS ACT.

The food and drugs act approved June 30, 1906, provides that it shall be unlawful for any person to manufacture within the District of Columbia any article of food which is adulterated or misbranded, and prohibits the introduction into the District of Columbia, or from the District into any State, of any article of food which is adulterated or misbranded. Severe penalties are prescribed for the violation of the provisions of the act, under the terms of which the Secretaries of the Treasury, Agriculture, and Commerce and Labor are charged with framing uniform rules and regulations for carrying out its provisions. In accordance with this empowerment standards of purity for food products have been issued by the Secretary of Agriculture.<sup>1</sup> A copy of the food and drugs act is appended (Appendix M).

The act imposes upon the Department of Agriculture the duty of publishing notices of judgments in cases brought for enforcement of its provisions. An examination of the series of notices issued to date reveals the fact that 94 cases have related to proceedings against persons or corporations charged with violation of the provisions of the act appertaining to the adulteration and misbranding of milk. It appears that of these 94 cases 37 have been instituted against inhabitants of the several States and 57 against residents of the District of Columbia. The charges have been based upon the excessive skimming of cream and butter fat from milk, dilution with water, the addition of formaldehyde as a preservative, and of coloring matter, designed to deceive as to richness. Indictments have also been presented in several instances based upon an excessive number of bacteria, and others on account of the milk being putrid. These cases extend over a period from December 28, 1907, to May 17, 1910, the notices of judgment referred to issuing between August 13, 1908, and November 12, 1910. In the larger number of cases judgment was confessed or collateral forfeited, the fines ranging in most instances from \$5 to \$40. In a few prosecutions the defendant stood trial, resulting in acquittal in some cases and conviction in others.

There is appended a communication from Dr. H. W. Wiley, Chief of the Bureau of Chemistry, Department of Agriculture, under date of December 2, 1910, inclosing a memorandum from Dr. W. D. Bigelow, assistant chief of the bureau, dated the preceding day, referring to prosecutions for violations of the provisions of the Federal pure food law respecting the composition of milk (Appendix N).

#### SANITARY ARRANGEMENTS FOR DAIRY FARMS.

The paper by Mr. E. H. Webster, Chief of the Dairy Division of the Bureau of Animal Industry, Department of Agriculture, on "Sanitary inspection and its bearing on clean milk"<sup>2</sup> (Appendix O),

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture.

<sup>2</sup> Bulletin No. 56 of the Hygienic Laboratory, Public Health and Marine-Hospital Service, p. 559.

concludes with 21 suggestions concerning the treatment of cows, stabling, milking, and conditions pertaining to the milk house, which, if followed, must appeal to the intelligent observer as destined to produce important results in effecting a clean and wholesome milk supply. The fact is emphasized that the location of the barn and establishment of the milk house with particular reference to remoteness from sources of pollution constitutes an important factor in the production of pure milk, as does also the provision of an adequate water supply to afford a convenient and abundant source of this essential adjunct of cleanliness.

Of importance in this connection is the periodical examination of the water supply of dairies. An analysis, under the auspices of the Bureau of Animal Industry, of the water employed by dairy farms showed that in comparatively few instances is the water free from sanitary objection, though it is apparent that in most cases the impurification may be rectified with but little expense.

#### NECESSITY FOR FURTHER SAFEGUARDS.

As late as January 24, 1910, Dr. Melvin, Chief of the Bureau of Animal Industry, in transmitting for publication by the Department of Agriculture a series of papers on "The dissemination of disease by dairy products and methods for prevention,"<sup>1</sup> makes the statement that, notwithstanding the fact that within the last few years there has been great improvement in the direction of obtaining more wholesome and sanitary milk, much yet remains to be done in safeguarding the health of the community. To this end it is important, he continues, that there should be not only additional legislation and effective official supervision, but a better understanding on the part of producers themselves and of the public concerning the dangers lurking in contaminated dairy products and the latest approved methods of guarding against and eliminating these dangers. He renews the proposal made by him to the Washington milk conference of 1907, and included in its recommendations that the classification of milk should provide, first, for clean raw milk from healthy, tuberculin-tested cows, drawn and handled in a cleanly manner by healthy attendants and transported and delivered to the consumer at a temperature not exceeding 50° F. and within the least possible time. When these conditions can not be met, he urges pasteurization, "not for the purpose of making bad milk good, but to render milk of doubtful healthfulness safe." He further emphasizes the importance of handling milk properly after its arrival in the home.

Safe and clean milk can not be had without the active and energetic cooperation of the farmer, the transportation agent, the dealer, and the housewife, and it is only by inculcating in these various agents a proper conception of the extreme care which must be observed in the handling of milk to minimize the dangers resulting from impurities therein that we can hope to secure substantial advancement in reducing the inordinate amount of illness and disease communicated through milk and in directly conserving in this manner the public health.

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<sup>1</sup> Circular No. 153, Bureau of Animal Industry, issued Apr. 28, 1910.

## MILK AND CREAM CONTESTS.

The first milk and cream contest in this country was held in connection with the National Dairy Show in Chicago from February 15 to 24, 1906, under the direction of the Dairy Division of the Bureau of Animal Industry, United States Department of Agriculture. The objects of the contest were, first, educational; second, to determine the possibilities in the handling and keeping of milk and cream produced under sanitary conditions and kept cold; and, third, to test a score card for rating fairly and accurately this class of dairy products. Since this national contest was held, several States, notably New Hampshire, Pennsylvania, Ohio, and Massachusetts, have arranged similar exhibits in connection with State dairy association meetings. These contests have proved of great benefit to dairymen in pointing out defects in their product and suggesting remedies, and in indicating the most satisfactory forms of bottles to be used. The plan for holding these contests was first applied to a municipality when the city of Cleveland, which had already adopted the Dairy Division score card for rating dairy farms and was making a special effort to improve the conditions of its dairies and the quality of its milk supply, arranged with the chamber of commerce of that city to conduct the contest under its auspices. Medals were offered for the best milk and cream and the best dairy farms represented, and addresses germane to the purposes of the contest were delivered by representatives of the United States Department of Agriculture and the Cleveland Chamber of Commerce, followed by a general discussion among the dairymen present, which was productive of valuable results. These contests, national, State, and municipal, give evidence of the general interest manifested throughout the country in improved standards of milk production. Detailed information concerning the contests referred to may be gained by consulting Circular No. 117 of the Bureau of Animal Industry, Department of Agriculture.<sup>1</sup>

## NEW YORK MILK CONFERENCE.

Upon the invitation of a special committee of the New York milk committee a conference was held in New York City on December 2 and 3, 1910, for the purpose of considering plans for the improvement of the national milk supply and with the idea of forming a national association with that object in view. The conference was participated in by specialists of national reputation on the subject of sanitary milk production and the relation of milk to the public health, and a number of interesting papers were presented. The conference was attended by Dr. G. Lloyd Magruder, Dr. E. C. Schroeder, of the Bureau of Animal Industry, Department of Agriculture, and Mr. Emile Berliner, of this city. After mature deliberation the following resolutions, offered by the gentlemen mentioned and favorably reported from the committee on resolutions, received unanimous approval by the conference:

## RESOLUTION 1.

Whereas dairy products are among the most valuable assets of the world, billions of capital being invested in them in the United States alone;

Whereas milk, cream, butter, and cheese are the most generally employed articles of food and which have been proved by indisputable evidence to be

<sup>1</sup> A City Milk and Cream Contest as a Practical Method of Improving the Milk Supply, by C. B. Lane and Ivan C. Weld, issued October 28, 1907.

readily contaminated by disease-producing germs, thus greatly impairing the public health and increasing the general mortality rates;

Whereas this dissemination of disease by dairy products has been pointed out by writers the world over, and has in this country been especially disseminated in Circulars Nos. 114, 116, and 153 of the Bureau of Animal Industry of the United States Department of Agriculture, and Bulletins Nos. 41 and 56 of the Public Health and Marine-Hospital Service;

Whereas these facts have been confirmed by numerous authorities here and in Europe, and have been recognized within the past month by the United States Department of Agriculture, United States Department of the Interior, United States Department of Commerce and Labor, United States Navy Department, United States War Department, United States Department of State, and by the Commissioners of the District of Columbia: Be it

*Resolved*, That the United States Congress be requested to appoint a committee to investigate the questions of dairy products in their relation to the public health, in order that proper standards for dairy products may be adopted by the United States Congress; and be it further

*Resolved*, That a copy of these resolutions be sent to the President of the United States, to the Vice President, to the Speaker of the House of Representatives, to the chairman of the Public Health Committee of the United States Senate, and to the chairman of the Committee on Agriculture of the United States House of Representatives.

#### RESOLUTION 2.

*Resolved*, That the conference on milk problems of the New York milk committee indorses the classification of milk recommended by Dr. A. D. Melvin, Chief of Bureau of Animal Industry of the United States Department of Agriculture, approved by the milk conference of the District of Columbia in 1907, and published in Circular No. 114 of the Bureau of Animal Industry and in Bulletins Nos. 41 and 56 of the United States Public Health and Marine-Hospital Service.

This classification designates three kinds of milk: Certified, inspected, and pasteurized.

I. Certified milk must be produced in accordance with the requirements of the American Association of Medical Milk Commissions.

II. Inspected milk must be a wholesome, clean article, obtained under sanitary conditions from cows shown to be free from tuberculosis by the tuberculin test, and contain not more than 100,000 bacteria per cubic centimeter.

III. Pasteurized milk must be a clean, inspected milk, which has been properly pasteurized under an official standard, any shipment of which shall at all times be subject to inspection and test by public inspectors.

#### RESOLUTION 3.

Whereas it has been demonstrated by papers presented to the discussions by this conference held at the invitation of the New York milk committee, that it is imperative that definite standards and regulations should be adopted to govern the production and handling of dairy products for the prevention of disease and the saving of lives:

*Resolved*, That the New York milk committee be requested to invite between 12 and 20 recognized experts on milk problems to meet in conference, and that these experts be asked to make a unanimous report recommending proper milk standards on which Congress or State authorities may formulate milk legislation.

The following additional resolution was unanimously approved by the conference:

#### RESOLUTION 4.

*Resolved* that whereas 16,000 babies die annually in New York City, of which number 4,000 are killed by bad milk and improper food; and

Whereas there are 500,000 children in New York City under 5 years of age, whose future health and strength depends upon their proper nourishment and development; and

Whereas pure milk is the most important food in the diet of these children: Now therefore be it

*Resolved*, That the problem of securing a clean, safe milk for babies and young children is the most immediate and pressing problem confronting the health authorities of this city; and be it further

*Resolved*, That it is the sense of this conference that steps should be taken to label milk so that mothers may know what milk is safe for their babies and what milk they must avoid.

*Resolved*, That it is the sense of this conference that milk from tuberculin-tested cows, produced and kept under conditions which satisfy the highest medical and sanitary standards, is reasonably safe for babies, in a raw state.

*Resolved*, That it is the sense of this conference that milk from cows which have been physically examined for tuberculosis and are kept on farms which score at least 75 per cent by the health department methods is safe for babies if pasteurized at a temperature not lower than 140° F. and for a time not less than 20 minutes, provided such milk has a bacteriological count not higher than 100,000 per cubic centimeter, pasteurized, and not more than 10,000 per cubic centimeter not pasteurized.

*Resolved*, That it is the sense of this conference that all other milk is not safe for babies; that it should be pasteurized as above described, and that it should be recommended for cooking purposes only and not for drinking purposes.

*Resolved*, That this conference recommend to the New York health authorities that an effort be made immediately to secure a quantity of milk of grades I and II above described sufficient for the 500,000 infants and children under 5 years of age in New York City.

The conference took the position squarely that certified milk was only reasonably safe, and the sentiment of members was almost unanimously favorable to pasteurization as defined by the Washington milk conference of 1907.

An additional resolution was passed, the phraseology of which is not at hand, providing that besides the committee of from 12 to 20 experts arranged for, a separate committee of 20 experts be appointed for the purpose of considering the various resolutions submitted to the conference. Dr. Magruder and Mr. Berliner have been designated as members of this latter committee. The membership of the first-named committee has not yet been announced.

#### MILK REGULATION IN DISTRICT OF COLUMBIA.

It is interesting to review the history of local milk regulation, a subject with which, in its general aspects, the District of Columbia has been conspicuously identified in setting the pace for development elsewhere throughout the country along the lines of sanitary milk production and distribution.

As early as August 1, 1863, an ordinance was enacted by the board of aldermen and board of common council of the city of Washington, providing against insanitary conditions in and about cow yards, pens, and stables in the District of Columbia, a similar ordinance being enacted by the board of aldermen and board of common council of the corporation of Georgetown on April 22, 1865. Pursuant to a provision of the act to establish a government for the District of Columbia, approved February 21, 1867, a board of health was created, and on May 15 of the same year this newly appointed board adopted an ordinance prohibiting the sale of unwholesome, watered, or adulterated milk, and of butter and cheese made therefrom. As far back as October, 1873, the food inspectors in the service of the board of health seem to have realized the importance of the inspection

of milk at the place of production as well as when offered for sale, though this suggestion was not generally accepted by sanitarians until a generation later. The board of health was abolished by the terms of the act providing a permanent form of government for the District of Columbia, approved June 11, 1878, the commissioners being authorized in lieu thereof to appoint a physician as health officer, charged with the execution and enforcement, under the direction of the commissioners, of all laws and regulations relating to the public health and to vital statistics. During the fiscal year 1883-84 the then health officer undertook to inspect the dairy farms supplying milk to the District, and as a result of this investigation he strongly emphasized the necessity of going beyond the analyses of samples of milk sold in the community, and rigidly examining into conditions affecting, from a sanitary standpoint, the dairy farms from which shipments of milk were made to the National Capital. On October 12, 1888, Congress passed an act to prevent the manufacture of adulterated foods or drugs in the District of Columbia, in consequence of which the Commissioner of Internal Revenue, to whom the enforcement of this act was committed, fixed as a standard for milk offered for sale in the District that the minimum specific gravity should be 1.030 at 60° F., and that the milk should contain not less than 13 parts in 100 of solids as follows: Fat, 3.5; solids, not fat, 9.5; water, not more than 87. The removal of cream, or the addition of water, foreign fats, or coloring matter were to be considered as adulterations.

#### INVESTIGATION OF PREVALENCE OF TYPHOID FEVER.

As the result of the prevailing high death rate from typhoid fever in the District, a committee, of which Dr. G. Lloyd Magruder was chairman, was appointed by the District Medical Society for the purpose of investigating the prevalence and causes of the disease. The report of this committee was submitted to the Committee on the District of Columbia, House of Representatives, and published as a congressional document in 1894. The report attributed the alarming prevalence of typhoid fever to the Potomac water, the pollution of the soil from defective sewers, the backing up of sewage from tidal movements, and the drinking of well or pump water and contaminated milk. The committee recommended the careful inspection of dairies contributing to the District milk supply and the enactment of a statute prohibiting the selling of milk in the District without a permit from the health office.

#### ACT OF MARCH 2, 1895.

The act approved March 2, 1895 (Appendix P), requiring the inspection of all dairy farms furnishing milk for consumption in the city of Washington, including not only farms located within the boundaries of the District, but also those in the States from which the supply is largely received, secured for the national capital the credit of being the first city in the country to extend inspection to dairy farms as well as to city milk depots.

This act charged the health officer, under direction of the commissioners, with the duty of making and enforcing regulations to

secure a proper water supply, drainage, ventilation, air space, floor space, and cleaning of all dairies and dairy farms, and to secure the isolation of cattle suffering from contagious disease.

It is represented by the health department that this law, being a departure from established precedents, was a more or less experimental measure, and that experience has revealed certain defects, which it has unsuccessfully endeavored to remedy by bills introduced in Congress from time to time, all such efforts proving without avail, owing to the active opposition of persons interested in the production and sale of milk in the District.

One can scarcely realize, however, the tremendous improvement in the conditions and surroundings of dairy farms which has resulted from the inspection provided by the act of Congress approved March 2, 1895. It is well within the recollection of the present generation that insanitary barns and milk houses were commonly and typically characteristic of most dairy farms in this section of the country. Laborers on the farm were not only ignorant and careless in their habits, but uncleanly and in some instances even suffering from disease. No endeavors whatever were made to maintain the cows in a cleanly condition, and the resulting filthy character of the milk was unavoidable. There were few, if any, facilities for heating or boiling water for cleansing the utensils used in handling and transporting the milk or for washing the udders of the cows or the hands of the employees. The water supply was in many cases at an inconveniently remote distance from the barn, and no attempt was made to avoid pollution or impurification from drainage or other sources. The improvement in all these particulars has been a process of very gradual accomplishment, and the importance of educating not only the producer and purveyor of milk but the ordinary farm hand to a proper recognition of the essentiality, from a hygienic viewpoint, of maintaining cleanly conditions is generally appreciated by all authorities on the subject of sanitary milk production. It may safely be asserted that, without the intelligent cooperation of every individual concerned with the furnishing of milk from the time it leaves the cow until it is deposited on the doorstep of the consumer, but little substantial progress can be expected in eradicating the dangers which are ever present in milk.

#### REGULATIONS FOR STABLING OF COWS.

The annexed copy of the regulations of the health department relative to the stabling of cows (Appendix Q) sets forth specifically the present requirements of the department in this regard.

#### INSTALLATION OF FILTRATION PLANT.

With a view to removing the causes of the extraordinarily high death rate from typhoid fever and kindred diseases in the District, a filtration plant was installed (completed in 1905), as a result of the recommendations contained in the medical society's report of 1894, at a cost of approximately \$3,400,000. It was expected that the installation of this important service would appreciably diminish the mortality resulting from such diseases, but strange to say there

was but a slight decrease in the number of deaths reported, as will be observed by consulting the statement below:

*Death rates in the District of Columbia before and after the enactment of the milk law of Mar. 2, 1895.*

Years.	Death rates per 1,000 of entire population. <sup>1</sup>			
	General death rate.	Of persons 1 year and over.	Of persons under 1 year.	From diarrhoea and enteritis under 2 years.
<b>Fiscal year:</b>				
1880.....	23.88	16.93	6.95	2.09
1881.....	24.60	18.06	6.54	1.14
1882.....	22.33	16.47	5.86	2.21
1883.....	23.74	17.83	5.91	1.55
1884.....	24.64	18.28	6.36	1.16
Average 5 years.....	23.85	17.54	6.31	1.62
1885.....	24.77	18.64	6.13	1.79
1886.....	22.97	17.03	5.94	1.44
1887.....	22.30	16.14	6.16	1.65
1888.....	24.23	17.31	6.92	1.58
1889.....	23.15	17.28	5.87	1.49
Average 5 years.....	23.48	17.27	6.21	1.68
1890.....	23.81	17.43	6.38	1.85
1891.....	25.16	19.04	6.12	1.46
1892.....	25.36	18.58	6.78	1.69
1893.....	23.25	16.96	6.29	1.88
1894.....	21.89	16.19	5.70	1.89
Average 5 years.....	23.95	17.70	6.25	1.75
1895 <sup>2</sup> .....	21.23	16.00	5.23	1.10
1896.....	21.16	15.84	5.32	1.68
1897.....	19.75	15.05	4.70	1.51
1898.....	20.54	16.13	4.41	1.36
1899.....	20.32	15.93	4.39	1.10
Average 5 years.....	20.59	15.77	4.82	1.35
<b>Calendar year:</b>				
1900.....	20.61	16.04	4.57	1.32
1901.....	20.19	16.07	4.12	1.15
1902.....	18.95	14.91	4.04	1.08
1903.....	19.08	15.57	3.51	.91
1904.....	19.61	16.05	3.56	1.02
Average 5 years.....	19.68	15.73	3.95	1.09
1905.....	19.20	15.68	3.52	1.04
1906.....	19.35	15.57	3.78	.97
1907.....	19.25	15.85	3.40	.98
1908.....	18.08	14.84	3.24	.98
1909.....	18.12	15.08	3.04	.73
Average 5 years.....	18.80	15.40	3.40	.92
1910.....	18.71	15.64	3.07	.86
<b>Total number of deaths, 1910.....</b> 6,520				
<b>One year and over.....</b> 5,450				
<b>Under 1 year.....</b> 1,070				
<b>Diarrhoea, etc., under 2 years.....</b> 301				

<sup>1</sup> Reasonably accurate data are not available for the calculation of these infantile death rates upon the basis of the infantile population alone.

<sup>2</sup> The act now regulating the sale of milk in the District was approved Mar. 2, 1895.

The markedly beneficial effect of the enactment of the milk law of 1895 is indicated by the fact that the death rate from diarrheal diseases among infants in the District of Columbia during the five-year period extending from 1880 to 1884, inclusive, was 162 per

100,000; during the next five-year period it increased to 168, and during the succeeding period ending with 1894 it was further augmented to 175. The milk law was enacted, as stated, in 1895. From the date of its enactment to 1899, the death rate decreased to 135, and during the subsequent five-year period it dropped to 109, in the year 1909 reaching the gratifying minimum of 73, increasing slightly, however, to 86 for the year 1910.

A statement prepared by Health Officer Woodward (Appendix K) shows that while the total number of deaths from all ages in the District of Columbia increased from 4,243 in 1880 to 6,216 in 1909 the number resulting from diarrhea in infants under 2 years of age showed a marked reduction, from 372 in 1880 to 250 in 1909, deaths of infants under 1 year of age, resulting from all causes, showing a diminution from 1,235 in 1880 to 1,042 in 1909.

While it is impossible to estimate the extent to which the decrease in mortality in the District has been due to the improvement of our milk supply, the fact, states Dr. Woodward, that the decrease in infant mortality has been greater than the decrease in mortality generally, and the fact that there has been a very marked decrease in the infant mortality from diarrheal diseases (the decrease in infant mortality coinciding practically with the date of enforcement of the milk law of 1895) suggests very strongly the extent of the relation of the milk supply to this result. There have, of course, been other important factors tending toward a reduction of infant mortality, not the least essential of which has been the extremely valuable service rendered by the Instructive Visiting Nurse Society and by the physician attached to the Straus Laboratory in disseminating information, especially among the poorer classes, with reference to the proper handling of the infant, its bathing, clothing, feeding, etc. This latter service, it must be admitted, has been a potential factor in the decrease of infant mortality.

#### WASHINGTON MILK CONFERENCE OF 1907.

The failure of the newly installed filtration plant to improve the typhoid situation in the District attracted more attention than ever to the investigation of milk as a potent factor in the causation of this malady, and every one of the farms supplying milk to the city of Washington was inspected by the Bureau of Animal Industry in the winter of 1906-7. The conditions obtaining on dairy farms furnishing milk to the District were brought to the attention of the commissioners and resulted in the appointment of what is known as the Washington milk conference, called to deliberate with respect to the milk supply of the District of Columbia, and to advise the commissioners with reference to its improvement. This conference marked an epoch in the development of the movement for sanitary milk production, with particular reference to the District of Columbia, but having an extremely important bearing likewise on the encouragement of similar action in various States and municipal jurisdiction throughout the country, its influence extending even to foreign lands. The report of its deliberations was published under the title "Sanitary milk production," constituting Circular No. 114 of the Bureau of Animal Industry, United States Department of Agriculture, issued August 2, 1907.

This conference was composed not only of scientific and professional men, but embraced among its participants, in addition to officials of the Department of Agriculture and the Public Health and Marine-Hospital Service, representatives of the local producers and dealers in milk for the Washington market, the presiding officers of the Medical Society of the District of Columbia, the Homeopathic Medical Society of Washington, the Veterinary Medical Association of the District of Columbia, the Academy of Sciences of the District of Columbia, the Chemical Society of Washington, the Washington Board of Trade, the Business Men's Association of Washington, and the District Bar Association, as well as a number of other gentlemen interested in the affairs of the National Capital.

This conference, after a number of meetings, arrived at the following conclusions:

That, in order that the milk supply of the District might be pure, it must come from healthy cows properly fed, that are neither about to calve nor have recently calved; that it must be drawn in a cleanly manner and be promptly cooled; that all persons engaged in handling it must be free from communicable diseases and be of cleanly habits; the receptacles into which the milk passes and the utensils and apparatus used in handling it must be perfectly clean, and the milk, after having been promptly cooled, must be kept cool until delivered to the consumer.

The conference recommended that there be recognized by law three grades of milk, namely, (1) certified, (2) inspected, and (3) pasteurized, the requirements for which are set forth on pages 27-28 of this report.

The conference further recommended that the District Commissioners be empowered to make, on the recommendation of the health officer, such regulations as might be necessary, in their judgment, to safeguard the milk supply of the District; that an adequate force of inspectors be provided; that increased laboratory facilities for the making of chemical and bacteriological analyses of milk and water from dairy farms and other places where milk is handled and sold be authorized; that, as intimated under the last-named classification of milk, plants be established by private enterprise or otherwise by the District government for the pasteurization of milk under the immediate supervision of the health officer; that the health officer be empowered to suspend and to revoke summarily any license to produce or sell milk in the District of Columbia, and any license to bring milk into the District; that a similar temporary suspension for a period not exceeding 48 hours be authorized to be made by inspectors in the service of the health department; that all cows on dairy farms producing milk for the District of Columbia be tagged, tattooed, or otherwise marked for the purpose of identification; that the milk produced for use in the District should either come from cattle free from tuberculosis as shown by the tuberculin test, which test shall be repeated at least once every year, or be subjected to pasteurization under the supervision of the health department in case the herd is not tuberculin tested; that thereafter no licenses shall be granted to produce milk for use in the District of Columbia unless the herd be found by the tuberculin test to be free from tuberculosis; that the milk of cattle suffering from any disease of the udder or from anthrax, rabies, gastro-enteritis, septic conditions, or showing clinical symptoms of

tuberculosis should not be utilized as human food, even though the milk be pasteurized, which inhibition shall also apply to milk taken from cows 15 days before or 5 days after parturition or from cows receiving any deleterious medicaments or foodstuffs; that the veterinary inspectors of the health department make frequent visits to the dairy farms; that particular attention be given to the water supply of dairy farms and of dairies, with special reference to the location and construction of wells, cisterns, and springs; that every dairy farm and dairy be equipped with all necessary appliances for cleaning, scalding, or otherwise sterilizing all receptacles, utensils, and apparatus used for the handling of milk, and with all necessary appliances for properly handling the milk and keeping it cool awaiting delivery; that the sale of milk in grocery stores, bakery shops, and other similar places be prohibited, except when sold and delivered in the original package in which received; that the production and sale of milk be maintained entirely apart and separate from household operations; that all receptacles containing milk in quantities exceeding 1 quart for delivery to customers be sealed in a manner satisfactory to the health officer before being placed upon the delivery wagon and be kept so sealed until after delivery except when opened for the purpose of official inspection; that whenever a sample of milk is collected for analysis the inspector divide the sample into two parts, placing each part in a proper container, sealing such containers, and delivering one sealed container to the vendor, the sealing of samples to be done, when practicable, in the presence of the vendor or his agent; that the immediate seizure and denaturing with some deleterious substance or coloring matter of milk found to contain preservatives or to be in such condition as to render its sale unlawful be authorized; that the health officer be authorized to publish daily the rating of dairies and dairy farms and the chemical composition and bacterial count of samples of milk analyzed; that for the purpose of procuring modified milk for infants and persons in ill health the milk commission of the Medical Society of the District be requested to procure the establishment of a laboratory under its supervision in which only certified milk shall be used and milk of a definite chemical composition may be obtained according to prescriptions of physicians; that an effort be made to procure the establishment of a refrigerator-car service for the transportation of milk into the District from May 1 to December 1 and to provide for cooling rooms or devices at all stations where milk is held awaiting the arrival of milk trains; that parents and guardians be urged to use only certified milk, at least as the food of infants under the age of three years; that systematic instruction with reference to the sanitary relations of milk as an article of diet, and all other foods, be made a part of the curriculum of the public schools of the District; that popular articles be frequently prepared for the press; that lectures and demonstrations be given; that pamphlets in plain language be prepared by the health officer for general distribution, and the rules and suggestions, accompanied by a statement of the reasons therefor, be placed in the hands of dairymen and dairy attendants; that consumers of milk be urged not to patronize milk dealers whose milk, after standing for two hours or less, reveals a visible sediment at the bottom of the bottle; that the consumer, unless the milk received by him comes from a tuberculin-tested herd or from a source otherwise

above suspicion, subject it to a process of purification by bringing it to the boiling point, cooling it immediately thereafter, and keeping it on ice; and that no dairy farm should be permitted to supply milk of a higher class than that for which a permit has been issued, and each dairy farm supplying milk of the specified class be separate and distinct from any dairy farm of a different class.

#### RECOMMENDATIONS OF WASHINGTON MILK CONFERENCE INDORSED.

The recommendations of the Washington milk conference were indorsed by the commission of experts, who by direction of President Roosevelt conducted an investigation, the results of which were published in a report entitled "Milk and its Relation to the Public Health," issued in January, 1908, by the Public Health and Marine-Hospital Service,<sup>1</sup> a revised edition being published in January, 1910.<sup>2</sup> This commission was composed of officials from the Department of Agriculture and the Public Health and Marine-Hospital Service. Dr. Woodward, health officer of the District, also participated in its deliberations.

#### FOOD AND DRUGS ACT, DISTRICT OF COLUMBIA.

On February 17, 1898, a measure was enacted by Congress entitled "An act relating to the adulteration of foods and drugs in the District of Columbia (Appendix R)." By the terms of this act the prescribed chemical composition of milk offered for sale in the District was amended by raising the minimum allowable amount of butter fat in whole milk to  $3\frac{1}{2}$  per cent, and the total solids in whole milk to  $12\frac{1}{2}$  per cent and requiring a minimum of 20 per cent of butter fat in the chemical composition of cream.

#### PROPOSED ADDITIONAL LEGISLATION.

With the exception of the legislation here mentioned, all attempts to secure favorable action by Congress on measures calculated to compel the adoption of improved sanitary methods in the handling of milk have failed, principally through opposition on the part of milk producers and dealers. As late as January 10, 1910, a bill (S. 4986) (Appendix S) was introduced in the Senate by Mr. Gallinger, chairman of the Committee on the District of Columbia, "To protect the public health by regulating the production and sale of milk, cream, and ice cream in and for the District of Columbia," embracing among its provisions the empowering of the District commissioners to promulgate and amend from time to time such regulations as, in their judgment, may be necessary to fix the class and standards and the condition and manner under which milk, cream, and ice cream must be produced, manufactured, transported, and sold in this jurisdiction; also inhibiting the use of false or misleading labels, advertisements, or other means intended to deceive the purchaser. The bill was referred to the Committee on the District of Columbia, from which it failed of report. A bill with identi-

<sup>1</sup> Bulletin No. 41, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service.

<sup>2</sup> Bulletin No. 56, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service.

cal provisions (H. R. 17506) (Appendix T), was the same day presented in the House of Representatives by Mr. Smith, of Michigan, and referred to the House District Committee, receiving no further action. It is the judgment of the committee that such authority could safely be vested in the commissioners, and that if extended the power would not be unwisely exercised.

On April 26, 1910, Mr. Lever introduced in the House of Representatives a resolution (H. Res. 605) directing the House Committee on Agriculture to investigate the condition of milk, cream, cheese, and butter offered for sale or transportation in the District of Columbia, and to report its findings concerning the extent to which tuberculosis and other diseases are communicated to the human family by the sale of such infected articles of food, and to what extent tuberculosis is prevalent among farm and dairy animals in the District of Columbia; also to report to the House the reason for the failure to enforce the pure food law as it affects butter and butter products in the United States. The resolution was referred to the Committee on Rules, but failed of further action. A copy of the resolution is appended (Appendix U).

An amendment (Appendix V) to the health ordinances of the District, promulgated by the commissioners on May 28, 1906, specifies the actual content required for milk bottles or jars, and provides for the inspection and sealing of receptacles used for the delivery of milk and cream in the District of Columbia.

An act approved February 27, 1907 (Appendix W), amending section 878 of the District Code,<sup>1</sup> provides for the labeling of vessels intended for use in selling milk and cream, and specifies a penalty for violation of its provisions.

In order to maintain an absolutely impartial, uninfluenced inspection service, the District appropriation act approved March 2, 1907 (see Appendix X), prohibits any officer or employee of the health department to serve in his private capacity for compensation or reward any licensed dairyman or dairy farmer, or applicant for such license. This injunction extends also specifically against such employment by any manufacturer of or dealer in foods, drugs, disinfectants, or similar materials.

So far as the committee is able to learn there are no additional orders at present in contemplation by the health department affecting the production or distribution of milk to the Washington public, and no legislation is proposed by the District Commissioners beyond that embraced in the Senate bill referred to. Copies of the regulations of the health department at present governing the production and sale of milk are appended. (Appendix Q.)

#### DETAIL OF BOARD TO INVESTIGATE OUTBREAKS OF TYPHOID FEVER.

Three separate outbreaks of typhoid fever in Washington from contaminated milk between June and November, 1906, and the alarming increase in typhoid infection and resulting mortality aroused public apprehension and led to a systematic study of the sanitary conditions affecting the District of Columbia by authorities of the Public Health and Marine-Hospital Service, acting under request of the District

<sup>1</sup> U. S. Stat. L., XXXIV, 1006.

Commissioners, the investigations being conducted in cooperation with Dr. William C. Woodward, health officer. A board of officers was detailed to convene on July 2, 1906, for the purpose of investigating the origin and prevalence of typhoid fever in the District. The results of the investigations by this board have been published.<sup>1</sup> The board is still continuing its work, and a supplemental report, constituting the fourth of the series, is understood to be now in preparation for the press.

The board reported among its findings that the milk supplied to the citizens of the District has been, for the most part, old, dirty, and warm, there being no endeavor to maintain a cold temperature, especially from the farm to the city dairy and while in transit on the delivery wagons from the dairy to the householder. Of 172 samples tested during the warmer months only 16 were found to have a temperature of 50° F. or lower, and only 29 contained less than 500,000 bacteria per cubic centimeter, the average bacterial content assuming the enormous proportion of 22,134,289 per cubic centimeter. The great bulk of the milk sold in Washington during the summer months would, therefore, have been condemned in New York and prohibited from sale in Boston. The investigations of the board evidenced the fact that many of the dairies were unsuitably located in close proximity to stables and other insanitary surroundings. No attempt was made, except in a single instance, to screen the premises against flies, which are now recognized as a prolific source of contamination. The employees coming into contact with the milk had dirty hands, soiled clothing, and the milk was kept inordinately long before reaching the consumer, a period of almost 24 hours being occupied customarily in its handling at most of the dairies.

Of the 866 cases of typhoid fever investigated by the board about 10 per cent were attributed to infection conveyed by milk in the course of pronounced outbreaks among the customers of three milk dealers. In this connection the important fact developed that a local dealer whose record showed conspicuously the smallest number of cases of typhoid fever proportionate to the amount of milk dispensed was the only one at the time who sterilized his bottles and pasteurized the milk sold.

The board has unqualifiedly recommended the pasteurization of milk with a view to destroying any possible infection therein and at the same time not impairing its food value, this being in its judgment the most practical manner of preventing the conveyance of typhoid fever infection by milk.

The fact that the board found, in the case of 17 out of 38 dairies inspected, that some of the milk received between 8 and 10 o'clock in the morning did not leave the dairy until the following morning, showed, in its judgment, a lack of proper systematic cooperation between the shipper, the common carrier, and the city dealer, which concerted action should by all means be exerted in reducing to a minimum the interval of time elapsing between the milking and the actual delivery to the consumer.

Dr. Kober presented to the International Medical Congress, at Paris in 1900, the history of 195 outbreaks of typhoid fever, 99 of scarlet fever, and 36 of diphtheria, all traceable to the milk supply.

<sup>1</sup> Bulletins Nos. 35, 44, and 52, Hygienic Laboratory, Public Health and Marine-Hospital Service, issued in February, 1907, May, 1908, and October, 1909, respectively.

## SYMPOSIUM ON CAUSES OF TYPHOID FEVER IN DISTRICT.

In a symposium on the causes of typhoid fever in the District under the auspices of the District Medical Society on February 19 and 26, 1908, in which Dr. H. W. Wiley, Dr. H. M. Bolton, and Mr. C. B. Lane, of the Department of Agriculture, Dr. M. J. Rosenau, Dr. L. L. Lumsden, and Mr. J. H. Kastle, of the Bureau of Public Health and Marine-Hospital Service, Dr. G. Lloyd Magruder, and others participated, and which was followed by a discussion in which Gen. George M. Sternberg, Dr. George M. Kober, Dr. William C. Woodward, Dr. E. C. Schroeder, Dr. Henry G. Beyer, and others took part, the attitude of the committee of the District Medical Society with regard to the importance of the improvement of the local milk supply as a potential factor in the elimination of typhoid fever and other germ diseases from the District of Columbia was in a large measure confirmed.

## MILK EPIDEMICS.

The committee invites attention in this connection to a most interesting and valuable article by Passed Asst. Surg. John W. Trask, of the Public Health and Marine-Hospital Service, on "Milk as a cause of epidemics of typhoid fever, scarlet fever, and diphtheria,"<sup>1</sup> in which the following suggestions are offered for the detection, prevention, and reporting of milk epidemics:<sup>2</sup>

When in a city an unusual number of cases of scarlet fever, diphtheria, or typhoid fever occurs among the customers of any one dairy it may be considered a sufficient reason for causing a careful inquiry to be made and a search for some source of milk infection. The mere finding of cases on one milk route is not by any means conclusive that milk is the carrier of the infection, but it is sufficient to cast suspicion and at times, undoubtedly, also to warrant regulation, even if no source of contamination is found, for it is often exceedingly difficult to find the infective focus.

The health officers of many cities have for some time been charging each case of typhoid fever, scarlet fever, and diphtheria to the dairyman supplying the milk to the invaded household. In this way it is apparent when an unusual number occurs on one route, and measures can be taken to ascertain whether the incidence of the disease has an etiologic relationship to the milk. Cases which otherwise would show no relationship to each other are revealed as associated, and the milkman makes neighbors of families separated by considerable distances. In the complicated life of cities this gives the health officer a valuable aid in the control of certain of the common infectious diseases.

Inspection and regulation of the production, handling, and sale of milk will lessen the number of milk epidemics. In cities the proper charging of each case of scarlet fever, diphtheria, and typhoid fever to the dairy on whose route it occurs will often reveal milk outbreaks which can then be suppressed before reaching too great proportions. The most rigid inspection and regulation practicable at the present time, however, are impotent to prevent chronic bacillus carriers from being employed on milk farms and at dairies. They are also unable to keep mild ambulant cases of infectious diseases from being so engaged, for the reason that such cases often can not be diagnosed until after other cases have developed. Soper's cases<sup>3</sup> of "Typhoid Mary" was a constant danger in her capacity as family cook to the members of the family in which she happened to be employed and to visitors eating of the salads and food prepared by her, but what might have happened had she been employed in the handling of milk distributed over a large city route can only be surmised.

<sup>1</sup> Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service, pp. 23-115; March, 1909.

<sup>2</sup> Op. cit., pp. 47-49.

<sup>3</sup> Soper, George A., Jour. Am. Med. Assn., June 15, 1907, p. 2019.

The only way to prevent these epidemics entirely would appear to be to pasteurize or sterilize the milk, either at the dairy before delivery to the consumer or in the household after delivery.

In reporting milk epidemics, some of the points of special interest are the following:

1. The number of cases of the disease existing in the involved territory during the time covered by the epidemic.
2. The number of houses invaded by the disease.
3. The number of invaded houses supplied in whole or in part, directly or indirectly, by the suspected milk.
4. The number of cases occurring in invaded houses so supplied.
5. The number of houses supplied with the suspected milk.
6. The relative proportion of houses so supplied to those supplied by other dairies.
7. The time covered by the epidemic.
8. The location of the case or cases from which the milk became contaminated.
9. The relation of the original case to the milk.
10. The time relation of the original case to the epidemic.
11. The special incidence of the disease among milk drinkers.
12. The elimination of other common carriers of infection.
13. The effect upon the epidemic of closing the dairy or taking such measures as will eliminate possibility of milk contamination from the suspected focus.
14. The finding of the specific organism in the milk.

#### RESTRICTION ON MILK FURNISHED EMPLOYEES OF EXECUTIVE DEPARTMENTS.

The Secretary of Agriculture, under date of October 14, 1910, issued a special order to the bureaus, offices, and divisions of the department located in Washington (Appendix Y), enjoining the sale of milk within any building occupied by the department, not conforming to the requirements of the classification defined in Circular No. 114 of the Bureau of Animal Industry. After specifying the three grades of milk, namely, certified, inspected, and pasteurized, embodied in the recommendations of the Washington milk conference of 1907 on the suggestion of Dr. A. D. Melvin, the order stipulates that the milk must come from healthy cows properly fed; that are neither about to calve nor have recently calved; that it be drawn in a cleanly manner and promptly cooled; that all persons engaged in handling it be free from communicable diseases and of cleanly habits; that all receptacles into which it passes and all utensils and apparatus used in handling it be perfectly clean; and that, after having been promptly cooled, the milk be kept cool until delivered to the consumer.

This order was issued with the express purpose of precluding the sale within the buildings occupied by the department of (1) milk containing extraneous matter, (2) raw milk from cows not known to be free from tuberculosis, and (3) milk of unknown origin, unless pasteurized.

Following the initiative of the Department of Agriculture, orders have been issued by the Departments of State, War, Navy, Interior, and Commerce and Labor, requiring milk sold in buildings in Washington City under their respective jurisdictions to conform to the classification recommended by the Washington milk conference as defined in Circular No. 114 of the Bureau of Animal Industry. Copies of these orders are annexed. (Appendix Y.) Inquiry by the committee developed the fact that the Treasury Department has not promulgated such an order up to the present time; that the Post Office Department has issued none on the subject, "the department

considering it one coming peculiarly under the supervision of the District health authorities;" that, in view of the inconsiderable amount of milk purchased by employees, the Department of Justice contemplates no such action; and that the Smithsonian Institution and the Government Printing Office have taken no steps toward establishing requirements of this nature. No response was received from the Interstate Commerce Commission. Copies of the replies from the several heads of departments and bureaus are appended. (Appendix Z.) It will appear, therefore, that six out of the nine executive departments now insist that milk furnished employees at the buildings be from tuberculin-tested cows, and otherwise safeguarded against infection and contamination.

It is recommended that this action, with a view to insuring a purer milk supply for employees, be extended to embrace all the executive departments and independent establishments of the Government located at Washington.

#### REGULATIONS CONCERNING MILK FOR DISTRICT GOVERNMENT EMPLOYEES AND INSTITUTIONS.

Under date of November 8, 1910, the District Commissioners issued an order in the following terms (Appendix AA) :

*Ordered*, That the purchase of milk by the District of Columbia for use in institutions under its control is limited to milk that has been properly pasteurized or that has come from tuberculin-tested herds.

While this order is, in the opinion of the committee, a step in the right direction, it (differing from the orders recently issued by a number of the executive departments) permits milk that has not been pasteurized to enter institutions under control of the District government, with the safeguard only that it shall be from tuberculin-tested herds. In the opinion of the committee, the order does not go as far as it should, in that further than being limited to the product of tuberculin-tested cows, it should prescribe that all raw, unpasteurized milk should conform to the requirements for certified milk in the classification recommended by the Washington milk conference of 1907.

It may be noted in this connection that an order similar to that issued by a majority of the executive departments within the past few weeks, specifying the character of milk which shall be supplied to employees at the department buildings, has not been issued, protecting the employees of the District government. The committee is strongly of the view that such an order should be issued without delay.

#### DISPOSAL OF NATHAN STRAUS WASHINGTON LABORATORY.

Detailed reference is made in the chapter on infant feeding in this report to the recommendations, under date of December 7, 1910, of a special committee designated by the Commissioners of the District of Columbia to report upon the feasibility of acceptance by the District government of the offer of Mr. Nathan Straus to donate for public use the pasteurizing laboratory established by him in May, 1910, in Washington City, and to an account in the same connection of legislation proposed by Senator Gallinger for the operation of this plant under the control of the Surgeon General of the Public Health and Marine-Hospital Service, with the cooperation of the health office of the District of Columbia.

## V. THE TUBERCULIN TEST.

## EXTENT OF TUBERCULOSIS AMONG HUMANS.

Tuberculosis is responsible, in one form or another, for an astounding percentage of the deaths occurring annually throughout the United States. Statistics show that 14 out of every 100 persons who die in this country are affected to a greater or less degree with tuberculosis, and that throughout the entire country over 11 per cent of all deaths primarily result from this disease.<sup>1</sup> It may be assumed that probably many other deaths are additionally due to tuberculosis, though erroneously assigned to other causes. We may reliably estimate, therefore, that at least one-seventh of the aggregate number of persons dying in the United States are infected with tuberculosis. It is safe to assume, moreover, that in a very considerable number of these instances tubercular lesions exist without possible detection by means of clinical examination.

It is noteworthy in this connection that autopsies indicate that few human beings entirely escape tubercular infection, though this infection is, in a majority of cases, so relatively unimportant that many persons are not conscious during their lives of being so infected. Post-mortem examinations by three European investigators of 1,452 and of 500 and 100 bodies, respectively, of persons who died from various causes, showed among this total of 2,052 bodies that not less than 91 per cent contained lesions of tuberculosis.

Since, furthermore, tuberculosis is obviously responsible for the death of cattle in large numbers, being beyond all measure the most destructive malady affecting beast and man, every known safeguard should be interposed to arrest the progress of this dread disease and to finally accomplish its extermination.

A compilation of statistics of investigators embracing 1,734 samples of milk examined in recent years deduces the fact that 11.3 per cent of the samples examined were found to contain tubercle bacilli.

It has been asserted by Dr. E. C. Schroeder, superintendent of the Bethesda Station of the Bureau of Animal Industry, and one of the foremost authorities in the world on the subject of bovine tuberculosis, that fully 1 sample among every 12 of milk sold throughout the country by dairies contains living, virulent tubercle bacilli, which conclusion is based on four of the most recent and reliable investigations on the subject.

In his summary of our information on the subject he adverts to the fact that tuberculosis is the commonest disease of human beings and dairy cows; that tuberculous cows expel tubercle bacilli long before they show signs of their diseased condition; that milk is so often infected with virulent bacilli that, unless we know it to be derived from cows that are certainly free from tuberculosis, it is not safe to use it in the raw state; that tubercle bacilli in milk are transferred to cream, butter, and cheese made from it, and may occur in these products in greater concentration than in the milk from which they were derived; that the available evidence regarding the different types of tubercle bacilli shows that bacilli of bovine types have been found in human lesions and human types in bovine lesions, and

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<sup>1</sup> Census report for 1900.

that tubercle bacilli of the bovine type are, as a general rule, more virulent than those of the human type for all animals.

Of prime importance in the eradication of tuberculosis is the possession of some adequate means of diagnosing its symptoms during the period of incubation and in its preliminary stages, so as to avoid the communication of the infection from the affected individual long before the existence of the disease may be established by clinical examination.

#### DISCOVERY OF TUBERCULIN.

This diagnosis has been made possible for animals by the epoch-making discovery of tuberculin in 1890 by Dr. Robert Koch, the world-famed specialist on tuberculosis. Tuberculin is the sterilized and filtered glycerin extract of cultures of tubercle bacilli. It does not contain the bacilli themselves, but the cooked products of the growth of these bacilli. When injected under the skin of a normal animal no effect whatever is produced. If, however, the animal is tuberculous a decided rise of temperature ensues.

Tuberculin was first used experimentally in treating tuberculosis in man. The fact that its injection occasioned a rise in temperature in tuberculous persons led veterinarians to apply tuberculin similarly to animals, and since 1891 the use of tuberculin as a diagnostic agent for tuberculous cattle has been almost universally availed of in all parts of the civilized world.

#### METHOD OF APPLICATION OF TUBERCULIN TEST.

The test is applied in practice by taking the temperature (usually three times at intervals of 2 hours) to ascertain the normal variations of temperature of the animal to be tested. The dose of tuberculin is then injected hypodermically between 8 and 10 p. m. on the same day, and on the following day, beginning at 6 a. m. and continuing until 20 hours following the injection, temperatures are recorded every 2 hours. If the temperature increases, the animal is said to "react," or in other words to respond to the test, which reaction indicates conclusively in general that tubercular infection exists.

#### IMPORTANCE OF TUBERCULIN AS DIAGNOSTIC AGENT.

This infection may be absolutely unobservable and undetectable visually. There may be nothing whatever to indicate an unhealthy condition in the animal, which may be fat, sleek, and apparently in the most robust health, even the most careful detailed clinical examination failing to evidence the diseased condition. It is this well-established fact that a cow may be experiencing a considerably advanced stage of tuberculosis and not give evidence of the existence of the disease in any outward appearance on the closest physical scrutiny that makes the tuberculin test an invaluable asset in establishing the diseased condition in time to prevent the spread of the infection to other animals in the herd, as well as to insure against the intermittent contamination of the milk of the diseased animal by tubercle bacilli.

It is estimated by the authorities consulted by the committee that from 24 hours to 3 days is requisite for applying the test, the

chief of the Bureau of Animal Industry stating that 24 hours is, on the average, required, covering part of 2 days. Dr. C. J. Marshall, of the veterinarian department of the University of Pennsylvania, is authority for the statement that an experienced man can test as many as 100 head of cattle in a single night.

Dr. Woodward states that, as a matter of practice, the tuberculin test would ordinarily require to be applied on the farm, though some cattle might, in his judgment, be tested in the hands of dealers, and possibly quarantine or testing stations might be established for economy in applying the test.

It may be added that tuberculin is quite inexpensive, costing approximately 10 cents per dose for a single cow, and is, besides, distributed by the Department of Agriculture gratuitously to owners of herds in all parts of the United States who are willing to accept it upon the terms elsewhere indicated in this report. It is not a proprietary preparation, but is compounded for the market by a number of manufacturing chemists, and is easily procurable.

#### TEST PRODUCES NO HARMFUL EFFECTS.

The contention that the application of the tuberculin test has a permanently prejudicial effect upon the animal tested is, in the judgment of the committee, unsupportable, since it is generally recognized that when prepared for use tuberculin contains no germs of tuberculosis and is absolutely incapable of producing any disease. It has been demonstrated, moreover, at the Bethesda Experiment Station of the Department of Agriculture, that as high as 1,000 doses of tuberculin administered at a single time has produced no appreciable injury in healthy animals, and cattle killed after the injection of larger quantities of tuberculin have shown no symptoms of abnormal conditions. It has been clearly proved also that the application of the test does not in any way interfere with the milking function in healthy cattle, nor has any variation been detected in the quantity of milk given or in its butter-fat value.

The test should be applied, however, only when the temperature of the animal is normal, and not within 15 days before or 5 days after parturition.

Since tubercle bacilli and colon bacilli are the only pathogenic micro-organisms contained, as a rule, in milk as taken from the cow (typhoid, diphtheria, scarlet fever, and other germs being introduced subsequently by contamination), the tuberculin test would appear to be the only precautionary measure of this nature which should be required by law to be made.

#### PROPOSED RESTRICTION OF USE OF TUBERCULIN.

There is a lack of harmony among those consulted by the committee as to whether the application of tuberculin should be restricted to officials of the Government and its duly authorized agents, though there is a preponderance of opinion in favor of such restriction. Some authorities, however, believe that governmental, or duly qualified and licensed, veterinarians should be allowed to administer the test. The Surgeon General of the Navy agrees with the Chief of the Bureau of Animal Industry that its use should be restricted to prop-

erly authorized officials, while the Surgeon General of the Army takes the view that such restriction is not necessary, with the reservation, nevertheless, that the certificate of authorized officials or agents only should be recognized. Dr. Crichton, commissioner of health of Seattle, Wash., is most emphatic in his indorsement of the suggestion that the use of tuberculin be restricted, since, as he states, a tuberculin test is valueless unless it be known that the stock has not been previously tested. Mr. Corbin Thompson, representing the Dairymen's Association, affirms that the Government should control tuberculin, that only qualified veterinarians should be allowed to use it, and that they should be required to report each test made. Borden's Condensed Milk Co., on the other hand, contends that to withhold tuberculin from the profession, assuming that such a thing is possible, and to restrict its use entirely to governmental agents, would be an unfair discrimination against the needs and rights of individual cattle owners and an unjust restriction on the veterinary profession. The Walker-Gordon Laboratory, of Washington City, observes that the proposed circumscription of its use to qualified and trustworthy persons should be practicable, and would unquestionably be advisable, since it is a well-known fact that after one injection an animal may not again react for "even six months later."

While it is, for obvious reasons, not practicable to limit its production and circumscribe its distribution to official agencies, as is done in the case, for example, of paper especially prepared for the printing of currency by the Federal Government, it is, in the judgment of the committee, feasible to require that all tuberculin manufactured in one State and offered for sale in another should measure up to a prescribed standard and be administered only by authorized veterinarians, or other skilled persons, under the supervision of the Federal Government, so far as this coincides with the powers granted by the Federal Constitution for the regulation of interstate commerce, as exemplified by the food and drugs act of 1906 and other enactments of the Federal Legislature having relevancy to the subject.

ADULTERATION OF TUBERCULIN SHOULD BE PROHIBITED UNDER SEVERE PENALTY.

Any attempts to adulterate or otherwise impair the efficiency or value of tuberculin as a diagnostic agent should be severely punished. Such punishment should, furthermore, extend with equal force to persons convicted of inoculating cattle with the intent and purpose of rendering them immune for a period of time thereafter to reaction under the tuberculin test, for it is known that animals may in this manner be made unsusceptible to reaction for so long a period as three months or more. It is advised by competent authorities that the test be applied to all cattle once in every six months or at least once each year. With a view to the proper enforcement of the safeguards against immunization, every druggist or other person dispensing tuberculin should be compelled to register each sale and maintain a detailed record of all such transactions for the scrutiny of the supervising officials. It should also be required that every veterinarian or other practitioner applying the tuberculin test make an accurate report thereof to the duly constituted authority, and

that all animals tested be tagged or otherwise individualized so as to enable an intelligent observance of the provisions of the statutes and ordinances to govern such matters.

CONDITIONS IMPOSED BY BUREAU OF ANIMAL INDUSTRY IN APPLYING  
TUBERCULIN TEST.

The act regulating the sale of milk in the District of Columbia, approved March 2, 1895, providing, inter alia, that it shall not be lawful for any person to offer for sale within the District milk taken from any cow known to be suffering from tuberculosis, an examination was made under the auspices of the Bureau of Animal Industry of the Department of Agriculture of all cattle within the District as well as of such cattle in the adjacent States of Maryland and Virginia furnishing milk for consumption in the District whose owners volunteered to submit their herds for examination. As a condition precedent to the making of the test by the Bureau of Animal Industry, an understanding was entered into in each instance between the cattle owner and the bureau, by the terms of which the owner engaged himself as follows:

1. I will cause all animals which react to the tuberculin test and which also show other marked symptoms of tuberculosis to be slaughtered within a reasonable time under the United States meat-inspection regulations, and I will cause the carcasses of said animals to be disposed of according to the meat-inspection regulations of the Bureau of Animal Industry, based upon the lesions found upon inspection.

2. I will cause all animals which react to the tuberculin test, but which show no other evidence of tuberculosis, either to be slaughtered and disposed of as herein, provided for animals which show also other evidence of tuberculosis, or I will cause such animals to be removed from the herd and portion of the farm upon which the healthy animals of the herd are maintained, and I will cause the diseased animals to be segregated from the healthy animals, and thereafter they shall remain so segregated.

3. In all cases where the milk from such segregated reacting cows is to be used for any purpose whatever I will cause the said milk to be sterilized.

4. Segregated reacting bulls may be used for breeding, provided they are held on leash and are not permitted to leave the premises reserved for their use, and provided the healthy cows bred to such bulls are not unduly exposed to infected premises or to other diseased cattle.

5. I will cause the young from segregated reacting animals to be removed from their mothers at birth, and will not permit the said young to suck their mothers.

6. Any of my premises contaminated by reacting animals will be submitted by me to a thorough disinfection under the direction or supervision of the Bureau of Animal Industry.

7. All cattle owned by me, both healthy and tuberculous, I will mark, or allow to be marked, in such manner as to enable their identity to be retained, and I will not change the location of or slaughter any tuberculous cattle except after due and timely notification to the Bureau of Animal Industry, stating the exact nature of the change of location, or the exact date, name, and address of the official establishment at which the animal or animals are to be slaughtered.

8. I will add no cattle to the said herd which have not passed a tuberculin test with the tuberculin prepared by the Bureau of Animal Industry, administered by a licensed veterinarian of the State, an authorized public agent qualified to perform such test, or by an inspector of the Bureau of Animal Industry: *Provided*, That I may purchase cattle to be added to my herd if the said cattle are kept effectually separated from the rest of my tuberculin-tested cattle until the same can be tuberculin tested, and I will immediately notify the Bureau of Animal Industry and the local board of health that these cattle are on my premises subject to test.

9. I will comply with all reasonable sanitary measures which are indicated by the proper officials of the State or Territory wherein my herd is located, or by the local board of health under whose permit I am disposing of dairy products, or by the Bureau of Animal Industry.

#### RESULTS OF TESTS AFFECTING DISTRICT MILK SUPPLY.

Prior to October, 1907, according to Dr. John F. Anderson, director of the Hygiene Laboratory of the Public Health and Marine-Hospital Service, 1,147 cows in the District of Columbia were subjected to the tuberculin test, and of this number 214, or 18.6 per cent, responded. About the same time 1,059 cows from 51 herds in Virginia, Maryland, and the District of Columbia, supplying milk to Washington, were tested, of which number 160, or 15.1 per cent, reacted. Even these figures fail to present a fair idea of the prevalence of tuberculosis in the herds supplying milk to Washington, since apparently only the owners of those herds who had reason to believe their cattle free from tuberculosis permitted the tests to be made.

In the fall and winter of 1908, 272 samples of the market milk of Washington were injected, under the direction of Dr. Anderson, into guinea pigs. Deducting from this number 49 of the animals that died of causes attributable partly, at least, to the effects of other bacteria, 15 of the remaining 223 samples, or 6.72 per cent, contained sufficient tubercle bacilli to cause typical tuberculosis in the inoculated animals. It should be explained in this connection that the upper stratum of cream was not used in these inoculations, and that it has been shown that tubercle bacilli are more frequent in this layer than in the bottom milk. It is reasonable to suppose, therefore, that if both cream and sediment had been used the percentage of positive results would have been much higher. This investigation disclosed the further fact that the milk from 11 of 102 dairies in the District contained tubercle bacilli, a percentage of 10.7 of the dairies examined showing tubercle bacilli in the milk supply to their customers. These results, observes Dr. Anderson, are sufficiently emphatic to show the necessity for the enactment and rigorous enforcement of a law requiring that all cows supplying milk to the District of Columbia be tuberculin tested by a competent veterinarian, and that those animals which respond be disposed of in such manner that their milk may no longer be a source of danger to the community.

It was estimated in 1909 by Dr. John R. Mohler, of the Bureau of Animal Industry, Department of Agriculture, that from 15 to 25 per cent of all the cows supplying milk to the District of Columbia were tuberculous, and no less an authority than Dr. Melvin, Chief of the Bureau of Animal Industry, is responsible for the statement that tuberculosis existed to a very considerable extent up to the time of the general application of the tuberculin test to all cattle in the District of Columbia. Of 1,701 cattle tested with tuberculin, 319 reacted to the test—that is to say, gave evidence of tubercular infection—and 2 additional cattle were held as suspects for testing at a later date, about 19 per cent of all animals tested proving to be tuberculous.

During the period from April, 1907, to June, 1909, inclusive, the Bureau of Animal Industry supervised the testing of 2,471 cattle in herds supplying milk to the District of Columbia. These tests gave 377 reactions, showing more than 15 per cent of the cows to be tuberculous. In Virginia, from July 1, 1909, to June 30, 1910, 899 cattle

were tested, of which 162 gave indications of tuberculosis and 39 were held as suspicious, a percentage of 18.27 of all animals inspected being shown thereby to be affected to a greater or less degree with tuberculosis.

During the same period the application of the test to 289 head of cattle in Maryland resulted in 48 reactions and 6 suspects, with a consequent percentage of 15.74.

It is conspicuously noteworthy that during the same interval there were retested in Virginia 966 animals, of which 923 passed examination, only 39 reacted, and 4 were held for further examination, making a percentage on the retest of 4.45, which result contrasts strongly with the percentage of 18.27 reactors and suspects among cattle subjected in the first instance to the test.

A similarly remarkable improvement in the conditions of the herds, so far as infection with tuberculosis is concerned, was evidenced in Maryland, when on retest 301 animals successfully withstood the test, while only 5 reacted and 3 cases were suspicious, making a percentage, including those reacting and suspected, of 2.58, a marked reduction from the percentage of 15.74 shown in the original test.

A retest of cattle in the District, embracing 455 individuals, showed 423 to be free from tuberculosis, 31 reacting, and 1 suspect, evidencing a very gratifying reduction in the percentage to 7.03.

These examinations have demonstrated beyond question the feasibility of eliminating tuberculosis from existing herds at the conclusion of not more than three or four tests. Frequently a herd has been found to be clear of tuberculous infection on a second test.

Aside from the efficacy of the test in eliminating diseased cattle from the herds, the same examination gave convincing evidence of the remarkable accuracy and reliability of the application of tuberculin in indicating infection with tubercle bacilli. In the tests made in the District of Columbia tuberculosis was demonstrated in cattle which reacted in something over 98 per cent of the cases, and in examinations of 126 cattle in and near the city of Washington tubercular lesions were found in 99.21 per cent of the cases which reacted, showing an error of but seventy-nine hundredths of 1 per cent.

#### RESULTS OF TESTS THROUGHOUT THE UNITED STATES.

By consulting a statement prepared by the Bureau of Animal Industry, giving the results of the tuberculin testing of cattle by State and Federal officers, we find that between 1893 and 1908 there were tested 400,008 cattle in all parts of the United States. Of this vast number 37,000 head reacted to the test, yielding a percentage of 9.25 of all cattle tested. Of the number reacting, 24,784 were slaughtered under inspection, and upon post-mortem examination 24,387, or 98.39 per cent, of these were shown to be infected with bovine tubercle bacilli.

At the Bethesda Experiment Station of the Department of Agriculture a number of District herds, apparently in the best of health so far as evidenced by physical examination, were subjected to the tuberculin test, and 40 per cent of these animals reacted. The reacting animals were shown to be intermittently expelling tubercle bacilli, and, since the commonest mode of expulsion of the bacilli from the body of the cow is with her feces, the very general contami-

nation of milk from this source during the ordinary process of milking compels the conclusion that tuberculosis among dairy cows is one of the greatest dangers to which the public is exposed, and that every effort should be exerted to remove this very prevalent cause of the disease among human beings.

The accuracy of tuberculin as a diagnostic agent has, as has been stated, been established in over 98 per cent of the cases tested. The only instances, generally speaking, in which it has not been efficient are when the disease is in an advanced stage and has become so generalized that the ordinary dose of tuberculin has no appreciable effect with so much natural tuberculin in the system of the animal (in which condition the effects of the disease are usually clearly observable by visual examination), or when, by reason of the application of the tuberculin test shortly before, the animal fails to react or respond, which tendency to unresponsiveness lasts generally about six weeks. The test is also inoperative in certain instances which are, however, as a rule clearly detectable by the veterinarian when making the examination.

It was represented by the milk producers and dealers at the hearings of the committee that the proposed enforcement of the tuberculin test was impracticable and onerous for the reason that the reliability of tuberculin as a diagnostic agent had not been established, and for the further reason that, if the test be insisted upon, the milk producers would refuse to submit their herds to the test and would ship their product to Baltimore and other markets, causing a permanent shortage in the milk supply of the District and a correspondingly increased price to the consumer, rendering it impossible for the poorer classes to purchase milk, thereby compelling the use by them of prepared milks and other substitutes of alleged inferior quality.

#### TUBERCULIN TEST MANDATORY IN DISTRICT OF COLUMBIA.

It is perhaps not generally known to the public that the tuberculin test has been compulsorily applied in the District of Columbia; that is to say, that all cattle actually maintained within the boundaries of the District have been subjected to the test since November 27, 1909. This observation does not extend, however, to herds in Maryland and Virginia, from which the major portion of our milk supply is obtained.

On the date mentioned the District Commissioners issued a series of regulations (Appendix AB) providing for the compulsory tuberculin testing of all cattle within the District, as a result of which practically all the cattle in the District have now been subjected to the test.

The first prosecution under the above regulations was undertaken in the local police court since the date that this committee commenced its investigations. The defendant was arraigned on the charge of violating section 4 of the regulations, in not permitting inspecting veterinarians to apply the tuberculin test to a cow on November 28, last. On an agreed statement of facts, argument was had resulting in a verdict against the defendant. The defendant was not represented by counsel, and it is not known whether the case will be appealed. It is expected that the decision in this case will confirm

the right of the District authorities to enforce the above regulation against owners of cattle, even where the product is not offered for sale or used outside the owner's family.

#### RELIABILITY OF TEST AFFIRMED BY AUTHORITIES.

The tuberculin test, states Dr. Schroeder, is now almost universally accepted by veterinarians as a practically infallible means of diagnosis, and while we know that all cases of tuberculosis diagnosed with the aid of tuberculin are not at the time dangerous and may not become so in some instances until many months have passed, we are obliged by the exigencies of the case to assume that, for all practical purposes, every tuberculous cow is dangerous from the moment she is known to be affected. It is not feasible, therefore, in eradicating tuberculous animals from existing herds, to distinguish between dangerously and not dangerously tuberculous cows. Since, however, from the viewpoint of the milk supply, this may, as has been stated, even when the animal is in the early stages of infection, be contaminated, the advisability of at once segregating the diseased animal can not be questioned. It is interesting to note that animals of entirely healthy appearance, apparently fat, sleek, and well fed and with good appetites, may be already actually diseased with tuberculosis to a somewhat advanced stage, and that as a rule cows which are visibly tuberculous have very probably been dangerously affected for several years.

The profound value of tuberculin in enabling an accurate diagnosis of animals infected in a greater or less degree with tuberculosis is due, we may repeat for emphasis, to the fact that cattle, acting in all respects like healthy animals and whose bodily condition is apparently better than can be expected of ideal dairy cows that give large quantities of milk and have excellent appetites and no visible or audible respiratory difficulties, may have their tuberculous condition revealed in this manner. It is only when the substances that are eliminated from their bodies—feces, saliva, milk, etc.—are subjected to microscopic and other tests that the proof is obtained of the dangerous character of the diseased animals toward the public health and the health of other animals.

Authorities communicated with by the committee mainly agree that the tuberculin test affords a wonderfully accurate diagnosis of tuberculous infection in bovine animals. Dr. Perrow, health officer of Lynchburg, Va., is authority for the statement that one herd of 150 cows in Lynchburg showed only one reaction. On killing it was manifested that the animal reacting had one lung badly affected.

It is interesting to note that 33 municipalities in the United States now require that herds which supply their milk be tuberculin tested and that the error in the application of the test has never been found in any of these jurisdictions to be greater than 3 per cent. Some communities which do not insist upon the application of the tuberculin test require, nevertheless, that all animals coming into their jurisdiction to be used for dairy purposes be subjected to the test without reaction or be shown to have recently successfully withstood the test.

During the past year laboratory experiments have been made by the Bureau of Animal Industry, testing by microscopic examination

and animal inoculation the glands of cattle which had reacted to the tuberculin test, but in which lesions were not found by ordinary post-mortem examination. In more than half of the cases tubercle bacilli were positively identified, showing that tuberculosis was really present in these carcasses in an incipient form, the lesions being too slight for detection by ordinary post-mortem examination. The percentage of accuracy of the tuberculin test may be said, therefore, to be even higher than indicated by the figures previously stated.

REPORT OF INTERNATIONAL COMMISSION ON CONTROL OF BOVINE TUBERCULOSIS.

In this connection, reference should be made to the very valuable report recently submitted by the International Commission on the Control of Bovine Tuberculosis, an advance typewritten copy of which is in possession of the committee (Appendix AC), the report having not yet been printed for distribution. The report was not only agreed to without dissent by the members of the commission, but received subsequently the unanimous approval of the American Veterinary Medical Association at its recent convention in San Francisco. The labors of the commission extended over the period of a year.

At the meeting of the American Veterinary Association at Chicago, Ill., in September, 1909, the following gentlemen were constituted an international commission to study the methods of the control of bovine tuberculosis and to report its conclusions at the next annual meeting of the association. In order that all interests affected might be adequately represented, the commission embraced among its personnel Senator W. C. Edwards, a member of the Canadian Parliament and one of the most extensive live-stock breeders of the Dominion; J. J. Ferguson, chief of the animal husbandry work of Swift & Co., Chicago, Ill.; J. W. Flavelle, head of one of the large packing companies of Canada; W. D. Hoard, editor of Hoard's Dairyman (a representative journal of the dairy interests) and a former governor of Wisconsin; C. A. Hodgetts, health officer of the Province of Ontario, Canada; J. N. Herty, secretary of the Indiana State Board of Health; Dr. John R. Mohler, chief of the pathological division, Bureau of Animal Industry, United States Department of Agriculture; V. A. Moore, professor of pathology, Cornell University; M. P. Ravenel, professor of bacteriology, University of Wisconsin; M. H. Reynolds, professor of bacteriological science, University of Minnesota; E. C. Schroeder, superintendent of the Bethesda Experiment Station, United States Department of Agriculture; T. W. Tomlinson, secretary of the American National Live Stock Association; F. Torrance, professor of bacteriological science, University of Manitoba; and J. G. Rutherford, veterinary director general of Canada. A cursory inspection of the make-up of this commission gives absolute assurance of the soundness of its conclusions, and breadth of view is guaranteed by the diversity of interests represented. Notwithstanding the participation in the labors of the commission, of recognized representatives of the packing and dairy interests, the report of the commission was a unanimous one. It is prefaced with a reference to the great economic and sanitary

significance of animal tuberculosis to the live-stock industry of America and the factors which must be accounted with in formulating successful measures for its eradication. The commission restricted its activities to the ascertainment of reasonable and economically practicable methods or systems to be recommended to both officials and live-stock owners for eradicating this great scourge of domestic animals. It averts to the fact that tuberculosis is increasing rather than declining among cattle and other animals, and, that as this disease is one of the strictly preventable infections, there is good ground for the belief that, through the formulation and enforcement of proper regulations, tuberculosis among animals may eventually be entirely suppressed.

The commission recognizing, after careful study, that the tuberculin test is the fundamental factor in any policy having for its object the control of bovine tuberculosis, recommends that, as a general policy, all contact between tuberculous and healthy cattle and between healthy cattle and stables, cars, etc., which may contain live tubercle bacilli, be prevented; that there should be no sale or exchange of animals affected with tuberculosis except for immediate slaughter (and for breeding purposes under official supervision); that all live-stock shippers should take every precaution to see that all cars furnished are thoroughly cleansed and disinfected before use; that tuberculin properly used is an accurate and reliable diagnostic agent for the detection of active tuberculosis (though tuberculin may not produce a reaction when the disease is in a period of incubation, when its progress has been arrested, or when it is extensively generalized, which last condition is relatively rare and may usually be detected by physical examination); that all exposed animals should be retested at intervals of 6 months to 1 year; that the tuberculin test should not be applied to any animal having a temperature higher than normal; that any animal having given one distinct reaction to tuberculin should thereafter be regarded as tuberculous; that the subcutaneous injection of tuberculin is the only method of applying same for the detection of tuberculosis which can be recommended at the present time; that the injection of tuberculin has no injurious effect on healthy cattle; and that a positive reaction to tuberculin in any properly conducted test, official or otherwise, in any animal in any herd shall be considered evidence sufficient upon which to declare the herd to be infected.

The commission proceeds to recommend the passage of legislation providing for the compulsory notification, by owners and veterinarians, of the existence of tuberculosis in a herd, whether such information result from clinical examination or from the tuberculin test, and favors the adoption of some system of marking, for the purposes of identification, of all cattle 3 years old or over shipped for slaughter.

In order to insure the eradication of tuberculosis the commission further specifies the necessity of separating healthy and diseased animals, maintaining that if a herd be found to be extensively infected, even the apparently healthy animals should be regarded with suspicion until they have been separated from the reacting animals for a period of at least 3 months, after the expiration of which those animals not reacting to the tuberculin test may be considered healthy and classified accordingly.

The commission suggests that a policy of compensation be pursued as useful, proper, and necessary, and as a temporary measure that, when tuberculosis exists in a herd to which a policy of slaughter and compensation can not reasonably be applied, such herd be compulsorily dealt with by the owner under Government supervision on the principle of the separation of all sound animals from those affected, and that in the event of anyone refusing or neglecting to comply with this requirement, his entire herd be closely quarantined and sales therefrom entirely prohibited; that when slaughter is necessary, in order to avoid economic loss, every effort be made to utilize, as far as possible, the meat of such animals as may be found fit for food; that, except when purchases are made from disease-free herds tested by a properly qualified individual, persons buying for breeding purposes or milk production, limit their purchases to animals successfully withstanding the tuberculin test; and that, in order to assist in properly carrying out this suggestion, official authorities adopt such regulations as will prevent the entry into their respective territories of cattle for breeding purposes or milk production unless accompanied by satisfactory tuberculin test charts.

The commission further recommends that all milk and milk by-products used as food be properly pasteurized unless derived from cows known to be free from tuberculosis; and, furthermore, that legislation be enacted inhibiting the sale, distribution, or use of tuberculin by any persons not acting with the full knowledge or under the direction of official authorities.

The commission concludes with a recognition of the necessity for a widespread campaign of education on the subject of its deliberations and the importance of the cooperation of the press in convincing the public of the vital importance of the life of farm animals to the welfare of all classes of society; and with a reference to the desirability of uniform legislation regarding the control and eradication of tuberculosis, it being recommended that the laws of the United States, Canada, and other American countries governing the admission of animals from without be made stringent and assimilated, so far as possible, as well as those regulating the interstate and interprovincial movement of cattle. It dwells additionally upon the urgency of legislation to prevent the various frauds which interfere with the satisfactory use of tuberculin as a diagnostic agent and points to the necessity of making cattle as resistant as possible to infection by stabling them in clean, disinfected, and properly ventilated and lighted barns, giving them abundant, clean water, nutritious food, a sufficient amount of daily exercise in the open air, and by providing such other conditions as are well known to contribute to the health of animals, including the daily removal of manure from stables and the installation of water-tight floors and proper drainage.

The foregoing recommendations were made by the commission with the primary purpose of eradicating tuberculosis among animals as an economic problem. The necessity for their adoption is magnified manifoldly when we consider tuberculosis among animals in its relation to the problem of conserving the public health.

The commission concludes its report with the admonition that the eradication of tuberculosis among animals should have the approval and support of all persons who are interested in curtailing human

suffering and prolonging human life. The campaign of education recommended must, it urges, to be effective, be accompanied with a measure of disciplinary control, accomplished through conservative legislation calculated to insure active cooperation on the part of cattle owners and enforced with tact and determination.

It may be concluded from the foregoing observations that the tuberculin test is a wonderfully accurate method of detecting tuberculosis; that the application of tuberculin has no injurious effect upon healthy cattle, and that its employment in diagnosing the disease in animals makes possible the eradication of bovine tuberculosis.

#### CONTEMPLATED ADVANTAGES OF THE TUBERCULIN TEST.

The advantages which should result from the enforcement generally in a given jurisdiction of the tuberculin test are well specified by Surg. Gen. Wyman, of the United States Public Health and Marine-Hospital Service. He says:

The enforcement of the tuberculin test would reduce the amount of tuberculosis among dairy cattle and free the milk supply from tubercle bacilli, with the probable result that the incidence of tuberculosis among hogs fed on creamery skimmed milk would be reduced and the incidence of infection with the bovine tubercle bacilli among human beings would be practically eliminated.

Freeman is authority for the statement that the enforcement of the tuberculin test will effect a marked diminution in infant mortality, which opinion is shared by Ravenel, Winslow, Vaughan, and Prescott, who include adults as well in their commentary, while the Chief of the Bureau of Animal Industry, the Surgeon General of the Army, and the Surgeon General of the Navy unite in the judgment that it may be used in a rational way to eradicate tuberculosis from cattle with good economic results to the live-stock industry. Dr. T. Alexander Geddes, who has pursued studies and observations on this subject in European countries, refers to the great advantage which would inure to the owners of herds from the fact that it takes less foodstuffs to produce results in a healthy animal than in a tuberculous one, which is especially true where glands of the intestinal tract are involved. Dr. Perrow, health officer of Lynchburg, Va., calls attention to the difficulty of enforcing the test and enjoins that it be introduced gradually, while Dr. Wheeler, health officer of Portland, Oreg., claims that it will, by removing diseased cattle from the market, give us better meat for table use. The enforcement of the test would furthermore, it is observed by Dr. Babb, dairy and milk inspector of Topeka, Kans., aid in educating the people to greater caution among themselves with respect to human tuberculosis. Borden's Condensed Milk Co. takes the position that in the present state of the dairy business a general enforcement of the tuberculin test and the slaughter of reacting cows would produce a great financial injury to the dairy business and a loss to the people of the country in depriving a great majority of a large portion of their milk supply. The time is not ripe, in its opinion, for the inauguration of the test. The representatives of the Milk Producers' and Dairymen's Associations furnishing milk for local consumption claim that the requirement of the tuberculin test will result disadvantageously and lead to exorbitant prices for milk.

## COST OF APPLYING TEST.

Regarding the criticism that the making of the tuberculin test necessarily involves a considerable expense, which would work a hardship upon the owner of cattle if the test be demanded, it should be explained that the better part of two days is required in practice for effectually applying the test, irrespective of whether the herd comprises 5 or 50 head, requiring, if properly done, the actual attendance of the veterinarian during this period of time. However, the expense of testing might, it is believed, be materially reduced by providing the requisite number of officials (under Federal, State, or municipal direction) to make such tests, which plan, it is conjectured, would reduce the cost to the owner to \$1.50 per head of cattle, regardless of the number of cattle in each particular herd. In the absence of such an arrangement it is manifest that the expense of having, for example, 2 or 3 cattle tested would be markedly greater than where a herd contains 20 or more individuals, since the time required to make the examination is approximately the same where a considerable number of animals is concerned as when a single individual is tested.

The actual expense of applying the test, including the services of a veterinarian, depends largely upon the size of the herd tested and its convenience of access by the veterinarian. It is estimated by the Chief of the Bureau of Animal Industry that the test can probably be made, if not done gratuitously by the Government, at an average cost to the owner of \$1 per cow. Borden's Condensed Milk Co. intimates that it is practically impossible to make an intelligent suggestion as to the approximate expense unless the conditions under which the test is to be applied are given, but that, in general, if the herd is not over 3 miles distant from the office of the veterinary, the testing can be done for \$15 on a basis of 25 cows in the herd, for \$20 on a basis of 50 to 75 cows in the herd, and for \$25 for 100 cows in the herd, including the cost of tuberculin, which is about 5 cents per test.

## SHOULD GOVERNMENT OR HERD OWNER DEFRAY EXPENSE OF TEST.

There has been considerable discussion throughout the country as to whether, in the event of the insistence upon the tuberculin test, the cost of the test should be defrayed by the National, State, or Municipal Government, as the case may be, or by the herd owner. The Chief of the Bureau of Animal Industry asseverates that the Federal Government or the State should bear the expense of making the test when officially required in the interest of the public health, the Department of Agriculture being willing to test without charge herds supplying milk to the District of Columbia, and to extend cooperation so far as possible to State and municipal authorities elsewhere throughout the country. This view is coincided in by the Surgeon General of the Army and the Surgeon General of the Navy, while varying positions are taken in the matter by other authorities consulted by the committee, some contended that the States should undertake the expense for a fixed period; others that, if compulsory, the Government should bear the expense, while, if voluntary, this should be assumed by the owner; while still others suggest that the

expense be shared equally by the Government and the owner. The president of the Milk Producers' Association supplying Washington recommends that two-thirds of the expense be borne by the Government and one-third by the owner.

Generally speaking, the expense of applying the test should, in the judgment of the committee, devolve upon the government (State or municipal). The necessary cost of testing would be slightly reduced to the State or municipality by the furnishing gratuitously by the Bureau of Animal Industry of tuberculin for the purpose. In accordance with what is known as the "half and half" principle of appropriating for the needs of the District government, the cost should, so far as the testing of cattle supplying milk to the Washington market is concerned, be provided, in the committee's view, one-half from the Federal Treasury and one-half from the revenues of the District of Columbia.

It should be observed that many farmers, intent upon improving their herds and with a conscientious desire to furnish for consumption only milk of a high standard of purity calculated to be free from causation of sickness and mortality, have, up to the present time, voluntarily and anxiously submitted their cattle to the tuberculin test, notwithstanding the fact that this expense on their part has been practically without appreciable advance in the price received by them for their output of milk or for the cattle tested.

The indisposition on the part of certain farmers to submit their herds to the tuberculin test is not a matter of surprise, since it is the history of all reforms that objection, largely the result of prejudice, is interposed to advances which are later universally recognized as advantageous, even by those who are at first strongest in their opposition to them. Aside from the large benefit which must, in the opinion of the committee, inevitably result to the milk-drinking public, there is a decided economic advantage in the long run to the cattle owner who, by the systematic application of the tuberculin test to his herd, greatly reduces and finally exterminates all tuberculous infection from his cattle. The intelligent farmer is beginning to recognize the ultimate advantage of having his herd free from constant decimation through the ravages of tuberculosis.

#### COMPENSATION FOR CONDEMNED CATTLE.

That it is an exceedingly difficult matter to arrive at a satisfactory solution as to the appropriate remuneration to the owner of cattle condemned as the result of reaction under the tuberculin test is evidenced by the wide divergence of views expressed by authorities consulted by the committee.

A consideration of much force adduced in opposition to the arbitrary condemnation and slaughter without compensation of animals shown by the tuberculin test to be infected with tubercle bacilli is that, since the practical confiscation of private property is insisted upon with the avowed purpose of safeguarding and improving the public health, the owner of the condemned cattle should be fully compensated from the Public Treasury for losses sustained through such action. In Pennsylvania all animals reacting to the test are paid for by the State, and it is noteworthy that in this Commonwealth tuberculosis among cattle is being eradicated with more success than in any

other State, and there are usually three times as many voluntary requests on file for the application of the test as can be made. It is suggested by Dr. Mohler, of the Bureau of Animal Industry, that provision should perhaps be made to pay 70 per cent of the price of all condemned animals, not to exceed \$30 per head for common stock and \$60 for registered stock. Dr. W. H. McLain, commissioner of health of Wheeling, W. Va., is inclined to the opinion that the owner should receive about 75 per cent of the value of cattle condemned as a result of the tuberculin test.

The Chief of the Bureau of Animal Industry takes the position that owners should be compensated, at least in part, for cattle condemned, and that the respective States where cattle are owned should make provision for compensation for cattle slaughtered as a result of the tuberculin test, several States having, he remarks, already laws providing for such compensation. Dr. Melvin refers to the basis of condemnation in recent cases in the District of Columbia, which may be briefly stated as follows: Cattle were appraised before slaughter, the appraisal not to exceed \$75 for a pure-bred or registered animal, or \$50 for a grade or unregistered animal. Eighty per cent of the appraised value, less the amount realized as salvage, was paid on cattle whose carcasses were passed for food on post-mortem inspection, and 40 per cent, less salvage, in the case of cattle condemned for offal. If a reacting animal showed no lesions of tuberculosis on post-mortem examination, the full appraised value, less salvage, was paid.

This arrangement was followed in carrying out the order of the District Commissioners "for the suppression and prevention of tuberculosis in cattle," dated November 26, 1909, and now operative in the District of Columbia, the regulations having received the approval of the Secretary of Agriculture on the following day. The committee is prepared to recommend this scale of compensation as best adapted to secure justice to the herd owner. The granting of an indemnity for animals shown by the tuberculin test to be diseased will do more toward making the test popular with cattle owners than any other possible action and will have the further incidental but materially important effect, if tuberculosis can be eradicated from dairy herds with but slight loss to the owner, of making it unnecessary to materially increase the price of milk to the consumer or to deprive the children of the poorer classes wholly or partially of this necessary article of diet.

#### EFFECT OF COMPULSORY TUBERCULIN TEST ON PRICE OF MILCH COWS.

It has been urged that the enforcement of the tuberculin test with regard to all animals supplying milk to the District would result in a material augmentation of the price of milch cows, which have, it is alleged, experienced an increase from \$35 to perhaps \$65 per head during the past 10 years in this section of the country.

There is a wide diversity of opinion as to the effect of the enforcement of the tuberculin test on the price of cattle, referring particularly to the price of milch cows. It has been contended before the committee by a representative of the local Dairymen's Association that the price of cows would be increased from 20 to 30 per cent, while the president of the Milk Producers' Association has estimated 25 per cent as the probable advance in cost of cows. This contention

is not sustained, however, by the general consensus of opinion among authorities consulted by the committee. The Chief of the Bureau of Animal Industry invites attention to the fact that the price of cows, as well as of other things, has increased all over the country within recent years, regardless of whether the tuberculin test has been applied or not, the statistics of the Department of Agriculture showing that the average value of milch cows has increased from \$30.67 per head on January 1, 1908, to \$35.79 per head on January 1, 1910, a ratio of 16.7 per cent in two years.

It is Dr. Melvin's opinion that while the price of cows might possibly be affected if the tuberculin test were applied simultaneously over a large part of the country and all reacting animals slaughtered, the gradual application of the test, followed by slaughter, extending over a small area would have no perceptible effect upon prices. He takes the position, furthermore, that since all milk from tuberculous cows is unquestionably dangerous to human health and life a slight increase in price of cows and in the cost of milk should not be considered an adequate reason for refusing to remove this danger. He refers, besides, to the fact that cows affected with tuberculosis are usually not as productive as healthy cows and that their value as milk producers would probably steadily decrease.

The State health officer of Florida opines that while the immediate effect would be to raise the price, the ultimate tendency would be to conserve the health and vitality of the cattle and consequently reduce the price. Ravenel philosophically asserts that "a healthy cow is worth more than a sick one."

Dr. Coit estimates that the enforcement of the tuberculin test would increase the price of cattle from 25 to 50 per cent. It is assumed that he refers to the effect of national enforcement, or the application of the test covering a very considerable territory, and not to the influence on the price of cattle which might reasonably be expected to follow the introduction of the test is so limited a territory as the District of Columbia. The initiation of the test judiciously and gradually, not instantaneously and abruptly within so circumscribed an area as the District of Columbia, could even less reasonably be expected to produce the result predicted by Dr. Coit.

Dr. C. J. Marshall, of the veterinarian department of the University of Pennsylvania, expresses the belief that the enforcement of the tuberculin test, if generally applied, would undoubtedly increase the price of cattle for a few years.

Dr. Goler, health officer of Rochester, N. Y., reports that the introduction of the test has had no effect yet in his jurisdiction, while Borden's Condensed Milk Co. expresses the belief, based upon its investigations in Massachusetts and other States where the enforcement of the test has been attempted, that it would very greatly increase the price of cattle.

Dr. Park, of New York City, makes the ingenious suggestion that in order to counteract as fully as practicable the increased price of cattle resulting from the introduction of the tuberculin test, the reacting cattle be at first separated (when in sufficient number to make this practicable) and their milk pasteurized and used. This course would undoubtedly, in his judgment, alleviate to some extent the effect on the price of cattle.

While the effect of the introduction of the tuberculin test on the price of cattle is problematical, it may be conservatively estimated with some degree of accuracy that the effect of the enforcement of the test gradually, as proposed, or only so far as applies to cattle furnishing milk to the District of Columbia, will be quite inconsiderable and will be counterbalanced by the increased value to be derived by the farmer for his stock already on hand and by the additional price received by him for his milk.

#### COMMUNICABILITY OF HUMAN TUBERCULOSIS FROM BOVINE SOURCES.

Much attention is being devoted at the present time, by segregation and otherwise, to minimizing the danger among human beings of infection with tuberculosis from bovine sources, with the hope of ultimately eradicating the disease among humans. The prudence of removing this possible source of infection by expelling from existing herds such animals as are shown to be affected with tuberculosis in even its preliminary stages must appeal with force to every well-minded person. The elimination of the disease from among cattle by rigorous insistence upon segregation of tuberculous individuals is obviously more easy of accomplishment than among human beings, where our sympathy and commiseration leads us to ignore many well-established sanitary precautions for preventing contagion.

It should be understood that the movement which is now progressing so successfully to oust all diseased animals from herds of milch cows, and indeed of neat cattle, is not only substantially in the interest of the public health, but will be found to be of decided advantage from an economic standpoint to the herd owner; for tuberculosis among animals, encouraged by conditions existing up to the present time, is not only increasing with alarming rapidity, often extending to every single animal in a herd and decimating its numbers with frequency, but experience shows that the amount and quality of milk derived from diseased animals is inferior to that which may be reasonably expected from healthy cattle maintained under proper sanitary conditions. When it is estimated that 25 per cent of all cows furnishing milk to the District of Columbia are infected with tuberculosis the importance of proceeding at once with firmness to the elimination of diseased cattle from such herds will be promptly recognized.

There has been considerable dissension among the ranks of physicians and sanitarians as to the communicability of tuberculosis to human beings from tuberculous animals, either through the medium of milk or the use of their flesh for human food, and numerous investigations have been in progress with a view to establishing the facts relating to this important subject. So eminent an authority as Prof. Robert Koch, who first discovered the primary cause of tuberculosis, and who first presented tuberculin to the world, while accompanying the announcement of the latter triumph with the statement that he considered the disease identical in both man and cattle (which view was almost universally accepted by scientists as well as the general public), subsequently announced in 1901 that he regarded the disease as different in man and in cattle, and that there was no practicable need for prohibiting the use of the products of tuberculous animals for human food. This latter statement gave

rise to numerous endeavors on the part of scientific men to establish the truth or fallacy of the position newly assumed by this eminent authority. The results obtained by governmental commissions in different countries, as well as by many public and private scientists, have been so strikingly in accord, in controverting the position taken by Prof. Koch, that it is now the generally accepted opinion among savants that the disease is communicable from beast to man, especially in the case of children. To what extent such infection occurs it is not possible from the nature of things to definitely ascertain, but evidence which must be considered as conclusive has been obtained by the Bureau of Animal Industry, as well as by Ravenel and a number of French investigators, showing that the percentage of cases indicating the transmission of the disease is probably considerably greater than claimed by the authorities who have estimated the relative amount of infection from these sources. As vital statistics demonstrate that 11 out of every 100 persons who die succumb to tuberculosis of one form or another, while of the remaining 89 more than one-half show tubercular lesions on post-mortem examination, the value of imposing every reasonable protection against infection may readily be appreciated. Since objective experiments on living human beings are not practicable, the finding of the bovine type of tubercle bacillus in human lesions is the most direct and positive proof that tuberculous cattle are responsible for a certain amount of tuberculosis in the human family.

In a series of tests conducted by the British Royal Commission on Tuberculosis, 60 cases of the disease among human beings were tested, with the result that 14 cases were regarded by the commission as having been infected from bovine sources.

Dr. William H. Park, of New York City, a recognized authority in this country on the diagnosis and treatment of tuberculosis, has recently found 6 cases of bovine infection in 35 samples of intestinal tuberculosis among infants, and 10 cases due to the bovine type of bacillus out of 35 cases of surgical tuberculosis, representing altogether about 23 per cent of the cases in children due to bovine infection. Of 306 cases reported by Ravenel, 63, or approximately 20 per cent, were found to be due to the bovine tubercle bacillus.

Dr. Schroeder, in his interesting article on *The Unsuspected But Dangerously Tuberculous Cow*, issued December 21, 1907,<sup>1</sup> sets forth the dangers of infection from contaminated milk in a manner which the committee deems worthy of repetition. He says (on p. 16):

If the public were thoroughly informed of the dangers, among which tuberculosis is only one of many, to which it is exposed through the use of impure, dirty, and infected milk, the demand for milk of approved purity would rise to the magnitude of a concerted national movement and would sweep all objections and difficulties out of its way. Inform a man that a single one among many loaves of bread—you do not know which—is contaminated with arsenic, strychnine, or some other commonly dreaded poison, and he will go very hungry before he risks eating any loaf of the lot. He knows what arsenic and strychnine are and what he must expect from their introduction into his stomach. Yet he continues to use milk and dairy products and permits his family to use them without first testing their purity or insisting that the doubt about their purity be removed, notwithstanding that they have repeatedly been shown to contain poisons fully as objectionable and potent as those above named, such as the germs of tuberculosis, typhoid fever, scarlet fever, diphtheria, and

<sup>1</sup> Circular No. 118, Bureau of Animal Industry, U. S. Department of Agriculture.

other diseases, and the poisons that are the cause of the high death rate from abdominal diseases among children who have not passed the milk-drinking period of life.

There is an important moral side to the milk question which must not be ignored. We may have the right—a very doubtful right, to be exact—to neglect the dangers to which we as adults capable of judging and acting for ourselves are exposed, but we have absolutely no right to neglect the conditions that cause suffering and death among children. The failure to act and to act quickly and unceasingly until a safe milk for children at least is within easy reach of every mother may be characterized as barbarous, if not criminal, indifference.

Schroeder and Cotton, in a recent bulletin of the Bureau of Animal Industry, set forth that there is no more active agent than a tuberculous cow for the increase of tuberculosis among animals and its persistence among man. When it is reasonably estimated that human tuberculosis causes over 160,000 deaths a year in the United States, the importance of introducing every possible safeguard against the extension of the white plague may well be appreciated.

It is gratifying to note that the work of Schroeder and Cotton at the Bethesda Experiment Station of the Bureau of Animal Industry was considered sufficiently significant by the British Tuberculosis Commission to make it the subject of a special investigation and a separate report, the work of the commission fully confirming the results obtained by our investigators. It is unfortunate that the commission should have failed to expressly acknowledge the credit due to these officials of the Government for the important discovery that apparently healthy tuberculous cattle frequently expel large numbers of virulent tubercle bacilli through the rectum with the feces.

The International Tuberculosis Congress held at Washington, D. C., in September, 1908, resolved—

That preventive measures be continued against bovine tuberculosis and that the propagation of this infection to man be recognized.

In a comprehensive investigation by Dr. William H. Park and his associates as to the sources of tubercular infection 7.22 per cent of the patients examined proved on post-mortem examination to be infected with bovine tubercle bacilli, 26 per cent of those under 5 years of age showing infection from bovine sources.

Dr. Theobald Smith, a leading authority on the subject, found that 10 per cent additional were conclusively demonstrated to be infected with bacilli of bovine origin, thus demonstrating that about 17 or 18 per cent of all cases of tuberculosis which were the subject of these investigations were traceable to bovine sources. This work has been largely done since 1908, and the consensus of opinion among scientific men has since strongly developed in favor of accepting the view that tuberculosis is directly transmissible from cattle to man.

Dr. William C. Welch, of Johns Hopkins University, corroborates the statement (based on his observations) that bovine tuberculosis causes from 15 to 25 per cent of certain cases of tuberculosis in children under 5 years of age.

In a paper by Dr. Park, director of the research laboratory of the health department of New York, presented as recently as May 3, 1910, before the National Association for the Study and Prevention of Tuberculosis, it was stated that 22 out of 84 cases of tuberculosis in

children under 5 years of age coming under his observation clearly manifested the bovine type of tubercle bacilli, and bore convincing evidence of the communicability of bovine tuberculosis to man.

In a later recent investigation by Park and Krumwiede in the research laboratory of the department of health, New York City,<sup>1</sup> the actual number of cases examined was 436, the largest number included so far in a single investigation. Two hundred and ninety-seven related to persons over 16 years of age (278 being pulmonary), only 1 of which indicated bacilli of the bovine type, but in 54 cases of children between 5 and 16 years 9 exhibited bacilli of the bovine type. In 84 cases under 5 years of age 22 individuals were infected with bovine bacilli. In a total of 1,040 cases of human tuberculosis studied and recorded in literature from which pure cultures of tubercle bacilli have been obtained and identified Park and Krumwiede place 686 of these cases in the group comprising patients of 16 years and over, and 9 of these patients exhibited bacilli of the bovine type; 132 cases in the group of patients between 5 and 16 years old showed 33 to be infected with bovine bacilli, while in the group including children under 5 years of age, comprising 120 cases, 59 (or almost 50 per cent) proved to be of the bovine bacillary type. The larger proportion of the cases showing the bovine type of bacilli consisted of infections of the abdomen and of the glands of the neck, while in not a single case of pulmonary tuberculosis have bacilli of undoubted bovine origin been found.<sup>2</sup>

It has further been demonstrated with scientific exactitude that bovine tubercle bacilli are of a most virulent type and when ingested by human beings with cow's milk continue their virulence in the human body.

#### BRITISH TUBERCULOSIS ORDER OF 1909.

Confirmatory of the position taken by the American authorities as to the infection of human beings with tuberculosis from bovine sources is the action of the Board of Agriculture and Fisheries of Great Britain in issuing, under date of May 27, 1909, the Tuberculosis order of 1909, setting forth that—

So far as regards the possibility of the transmission of the disease from affected bovine animals to man, the board are satisfied that it must now be accepted as a fact that tuberculosis is transmissible by the agency of milk used for human consumption.

The board proceeds further to state that—

Any action which results in the reduction in the number of tuberculous bovine animals in the country must reduce the risk of the spread of tuberculosis amongst the community, and if it were possible to eradicate from this country [Great Britain] the disease in animals, a material step forward would have been taken in the campaign against the disease in man.

#### RESULTS OF INVESTIGATIONS BY GERMAN AND BRITISH COMMISSIONS.

In a series of tests conducted by the German commission on tuberculosis, over 10 per cent of the cultures of tubercle bacilli of human origin were found to be virulent for cattle, and in a similar investi-

<sup>1</sup> Park, W. H., and Krumwiede, Charles, jr.: The Relative Importance of the Bovine and Human Types of Tubercle Bacilli in the Different Forms of Human Tuberculosis, *Journal of Medical Research*, Vol. XXIII, 205.

<sup>2</sup> *Journal of American Medical Association*, Vol. LV, No. 26, Dec. 14, 1910, 2238.

gation by the British royal commission on tuberculosis, 60 cases of the disease in human beings were tested, with the result that 14 were determined by the commission to have been infected from bovine sources.

It may be stated with scientific accuracy, as the result of the splendid work of American investigators, corroborated by the researches of the British and German Government commissions and independent investigators, that bovine tubercle bacilli are fairly common in human beings, the frequent occurrence of bovine tuberculosis among children of itself emphasizing the importance of eliminating by the tuberculin test cattle proved to be infected with tubercular lesions, and insisting upon pasteurization before their product is offered for sale.

#### RESOLUTIONS BY NATIONAL AND LOCAL ASSOCIATIONS FOR STUDY AND PREVENTION OF TUBERCULOSIS.

At a recent meeting of the National Association for the Study and Prevention of Tuberculosis, held in Washington in April, 1910, resolutions were adopted (Appendix AD) urging the efficient supervision of dairy herds and of the handling of milk from the dairy to the consumer, and emphasizing the importance of a clean and pure milk supply as essential to the public health. The resolutions conclude with a feeble indorsement of the position that, in a certain percentage of cases, human tuberculosis is due to infection by tubercle bacilli of bovine origin.

At a meeting of the board of directors of the local association for the prevention of tuberculosis, held December 27, 1910, resolutions offered by Dr. George M. Kober and seconded by Mr. Emile Berliner and Dr. G. Lloyd Magruder, were unanimously adopted (Appendix AE) reciting that, whereas it has been shown by indisputable evidence that numerous epidemics of typhoid fever and other diseases have been traced to contaminated dairy products, that a considerable proportion of the cases of tuberculosis occurring in children under 5 years of age is the result of infection with the bovine tubercular bacillus, and that the mortality among infants fed upon cow's milk is very high, the Congress of the United States be requested to investigate the relation of dairy products to the public health, with a view to the enactment of remedial legislation.

#### BACILLI INTRODUCED INTO HUMAN BODY DURING INFANCY.

A potent factor in support of the belief that tuberculosis is directly communicable from cattle to man is the discovery in recent years by bacteriologists of certain interrelated species of tubercle bacilli showing apparent transition from the bovine to the human types of tubercle bacilli and vice versa. It has furthermore been established with apparent rationality that the bacilli may be introduced into the human body during infancy and remain dormant until some later period in life when they are aroused to activity and develop malignant tuberculosis, their activity remaining latent, in some instances, or being arrested until the person arrives at the age of three score or more.

Dr. Schroeder observes in this connection that by far the largest percentage of cases of human tuberculosis results from the ingestion of tubercle bacilli during the first five years of infant life, during which period the food of the child is restricted exclusively to a milk diet, and that the bacilli develop destructive virulence and energy often during the "high school" period of education, when the worry and mental strain of the child has reduced it to a condition of health which makes it impossible to combat the attacks of the germs; and in other cases at the age of approximately 25 years, when the worry and anxiety which may be regarded as the natural accompaniment of the initiation seriously into one's life work may be supposed to induce inability to cope with the development of disease germs; and then, again, in certain instances, about the age of 45, when those who are failures in life's battle begin to realize the hopelessness of their further endeavors toward success. It is significant that, at these periods of life, tuberculosis succeeds most effectively in its deadly ravages.

#### EFFICACY OF TUBERCULIN TEST IN ERADICATING HUMAN TUBERCULOSIS FROM BOVINE SOURCES.

A number of authorities consulted by the committee unite in the opinion that the tuberculin test, if generally applied in a given jurisdiction, will completely eradicate the disease from bovine animals, and will remove entirely the possibility of human infection with bovine tubercle bacilli. Freeman is authority for the statement that a third of the cases of human tuberculosis in persons under 15 years of age would probably be eliminated. Winslow predicts that human tuberculous infection from milk can be largely controlled by the tuberculin test. Dr. Babb, dairy and milk inspector of Topeka, Kans., expresses the belief that most human pulmonary tuberculosis is gained from the use of milk from tuberculous cows, and that the transmission of the disease from this source would be very greatly diminished by the enforcement of the tuberculin test in a rational, systematic manner.

Dr. Coit is convinced that the enforcement of the tuberculin test will curtail human infection with bovine tubercle bacilli only to the extent that tuberculosis is now disseminated by market milk. It will, in his opinion, reduce by 25 per cent the number of cases of tuberculosis occurring in children.

#### RECOMMENDATIONS BY DR. JOHN R. MOHLER.

With a view to insuring against the prevalence of tuberculosis through infection from bovine sources, the following recommendations are proposed by Dr. John R. Mohler, Chief of the Pathological Division of the Bureau of Animal Industry, Department of Agriculture, in a paper entitled "The Importance of a Wholesome Milk Supply":<sup>1</sup>

1. That all cows on dairy farms producing milk for market purposes be tagged, tattooed, or otherwise marked for identification.

<sup>1</sup> The Dissemination of Diseases by Dairy Products and Methods for Prevention, Circular No. 153, Bureau of Animal Industry, U. S. Department of Agriculture, p. 37, issued Apr. 28, 1910. These recommendations by Dr. Mohler were previously published in almost identical phraseology in Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service, pp. 525, 526, issued in March, 1909.

2. That all milk produced on such dairy farms shall either come from tuberculin-tested cattle, which shall be retested at least once a year, or be subjected to pasteurization under the supervision of the health authorities in case the herd is not tuberculin tested.

3. That no additions to any herd, whether the herd has been tested or not, shall be made in the future without subjecting the additional cattle to the tuberculin test.

4. That no license for the sale of milk shall in future be granted except to applicants having herds free of tuberculosis.

5. That the milk of cattle showing any of the udder affections above mentioned,<sup>1</sup> or anthrax, rabies, gastroenteritis, septic conditions, or clinical symptoms of tuberculosis, shall not be utilized as human food, even though the milk be pasteurized. Milk from cows 15 days before and 5 days after parturition shall likewise be excluded.

6. That veterinary inspectors of the health department make frequent visits to dairies having untested herds, in order that they may discover all advanced cases of tuberculosis or udder tuberculosis as early as possible.

7. That the various States pass laws granting an appropriate indemnity to all owners of tuberculous cattle which come under their respective jurisdictions, the said animals to be slaughtered in abattoirs having Federal or other efficient inspection.

#### MILK USED IN DAIRY PRODUCTS SHOULD BE TUBERCULIN TESTED.

Numerous investigations by recognized authorities, both in Europe and in this country, have conclusively demonstrated that tubercle bacilli may be present in butter, buttermilk, oleomargarine, and cheese, and that butter made in the customary manner and stored under ordinary market conditions until time of sale may retain virulent bacilli for several months. It is of essential importance, therefore, that the restrictions and safeguards applied to milk and cream should be extended to the various milk products so far as necessary to protect the public from the dangers of infection from these sources. The requirement that all dairy herds be subjected to the tuberculin test, and in addition to this that the milk from such herds should be pasteurized before it is used, should apply not only to milk and cream used in their raw state, but likewise to all milk and cream contained in ice cream, buttermilk, butter, and cheese.

#### ECONOMIC CONSIDERATIONS AFFECTING BOVINE TUBERCULOSIS.

Aside from the imminent danger of communicating this dreaded scourge to humanity, there is an economic consideration of great importance to the farmers of our country in eradicating tuberculosis from their herds. It is believed on good authority that between 15 and 25 per cent of all the cows supplying milk to the District of Columbia are tuberculous. It may be recounted that, during the period from April, 1907, to June, 1909, inclusive, the Bureau of Animal Industry supervised the testing of 2,471 cattle in herds supplying milk to the District, with the result that 377, or 15.25 per cent, were shown to be tuberculous. Nor is this startling percentage a fair estimate of the extent of tuberculosis among the dairy herds of this vicinity, since the number of animals tested includes many herds which had either been examined previously or which had exhibited such a healthy appearance as to remove any suspicions of tuberculosis.

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<sup>1</sup>Tuberculosis of the udder, botryomycosis, mammitis, mastitis, etc.

Statistics show that where the tuberculin test has been established either compulsorily or voluntarily on the part of cattle owners, tuberculosis is gradually being eradicated, while in localities where the tuberculin test has not been applied, the disease is spreading rapidly and becoming widely disseminated, the cattle owner being confronted with serious and continuous losses. Tuberculin may, therefore, be considered a most beneficial agent to the stock raiser.

As an indication of the extent of the movement for the elimination of tuberculosis among farm animals, it may be stated that 41 States (Appendix AF) at present require the application of the tuberculin test to cattle brought within their boundaries, this requirement usually being limited, however, to cattle for dairy or breeding purposes; and that 21 States and the District of Columbia (Appendix AG) provide for the slaughter of animals found to be affected with tuberculosis, and for the payment of an indemnity to owners; while a few others give authority for condemnation and slaughter without making provision for indemnity. Twenty States and the District of Columbia (Appendix AH) provide for the tuberculin testing of cattle within the State (not necessarily the subject of interstate commerce).

#### USE OF MEAT OF CONDEMNED ANIMALS FOR FOOD.

It is adduced that it is inconsistent on the part of the Federal authorities to permit the use for food of the meat of animals condemned on account of tuberculosis, while at the same time proposing to preclude the use of milk derived from such animals. The committee is reliably informed by officials of the Bureau of Animal Industry that animals may be infected with tuberculosis in certain parts of the body, this local infection not permeating the muscular portions or other parts of the animal utilized for food purposes. The Department of Agriculture has consequently, in the execution of the meat-inspection law, very properly permitted, under rigid inspection, the utilization of such parts of carcasses as are definitely and absolutely known to be free from contamination with tubercle bacilli.

The question raised as to the propriety of slaughtering for consumption animals having localized diseases has been the subject of careful and protracted deliberation by the Bureau of Animal Industry in enforcing the Federal meat inspection regulations, formulated and promulgated in pursuance of the act of Congress approved June 30, 1906.<sup>1</sup> It was suggested from several sources that, in order to enlist the public support and cooperation of packers which is so manifest in the execution of meat-inspection rules in European countries, the regulations adopted by the Department of Agriculture for controlling the meat industry in the United States should be submitted for criticism to a commission of experts not connected with the department, whose findings as to the effects of disease upon meat with reference to its fitness for human food would command the confidence of the packers and dealers as well as of the public generally. In pursuance of this suggestion, a commission was designated by the Secretary of Agriculture, composed of men whose

<sup>1</sup> Provisions for Federal meat inspection incorporated in Agricultural appropriation act for 1907, approved June 30, 1906.

eminence as authorities on the subject in question was generally conceded, and this commission, after thorough discussion and conference, reported its conclusions. The findings constituted in the main a confirmation of the wisdom of the regulations then in force, certain minor emendations being suggested by the commission, which have been approved by the department and incorporated in the rules for the disposition of meats now in operation.

As felicitously expressed by Dr. Melvin at the preliminary meeting of the commission, the department is required by law to stand as the mediator between the slaughterers and the consumers, and its only thought is to do justice to both. It may be observed, he explained, that if there was any error in Regulation No. 15 safeguarding the public health, this was in favor of the public rather than in favor of the butchers and packers, and that the requirements of the department with reference to the condemnation of diseased animals could be made less stringent without danger to the health of the consumer.

It frequently happens that an animal is infected with a localized disease which may not impair to the slightest degree the nutritive or food value of the parts of the carcass which are customarily eaten in a community, and while it is evident that, from an economic standpoint, it would be decidedly improper and wasteful to an extreme degree to condemn as a whole carcasses affected in certain organs only, your committee is convinced that the regulations of the department impose every reasonable safeguard for the protection of the health of the public against possible infection from diseased meat.

It should be observed, however, on the other hand, that milk (consisting as it does of secretions from the mammary glands) from any cow afflicted with almost any disease, however localized, is fraught with danger of contamination, intermittently at least, by death-dealing germs. The committee feels, therefore, that the separation of a diseased animal from a herd of milch cows is justifiable in every instance, while the use of portions of the carcass of the same animal, when slaughtered, may be advocated as entirely unprejudicial to the health of the consumer. Any attempt, therefore, to condemn for food purposes cattle in the wholesale manner suggested in some quarters would doubtless effect an absolute scarcity of the meat supply, resulting in high prices for beef, veal, and other products of the cow and calf, and serving to place them entirely beyond the reach of the purchaser of moderate means.

Aside from the generally recognized importance of eradicating tuberculosis from among cattle on account of the contamination of the milk supply derived from infected animals, and while assenting to the proposition that the saving of human life affords the highest motive for combating tuberculosis among animals, the economic importance of its elimination with the object of relieving the tremendous financial loss at present devolving from this cause upon the live-stock industry of the country should not be overlooked. This phase of the question is treated in a most convincing and capable manner in a paper entitled "The Economic Importance of Tuberculosis in Food-Producing Animals," by Dr. A. D. Melvin, Chief of the Bureau of Animal Industry,<sup>1</sup> read before the International Con-

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<sup>1</sup> Twenty-fifth Annual Report of the Bureau of Animal Industry, U. S. Department of Agriculture, 1908.

gress on Tuberculosis in Washington on September 29, 1908. Dr. Melvin observes that, while it must be realized that the exclusion of tuberculous meat and dairy products from the food supply means an appreciable reduction in the quantity of available food, with a corresponding tendency to an increase in the cost of such commodities, no nation is so wealthy that it can afford to sacrifice year after year a considerable and increasing proportion of its food supply, especially when by proper means the loss can be reduced and in time entirely prevented.

The animals principally infected with tuberculosis, he states, are cattle and hogs, the disease being easily communicated from the former to the latter by the common practice of giving skim milk to the hogs and allowing them to feed on the excrement of the cattle. When we consider, in addition to the loss occasioned by the necessity of slaughtering cattle and hogs, the considerable depreciation in the value of these animals when affected with the disease, if remaining alive, as also the effect of decreasing the productiveness of dairy cows by diminishing the yield of milk, as well as by shortening their lives, and consequently the period during which they produce milk; and when we realize, furthermore, that there are doubtless other sources of loss chargeable to this disease in live stock, it is conservatively estimated by Dr. Melvin that the tribute which the United States pays each year to this scourge among its farm animals aggregates more than \$23,000,000. Consider in addition to this enormous exaction the bearing of animal tuberculosis on human life, and it seems imperative that vigorous measures should be promptly adopted to eradicate the disease from our herds.

The work of the Federal Government, as carried on by the Bureau of Animal Industry, has thus far been exerted in this connection in supplying tuberculin free of charge to State officials, in endeavoring to prevent the interstate shipment of tuberculous animals, and in tracing, when practicable, the origin of animals found to be affected with tuberculosis.

It has been contended that the rigid enforcement of the tuberculin test and the condemnation of unhealthy cattle will produce a temporary, if not a permanent, shortage in the local milk supply. This condition, should it become apparent, will, it is believed by the committee, be readily met by resorting to pasteurization to render innocuous the milk derived from affected cattle and by authorizing the delivery and consumption of milk so treated from cattle which have not withstood the tuberculin test until such time as may reasonably be required to replace with healthy cattle animals found to be diseased.

While the committee places itself on record as unqualifiedly favoring the application of the tuberculin test, it is especially recommended that the test be gradually applied; that is to say, that a reasonable amount of time be reserved before the test shall be rigorously exacted, and that the herds supplying milk to the District be inspected seriatim, with such gradualness as may be intelligently calculated to enable the replenishment of the herds by the replacement of such animals as may be eliminated by operation of the test. The District Commissioners have, upon the recommendation of Dr. Woodward,

health officer, wisely consented to the postponement of insistence compulsorily upon the test in the case of all herds located in Maryland, Virginia, and elsewhere outside of the District of Columbia, furnishing milk for consumption in the District, for such period of time as the farmers may reasonably require to prepare themselves to meet the conditions of the test and until the legislatures of the States of Maryland and Virginia may have an opportunity to provide adequate compensation for animals condemned. It is proposed by the committee that a period of two years might appropriately and advantageously be arbitrarily fixed for the introduction of the test compulsorily among herds supplying milk for consumption in the District.

The committee concludes its observations on this feature of its investigations with the remark that the tuberculin test has been found to be a more nearly infallible means for diagnosing tuberculosis than any known agency for diagnosing other diseases of men and animals; and since it is the consensus of scientific thought that our dairy herds can be freed from tuberculous cows by the systematic application of the test and the segregation of all reacting animals, the committee recommends without hesitancy that the compulsory application of the test to all animals furnishing milk to the District of Columbia be required as rapidly as the exigencies of the situation will allow.

## VI. MAINTENANCE OF LOW TEMPERATURE.

### ESSENTIALITY OF TEMPERATURE NOT EXCEEDING 50° F.

Since the bacterial content of milk depends, (1) upon its age, (2) the number of bacteria contained initially and proliferated, or introduced during the process of milking and handling, and (3) the temperature at which the milk is kept, clean milk, quick cooling, and the shortest practicable time between milking and consumption are important factors in providing a pure milk supply. Not only should the milk be cooled immediately, which has been proved beyond peradventure to be an exceedingly important requirement, but in order to prevent the rapid multiplication of germ life, it should be kept cool until consumed. This necessitates the maintenance of low temperature in hauling to the depot, while waiting at the shipping point, during transportation on the cars, and while being held and distributed by the city dealer. In the winter months, the low atmospheric temperature renders the keeping of milk below 50° F. easy of accomplishment, but in the warm season to maintain the desired temperature involves the use of efficient methods of refrigeration on the part of the dairyman, the transportation company, the wholesale distributor, the retail dealer, and, finally, on the part of the consumer.

The rapid cooling of milk after it has been drawn, to a temperature of 45° F., and the maintenance of that temperature until the time of consumption, not only prevents the multiplication of the bacterial flora contained in the milk when drawn from the cow, but actually tends to diminish the number of bacteria.

So eminent an authority as Dr. William H. Park, of New York City, gives testimony to the effect that milk rapidly and sufficiently cooled remains almost unaltered chemically and bacteriologically for

36 hours, while milk that is insufficiently cooled (that is to say, allowed to attain a temperature in excess of 45° to 50° F.) deteriorates rapidly. Dr. Park states later that while 45° F. is a desirable standard, 50° F. is, in his judgment, much easier to observe and will answer fairly well. He assigns the failure to keep milk below the temperature of 50° F. as the greatest reason for the deterioration of city milk.

Dr. Coit asserts that, according to a well-known expert, a quart of milk maintained at 60° F. in a refrigerator will grow 19,000,000 germs in 24 hours.

The rapidity with which bacteria multiply at a temperature somewhat slightly above 50° F. has been well illustrated by a recognized authority on the subject, who, in an experiment with milk containing 153,000 organisms per cubic centimeter when exposed to a temperature of 59° F., showed a proliferation to more than treble this number in a single hour, the milk attaining the almost incredible figure of 85,000,000 bacteria per cubic centimeter at the end of 24 hours. When it is realized that a cubic centimeter corresponds approximately to one-fourth of a teaspoonful, the enormity of this increase in a given sample of milk can easily be imagined.

A series of systematic investigations has shown that the temperature, in order to retard generation of germ life, should be maintained as low, at least, as 50° F. Pathogenic or disease-breeding organisms are shown to multiply with remarkable rapidity when milk is maintained at temperatures ranging from 50° to 60° F., and even more markedly when 65° F. is reached. Although the practical observance of this requirement means the establishment of icehouses on dairy farms for the storage of a sufficient supply to maintain this reduced temperature from April 1 or earlier to November 1, or later in exceptional instances of mild weather, and the installation of refrigerator cars or the jacketing of cans in an efficient manner to keep down the temperature, which requirement, if insisted upon, must necessarily add to the cost of cooling, transporting, and delivering the local milk supply, your committee is nevertheless, after careful consideration, convinced that the arrangement is necessary in the interest of the public health and should be made effective by suitable legislation, provided that, so far as transportation is concerned, it be determined, upon examination of figures in detail, that refrigerator-car service is an economic possibility.

The requirement should, moreover, extend to the refrigeration of the milk while on delivery wagons, so as to continue the reduced temperature at a maximum of 50° F. until actual delivery at the residence or place of occupation of the consumer.

Dr. Park entertains the view that it is practicable to maintain a temperature not exceeding 50° F. on delivery wagons, provided the cans be protected from exposure to the air by boards or canvas and a little ice be kept on the cans.

The committee appends (Appendix AI) in this connection copy of a letter addressed, under date of October 9, 1907, by Surg. Gen. George M. Sternberg, United States Army, retired, to Dr. G. Lloyd Magruder, of this city, giving testimony as to the practicability of shipping milk in cans reenforced with a felt jacket for very considerable distances without attaining a maximum of 50° F.

The reasonableness of exacting a temperature that shall not exceed 50° F. is confirmed by the practice in such advanced communities as New York and Boston, the regulations of each of which cities specify a maximum temperature of 50° F., while Chicago enjoins a temperature of 45° F. or less.

The committee has weighed with the utmost care and deliberation the probable effect of compulsorily maintaining a temperature of 50° F. or less from the time of milking to the actual moment of delivery to the consumer, for it is recognized that the initiation of such a requirement will necessarily compel every dairyman to install on his farm a suitable icehouse, with facilities for carrying a sufficient store of ice to maintain the milk below the prescribed maximum temperature during the season from April 1 to December 1 of each year. If this proposal were merely the result of a theoretical step toward the improvement of the milk supply, the committee would have more hesitancy in coming to a conclusion in the matter, but it is so clearly convinced that pathogenic bacteria proliferate with astounding rapidity when milk is allowed to attain a temperature of even 2 or 3 degrees in excess of 50° F. that it is indispensably necessary, in its judgment, in the interest of the public health, that this requirement be gradually put into force, notwithstanding its material bearing as respects increased outlay on the part of the producer, and with the fullest consciousness of the great benefit which will inure from the enforcement of this perhaps seemingly onerous exaction.

The requirement that milk be kept at a temperature below 50° F. should likewise be rigorously enforced with reference to hotels, lunch rooms, cafés, and other public places where milk is consumed as a beverage in its raw or pasteurized state.

It has been claimed that, owing to the germicidal qualities of raw milk, the number of bacteria is reduced when kept under certain conditions of temperature free from contamination, which contention is advocated in defense of raw milk as opposed to pasteurized milk. Dr. Park, who studied this question in 1901, concluded that freshly drawn milk contains a slight and variable amount of chemical substances which are capable of inhibiting bacterial growth, and that at temperatures under 50° F. these substances act efficiently for from 12 to 24 hours, provided the milk be not filthy, but that at higher temperatures the inhibiting effect of these chemical substances is very soon completely negated and the bacteria in milk maintained at such temperatures will then rapidly increase. Thus the bacteria in fresh milk which originally proved 5,000 per cubic centimeter, decreased to 2,400 in the portion kept at 42° F. for 24 hours, but raised to 7,000 in that kept at 50° F., to 280,000 in that kept at 65° F., and to 12,500,000 in that portion kept at 95° F. This intelligent deduction emphasizes the extreme importance of keeping milk at temperatures below 50° F.

#### NECESSITY FOR ADEQUATE REFRIGERATOR-CAR SERVICE.

With regard to the objection raised by the producers and dealers to the proposal that all milk supplied to the District of Columbia be required to be maintained at a temperature not exceeding 50° F. from the time of milking until the actual delivery to the consumer,

the committee feels that this requirement is impossible of practical observance without the installation of an adequate number of refrigerator cars or the provision of a practical and efficient can jacket.

The committee has had great difficulty in securing from the railways entering Washington any definite information which would lead to a proper conclusion as to the practicability of providing the necessary refrigerator-car service or some alternative means for maintaining milk during transportation at a temperature below 50° F. The Pennsylvania and Southern Railways, and the New York Central & Hudson River Railroad Co. were the only ones to heed the request of the committee. President Brown, of the New York Central lines, regrets that it is impossible to furnish comparative figures, for the reason that the cost of refrigeration varies on different parts of his lines, being governed, he says, by weather conditions, the kind of container in which the product is shipped, the length of haul, facilities for rapid handling at destination, etc. The conditions in the District of Columbia are, furthermore, he maintains, different from those in New York State.

Mr. J. R. Wood, passenger traffic manager of the Pennsylvania Railroad Co., has, through reference from President McCrea, furnished the committee with certain data relating to the subject of its inquiry. He explains that three factors enter into the cost of hauling milk under refrigeration, namely, the length of the haul, the temperature of the milk when placed in the car, and the circumstance whether the cars are to be loaded all at one point or at intervals between originating point and destination. If the class "Rf" refrigerator car is to be used for the purpose proposed, the initial icing would, he estimates, require 7,400 pounds. After precooling, 4,000 pounds would be sufficient to maintain the milk under a temperature of 50° F. for a distance of 300 miles; that is to say, a 24-hour run. If, however, the car is to be opened at different points to receive milk, the temperature will fluctuate according to outside conditions. The cost for icing a car with 12,000 pounds of ice will approximate \$15 (that is on a basis of \$2.50 per ton of ice, including necessary labor). By using the same cars in this milk service, the bunkers would retain a percentage of the ice from one trip until the next, and the car would thus require on the same basis as above an average of only about 3,000 pounds of ice at a cost of \$4. The cost per gallon for refrigerated milk will depend on the number of gallons loaded in a car. The length of the haul, he states, would make no material difference in the cost of refrigeration, due to the fact that the requisite amount of ice and the necessary space for loading would need to be provided from the starting point of the car to the places of receiving and discharging its load.

It is interesting in this connection to note the present cost per gallon of milk shipped over the Pennsylvania lines from varying distances to Washington, namely, less than 30 miles, 1½ cents per gallon; between 30 and 60 miles, 2 cents per gallon; over 60 and not exceeding 90 miles, 2½ cents per gallon. Double rates are charged for the shipment of cream.

It is contended by the officials of the railways transporting milk into Washington that the length of the hauls and the aggregate amount of shipments do not justify the expense of providing and maintaining the necessary number of refrigerator cars for this serv-

ice unless such increase in the rates of transportation be exacted as would make the retail price of milk to the consumer prohibitively high. The committee appends copies of correspondence with the New York Central and the Pennsylvania Railways relating to this phase of its investigations (Appendix D). Officials of the Southern Railway have informally assured the committee of their desire to do everything possible to further the committee's recommendations, but they feel that it is absolutely impossible, without the imposition of prohibitive traffic rates, to maintain the necessary service. Milk is at present hauled over the several branches of the Southern Railway at a flat rate of  $2\frac{1}{2}$  cents per gallon, which includes the return of the can or other receptacle to the shipper.

#### FEASIBILITY OF PROVIDING ADEQUATE SUPPLY OF ICE.

Aside from the conditions affecting the feasibility of introducing an appropriate service of refrigerator cars, it is contended by the producers of milk that it is not practicable without a decided advance in the price of milk received by the shipper to install and equip the necessary ice houses for maintaining the low temperature from the time of milking to the instant of actual delivery on board the train. An examination of bulletins furnished through the courtesy of Prof. Willis L. Moore, Chief of the United States Weather Bureau, shows that it has been possible, with the exception of one winter, during the past 30 years to collect from ponds, natural or artificially provided for this purpose, an abundant supply of ice 4 inches or more in thickness, to enable the farmer to lay up a sufficient store to meet this requirement of refrigeration from April 1 to December 1, the interval during which in this latitude it is necessary to provide artificial means of maintaining a maximum temperature of  $50^{\circ}$  F. This deduction is confirmatory of a letter on the same subject from the Chief of the Weather Bureau under date of December 29, 1906 (Appendix AJ).

It is claimed by local wholesale and retail dealers, furthermore, that the insistence upon this requirement will have the effect of driving all of the small dealers out of business, as they allege that the public is neither willing nor able to pay the increased price which must necessarily be established in order to meet this proposed restriction.

So much for the mercantile side of the question. As to its scientific aspects, it is a matter of general agreement among authorities on the subject of milk production and distribution that, although milk obtained from the cow under the most careful conditions contains a minimum number of bacteria, these bacteria multiply with alarming rapidity when milk is subjected to temperatures in excess of  $50^{\circ}$  F., and this observation applies with equal force to pasteurized and to raw milk.

The failure to keep milk at a temperature below  $50^{\circ}$  F. provides favorable conditions for rapid multiplication of bacteria. Milk is a good culture medium for various pathogenic organisms which rapidly increase in high temperatures, making such milk dangerous, especially for infants. Dr. Wyman, Surgeon General of the Public Health and Marine-Hospital Service, asserts that if milk happens to contain a small number of typhoid bacilli or other organisms a great

increase in these organisms will take place if the milk be not kept below 50° F. The moment that a higher temperature than 50° F. is approached the proliferation of deleterious as well as other germs increases with astounding celerity, it being demonstrated by reliable authorities, as already stated, that a temperature of even 52° to 55° F., for example, encourages a much more rapid development of bacteria than 50° F. Some authorities suggest specifying as low as 45° F., but there is a substantial agreement among those qualified to speak in favor of 50° F. as a maximum temperature for maintaining milk from the time of milking till delivery to the consumer. Dr. Melvin, Chief of the Bureau of Animal Industry, observes in this connection that the specification of that temperature would require the use of ice in summer, but that this is not believed to be commercially impracticable, except possibly during the summer in warm climates, where the producer is unable to provide ice. This requirement, he states, has been met by the city of Atlanta, Ga., and if it is practicable there it should certainly be practicable for the city of Washington. The feasibility of meeting this situation will, it is observed by Surg. Gen. Stokes, depend among other things upon the facilities granted by the railroads and the amount of capital put into the business.

Dr. Hamill, of Philadelphia, expresses the view that from 40° to 50° F. is the maximum temperature at which milk should be kept to give the best results when commercially used. He is of the opinion that it is practicable to maintain a maximum temperature of 50° F. from time of milking to city delivery to the consumer, provided the producers, the railroad companies, and the dealers can be compelled by law to adopt proper methods. On the other hand, it is stated by the health officer of Columbus, Ohio, that 50° F. is too low for market milk under ordinary conditions as experienced in Columbus, a 65° F. rule having been in force in that city for two years past.

If the temperature could be fixed primarily to satisfy the convenience and advantage of the producer and dealer, this higher temperature could well be determined upon, but the committee is fully impressed, after consulting the authorities on the subject, that the fixing of 65° F. as the maximum temperature would not accomplish the end desired, and that this higher temperature would permit of rapid multiplication of disease-breeding germs in milk. If the somewhat low temperature specified be not enforced by stringent regulations of the health authorities, all other precautions (save, perhaps, the tuberculin test) tending to the production of a pure milk supply and the elimination of the danger of infection through contamination of the milk will be negated to such an extent as to almost totally defeat the purpose of the requirement.

The committee is strongly inclined to believe, therefore, that, notwithstanding the claims put forward by the producers and dealers as to the prejudicial effect upon their business and the possibility, if not likelihood, of a considerable shortage in the milk supply, the interests of the public health demand that this requirement be put into effect and rigidly enforced.

#### PREScribed HOURS OF DELIVERY NOT FEASIBLE.

The committee has considered, in this same connection, the practicability of assuring the maintenance of the prescribed temperature by limiting the hours of delivery, especially at residences, so as to

avoid the exposure of the milk to the rays of the sun or to warm air when standing on the doorstep. While it is undoubtedly desirable, in the judgment of the officials of the Bureau of Animal Industry, that milk should not be permitted to remain on the doorstep in warm weather long enough to allow a material rise in its temperature, the feasibility of specifying certain hours for its delivery is questioned. Some of the persons consulted by the committee are dubious as to whether such regulations would be capable of enforcement, while others suggest that the milk be so placed as to shelter it from the sun. In the opinion of Dr. Goler, health officer of Rochester, N. Y., milk should not be permitted to be delivered to the consumer prior to 6 o'clock a. m., while Dr. Walter S. Wheeler, health commissioner of Kansas City, Mo., alleges that in some cities regulations prescribe from 12 o'clock midnight to 8 o'clock in the morning as the hours for city delivery.

In Wheeling, W. Va., the distributor of certified milk is not allowed to leave it on the doorstep, but must place it in an ice chest or in the hands of an adult member of the family.

Dr. J. M. Houston, bacteriologist of the Washington branch of the White Cross Milk Co., is decidedly of the opinion that milk should be required to be delivered after 7 a. m., so that it can be taken into the home and not exposed to contamination on the doorstep and to the rays of the hot sun in summer and to freezing in winter. He adds that if this plan be effectuated, the dealer would not be embarrassed so largely by complaints of stolen milk and by the inefficient class of help on which he must depend for earlier deliveries.

Dr. Hamill, of Philadelphia, considers it very important to prescribe definite hours for the city delivery of milk, the dealer being required to deliver the milk at such hours as to enable the consumer to receive it into his home immediately upon delivery. Dr. Park favors the limitation of hours of city delivery during the warm months, so that milk would not, at least, remain more than 30 minutes exposed to a temperature above 55° F. Dr. J. P. Kennedy, health officer of Atlanta, Ga., thinks that the subject could best be controlled by issuing from the health department printed slips of instructions, to be delivered at intervals by dairymen to their customers.

The committee is not prepared to commend as feasible the specification of certain fixed hours for delivery, since, in its judgment, to exact this requirement would compel a large supplemental outlay on the part of distributors for additional delivery wagons and help, and would possibly make the retail cost of milk prohibitively high, imposing a hardship on the milkman and possibly embarrassing the plans of the householder.

#### TEMPERATURE FOR MILK PRODUCTS.

The fact that cream is shown to contain pathogenic germs in virulent form convinces the committee that it is advisable to require this to be maintained at a temperature below 50° F., and the committee consequently recommends that such a requirement be imposed. The same observation does not apply, however, to butter and cheese, which, owing to their density, are not favorable to the proliferation of pathogenic germs at ordinary temperatures, though it should be demanded that milk from which these products are made be kept, up

to the time of their manufacture, at a temperature not in excess of 50° F. There would appear to be no reason for a similar specification concerning buttermilk.

#### FREEZING OF MILK.

The committee has examined with interest a report by United States Consul T. H. Norton (Appendix AK) of an address by Prof. Hempel on the "Treatment of Milk" before the seventy-ninth annual meeting of the German Association of Scientists and Physicians, held at Dresden, Saxony, in September, 1907, discussing the feasibility of transporting and delivering milk in a frozen condition. Exhaustive experiments have shown conclusively, Consul Norton states, that pure milk when frozen preserves its original properties unchanged for weeks. Frozen specimens, kept for over a month in the refrigerating room, showed on thawing absolutely no alteration in taste, while the fact of a considerable diminution in the number of bacteria present was clearly established. Important also, he continues, was the circumstance that while frozen the cream remained evenly diffused throughout the solidified mass, which is not the case when milk is kept at a low temperature in a liquid state. To attain good results, he adds further, it is essential that pure, fresh milk, as soon as collected from the animal, be rapidly cooled to the freezing point. Dirty and contaminated milk, as well as milk in which the lactic fermentation has begun, after being frozen, curdles upon melting. He offers the suggestion that fresh milk could be frozen in the proper containers by submerging them in brine chilled far below the melting point of ice, and that, when the milk has not only been frozen, but cooled still further to the temperature of the surrounding liquid, the flasks or other containers could be removed, inclosed in felt protectors, and conveyed to the consumer. Frozen milk prepared under such conditions will, he contends, remain in a solid state for a day or more before the temperature of the entire mass can rise to the melting point. He further remarks that refrigerator cars would obviously be unnecessary for the transportation of milk in this form, unless unusually long distances are to be traversed. The comparatively small cost of freezing and chilling the milk supply of a city would, he asserts, be more than offset by economy in transportation, by the utilization of remote and inexpensive pasturage, and by the removal of one of the gravest causes of infant mortality.

There is considerable diversity of opinion as to the effect produced by freezing on the qualities of milk. Of 24 expressions of opinion on the subject, the committee finds 3 proponents of the belief that freezing has no effect whatsoever, while 5 of the authorities consulted maintain that the prejudicial effect is slight, if appreciable at all. Surg. Gen. Stokes claims that freezing has little or no influence, while Surg. Gen. Torney says that the effect is not injurious unless the freezing be long continued, when it would probably diminish the germicidal power of the milk. According to Dr. Melvin freezing has the effect of separating the butter fat and causing the fat globules to collect into granules. Dr. Duncan, bacteriologist and chief inspector of the health department of Birmingham, Ala., contends that it changes the character of milk slightly, and that it is not always possible to insure a good quality of milk after melting. This

practice has, he reports, been tried in some parts of Europe "without satisfactory success." Borden's Condensed Milk Co. states that freezing itself has really no effect whatever on the quality of milk, provided the milk in being restored to its normal condition is carefully mixed. Milk, however, does not, it goes on to state, keep indefinitely in a frozen condition, as certain forms of bacteria multiply even in that condition, while the lactic acid bacteria are entirely dormant. Bacteria are not, however, destroyed by freezing, even when the frozen condition extends over a period of time. Dr. Prescott observes that frozen milks are sold in Europe and used with apparent impunity.

Dr. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, states that while he has not made experimental determinations on the effect of freezing milk, he is of the opinion that it profoundly modifies its character, perhaps not so much in regard to its potability (that is to say, its quality for drinking purposes), as to its wholesomeness and nutritive qualities. His belief in the matter is, he avers, based on the well-known fact that the freezing of wine or beer, or of meats or fruits, profoundly affects their character, for which reason, in his judgment, milk, especially if intended for the nutrition of infants, should never be frozen.

## VII. PASTEURIZATION.

### PASTEURIZATION AND STERILIZATION DEFINED.

Pasteurized milk is defined in the Standards of Purity for Food Products,<sup>1</sup> issued by the Secretary of Agriculture in pursuance of authority given by Congress in the food and drugs act of June 30, 1906, as follows:

Pasteurized milk is milk that has been heated below boiling, but sufficiently to kill most of the active organisms present, and immediately cooled to 50° F. or lower.

Sterilized milk is defined in the same publication as follows:

Sterilized milk is milk that has been heated at the temperature of boiling water or higher for a length of time sufficient to kill all organisms present.

The term "pasteurization," as applied in a commercial sense, has been employed to denote all cases where milk is subjected to heat with the view, actually or ostensibly, as the case may be, of eliminating all prejudicial germ life, though with the real purpose in many instances of complying constructively, though not effectually, with the requirements of law and of an awakened public that it be subjected to the pasteurizing process to give assurance of its freedom from live deleterious organisms. So variant have been the methods employed for pasteurizing milk, both as to the degree of heat to which exposed and the term of exposure, that many authorities have suggested the coinage, or application at least, of some new term to express pasteurization when effected in the manner agreed by competent bacteriologists as calculated to destroy the pathogenic microorganisms without at the same time destroying the nutritive value of the milk and its facility of digestion.

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<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture.

Pasteurization as applied to milk consists properly in heating this commodity for a short period of time at a temperature considerably below the boiling point (212° F.), followed by rapid chilling, the object being not so much to preserve the milk as to destroy the harmful bacteria and their products. In this connection caution should be exercised to distinguish between sterilization as commonly understood and pasteurization scientifically attained, for in sterilizing the milk is heated at least to the boiling point, a temperature which completely annihilates all germ life, whether pathogenic or otherwise, and which treatment is shown to deprive milk to a certain extent of its nutrition and digestibility.

#### TEMPERATURE AND LENGTH OF EXPOSURE BEST SUITED TO PASTEURIZATION.

Varying temperatures and durations of exposure of milk to the heating process have been suggested by different observers as best calculated to insure the complete destruction of the disease-breeding micro-organisms without at the same time destroying the enzymes or ferments in the milk, which are generally recognized as playing a most important part in facilitating its digestion. Milk treated in the proper manner is rich in enzymes, retains entirely the taste of fresh milk, and is quite as digestible. The following exposures, among others, have been recommended by independent investigators: 140° F. for 15 minutes, 140° F. for 20 minutes, 140° F. for 40 minutes, approximately 154° to 156° F. for 30 minutes, 158° F. for 5 to 10 minutes, and 158° F. for 30 minutes.<sup>1</sup>

Dr. Coit, who is identified as closely, perhaps, as any other person with the development of sanitary milk production in America, recommends 140° F. for 40 minutes, 150° F. for 30 minutes, 167° F. for 20 minutes, or 190° F. for 1 minute, followed by immediate cooling to between 40° and 50° F. Efficient pasteurization at these temperatures and durations does not, according to his observations, destroy the digestive enzymes or nutritive principles in milk, though, on the other hand, it is destructive of all ordinary pathogenic bacteria and also of most other contaminating germs.

The two main considerations which control the temperature and time during which milk should be pasteurized are, first, the thermal death points of (1) the pathogenic (disease-breeding) bacteria, and (2) the ferments in the milk. The first named must be surely killed, so as to eliminate danger, and the latter should not be affected sufficiently to "devitalize" the milk. So far as may be judged from present knowledge, the best temperature is 60° C. (corresponding to 140° F.) continued for a period of 30 minutes, or 145° F. for 20 minutes, followed by rapid cooling, which, it should be emphatically noted, is an essentially important part of the process. There is reason to believe that a higher degree of heat applied during a shorter interval is not as satisfactory, since in commercial pasteurization the shorter periods are likely to result in imperfect pasteurization, and it is mechanically impracticable to assure the application of a uniform temperature in such cases to the entire body of milk subjected to the process. The pathogenic bacteria succumb to heat at temperatures below those of the ferments in milk, so that in this way the infectious-

<sup>1</sup> Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service, p. 650.

ness may be destroyed without injuriously affecting the beneficial components of the milk.

While authorities are not agreed as to the most advantageous degree of heat and the period for which this should be applied to effect perfect pasteurization, there is a substantial disposition among those consulted by the committee in favor of a range of from 140° to 145° F. for an exposure of 20 to 30 minutes (which period shall be interpreted to exclude the time required to attain the prescribed temperature, referring solely to the interval during which the stated temperature is actually maintained uniformly throughout the body of milk under treatment). From the evidence at hand we may therefore safely conclude that the heating of milk to 140° F. for 30 minutes or 145° F. 20 minutes destroys the pathogenic microorganisms without injuriously affecting the composition or quality of the milk and without sensibly impairing its food value, the milk retaining the taste of fresh milk and remaining quite as digestible.

#### EFFECT OF PASTEURIZATION ON GERM LIFE.

As to the effect of pasteurization upon the germ life in milk, Dr. Melvin, Chief of the Bureau of Animal Industry, observes that, if done at temperatures recommended by the bureau (namely, 140° or 145° F. for 30 or 20 minutes, respectively), while destroying most, if not all, of the pathogenic bacteria, the process will not eliminate all of the lactic acid bacteria, the advantage of destroying injurious germs greatly outweighing any possible loss from the destruction of germs that might be considered harmless.

Surg. Gen. Wyman, of the Public Health and Marine-Hospital Service, confirms the statement that pasteurization, if performed at a temperature of 145° F. for 20 minutes, destroys pathogenic bacteria, but does not destroy the ferments of the milk, which latter are understood to play an important rôle in its digestion and assimilation. On the contrary, Dr. Crichton, commissioner of health of Seattle, Wash., asserts that pasteurization destroys the beneficial germs, as it does largely the prejudicial, but that the latter come to the front and multiply with such rapidity that, after a certain length of time, the milk becomes absolutely dangerous. Pasteurization is probably a wise makeshift, he persists, but never to take the place of good, clean, natural milk. Dr. Clemmer, health officer of Columbus, Ohio, contends that friendly germs are more easily destroyed than prejudicial ones. But this view is contradicted by the testimony of most authorities consulted by the committee.

Dr. Hamill is disinclined to admit that milk contains any germs of a beneficial character, but acknowledges that pasteurization if properly carried out will destroy all so-called pathogenic—that is to say, disease-breeding—organisms.

According to Dr. Coit, the enforcement of the tuberculin test will, as elsewhere stated in this report, diminish human infection only to the extent that tuberculosis is now disseminated by market milk; having the effect, in his judgment, of reducing to the extent of about 25 per cent, the number of cases of tuberculosis occurring in children. Human infection from bovine sources would, in his view, be entirely obviated, however, by efficient pasteurization.

## HELD AND CONTINUOUS PASTEURIZATION.

The temperatures and durations of exposure above indicated refer to what is known as "held" pasteurization, or the "holder" process, a specific quantity of milk being retained integrally in what is known as the holder, or pasteurizing receptacle, during the prescribed period of time. The "flash" method, or "continuous" pasteurization denotes where the milk is constantly flowing in and out of the pasteurizer, being subjected during the brief interval of exposure to more intense heat, though not sufficient to destroy the ferments of the milk. It is urged against the latter process that the milk in different parts of the receptacle is not subjected uniformly to the heat, and that for this reason the pathogenic germs are not as certainly killed as by the holder process.

## OBJECTIONS TO COMMERCIAL PASTEURIZATION.

Much adverse comment has been expressed against commercial pasteurization on account of the imperfect and inefficient manner in which, according to actual experience, milk has been pasteurized for the general market. This criticism has been manifestly just in many instances, and has been due in large measure to the introduction of "continuous," or "flash," pasteurization. This method of so-called pasteurization is fairly characterized as a makeshift or subterfuge resorted to by dairymen, often innocently and unintentionally, on the recommendation of representatives of certain machinery interests promoting pasteurizing apparatus of this character. The investigations of the committee have impelled it firmly to the belief that this latter method of alleged pasteurization is not only mechanically impracticable, owing to the impossibility of subjecting the milk uniformly to the specified amount of heat, but results, in operation, either in failing to destroy the pathogenic germs by too mild an application of heat to certain portions of the volume of milk, or in making the heating of all or particular portions of the milk in the container so intense as to devitalize it and encourage its rapid putrefaction.

"Held" pasteurization, as has been explained, is the generally commended method of retaining the fluid in the tank or receptacle for a given period of time, instead of permitting a continuous flow in or out of the chamber. In the "continuous," or "flash," process the milk is customarily exposed only momentarily to the heat at a temperature of from 73° to 74° C. (which is equivalent to from 163.4° to 165.2° F.). It will be observed that this degree of temperature is considerably in excess of that recommended for pasteurization under the "held" process, namely, 140° to 145° F.

In an article entitled "The Pasteurized Milk Fraud,"<sup>1</sup> by Arno Dosch, reference is made to the contest which is now being waged in Chicago in favor of a purer milk supply and to the fraud which is being practiced upon the public in certain communities by placing on sale milk which, though represented to be pasteurized, has not been treated according to approved methods of pasteurization, the "flash" process being largely resorted to in this connection. In the article

<sup>1</sup> Pearson's Magazine, December, 1910, p. 721.

mentioned Dr. William H. Park, chief bacteriologist of the New York department of health, is quoted on the effect of the law enacted on December 8, 1909, regulating, among other things, the pasteurization of milk for consumption in New York City. It is represented that the law which was to have gone into effect on March 1, 1910, is still practically inoperative, owing to the failure of the dealers to provide the pasteurizing apparatus required, an extension having been granted, delaying actual compliance on their part with the provisions of the law.

The consensus of opinion among the authorities consulted by the committee in the course of its investigations is largely in favor of the practicability of commercial pasteurization.

#### COMPULSORY PASTEURIZATION.

The sentiment among the health officers consulted by the committee appears to be opposed to compulsory pasteurization. In most instances, however, where objection is registered no reasons are assigned. Dr. Woodward, health officer of the District, sees no reason why compulsory pasteurization should not be practicable, the health department having, he states, for some time had under consideration the feasibility of recommending the compulsory pasteurization of all milk coming from cows not tuberculin tested. Surg. Gen. Stokes advocates compulsory pasteurization.

Dr. Woodward directly affirms that in the present state of the production and sale of milk commercially pasteurization seems to be the only way of safeguarding the public health against milk-borne diseases. The sale of raw milk answering to the classification of certified milk should not, however, in his judgment, be forbidden.

Dr. Park suggests the following precautions, additional to the tuberculin test, in the absence of compulsory pasteurization: General hygienic rules, examination of feces before the return of typhoid convalescents to their employment, inspection of wells, and a report of all suspected communicable diseases.

#### ADVANTAGES AND DISADVANTAGES OF PASTEURIZATION.

Many considerations have been advanced in favor of and in opposition to pasteurization, both compulsory and voluntary.

In a paper entitled "The Bacteriology of Commercially Pasteurized and Raw Market Milk," by S. Henry Ayers and William T. Johnson, jr., issued November 14, 1910<sup>1</sup> (only a few weeks ago), the advantages and disadvantages of pasteurization are set forth, based upon the latest considerations advanced for and against this treatment of milk. The objections to pasteurization, generally accepted as well founded, are summarized by these writers as follows:

1. It is believed that the lactic-acid bacteria in raw milk, which eventually sour the milk, exert a restraining influence on the peptonizing bacteria, which would otherwise cause the putrefaction of the milk. In other words, when milk is pasteurized and subsequently kept free from lactic-acid bacteria, which are easily killed by heat, it will not sour, but will putrefy, due to the development of peptonizing bacteria, the spores of which are not destroyed during pasteurization. The peptonizing bacteria, when freed from the restraining influence of

<sup>1</sup> Bulletin No. 126, Bureau of Animal Industry, U. S. Department of Agriculture.

the lactic-acid organisms, may increase to large numbers and produce toxins and poisonous decomposition products.

2. The pasteurization of dirty milk, while reducing the bacterial numbers, does not destroy the toxins or other products of bacterial growth.

3. Careless methods of handling after pasteurization may result in serious contamination of the milk.

4. Pasteurization may be used simply to cover up dirty milk. It may encourage dirty methods in production and retard the extension of sanitary supervision.

5. Milk which has not been sold may be pasteurized, or even repasteurized, and its faults hidden.

6. Bacteria may increase more rapidly in pasteurized milk than in raw milk.

7. Undesirable changes may be produced by heating, which result in making the milk less digestible, particularly in the case of infants.

The paper concludes with the statement that commercially pasteurized milk always sours, because of the development of lactic-acid bacteria which, on account of their high thermal death point, survive pasteurization, and perhaps in some cases because of subsequent infection with acid-forming bacteria during the cooling and bottling; that the acid development in an efficiently pasteurized milk is about the same as that in a clean raw milk; that the "old" taste which sometimes develops is not characteristic of pasteurized milk, but may be noticed as well in clean raw milk when held under similar conditions; that the relative proportions of the groups of peptonizing, lactic acid, and alkali or inert bacteria are approximately the same in efficiently pasteurized as in clean raw milk; that the peptonizing bacteria are present in smaller numbers in the inferior grades of commercially pasteurized milk during the first 24 hours after receiving than in raw milk of the same quality; that the number of peptonizers in a good grade of commercially pasteurized milk on the initial count and on succeeding days is approximately the same as in a clean raw milk when held under similar temperature conditions; that lactic-acid bacteria of high thermal death point are found in milk and may be easily isolated by special methods of procedure, these heat-resisting lactic-acid bacteria playing an important part in pasteurized milk and undoubtedly accounting to a large extent for its ultimate souring; that all milk, whether pasteurized or raw, must necessarily be infected during cooling and bottling by bacteria in the receiving tanks, in the pipes, in the cooler, and in the bottles; that the low bacterial counts obtained from pasteurized milk in these investigations show that reinfection must have been very small; that it is manifestly unfair to conclude that bacteria increase faster in pasteurized than in raw milk, simply from a comparison of the ratio of bacterial increase, it being evident from the results of this investigation that the bacterial increase in an efficiently pasteurized and a clean raw milk is about the same when the samples of milk are held under similar temperature conditions; that the "holder" process of pasteurization is superior to the "flash" process, a temperature of 145° F. (62.8° C.) for 30 minutes appearing to be best adapted for efficient pasteurization; that pasteurized and raw milk should always be bottled and should not be allowed to be sold as "loose" milk from stores; and that pasteurization should invariably be under the control of competent men who understand the scientific side of the problem.

One of the chief objections urged against pasteurization is that it promotes carelessness and discourages efforts to produce clean

milk, the farmers and those who handle milk which is to be pasteurized believing that it is unnecessary to be particular, since the dirt that goes into the milk is going to be "cooked" and made harmless. In opposition to this it should be observed that it is not proposed that pasteurization shall take the place of inspection and improvements in dairy methods, and that, even if pasteurization be adopted, no milk should be accepted that does not comply with reasonable chemical and bacteriological standards.

It has been further asserted, in objection to pasteurization, that it injures the taste of the milk and increases its cost. Experience dictates, however, that the pure, sweet taste of milk is not appreciably affected by pasteurization, and that the cost of pasteurization (including the expense of transporting the milk to and from the pasteurizing plant) is so immaterial as to make this objection untenable from a practical standpoint.

It has, moreover, been contended by the opponents of pasteurization, that it induces scurvy and rickets, but investigations in Germany, France, and other countries, where artificial feeding of infants with heated milk is most popular, do not sustain this assertion.

#### VIEWS OF DR. H. W. WILEY.

Dr. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, expresses the belief that no milk which has undergone so-called preparation or modification of any kind is as wholesome and nutritious "as the pure article." In his opinion, pasteurization seriously injures milk in its nutritive value, especially for infants, and milk should never be pasteurized, he says, "except as a choice between two evils." Insanitary milk, if used at all, should, he admits, undoubtedly be pasteurized, though in his view "dirty milk is just as dirty after pasteurization as it was before." He takes the ground that pure, clean, properly handled cow's milk needs no pasteurization and no modification, and no preparation except as indicated in the modifications of milk under proper medical advice for the feeding of infants. He vouchsafes the opinion that large cities (under which designation he expressly includes Washington) might be able to get a much better milk supply (except for infant feeding) than is now afforded by establishing clean, sanitary milk plants in regions devoted to the dairy industry, drying the milk to a powder by one of the modern sanitary processes, and transporting it to the city for speedy consumption. He strongly urges upon every municipality the establishment of a milk plant under the direct control of the municipality, where pure, clean, wholesome, unpasteurized, unmodified, and unprepared milk may be kept for the use of infants fed artificially, the plant to include among its appurtenances a modifying chamber under the direction of a competent specialist, to modify the pure milk without any other changes to as nearly the composition of fresh mother's milk as possible, or to make special modifications of milk, under the direction of a physician, for those who are diseased. He would go so far, he states, as to make it a penal offense for any person, feeding an infant artificially, to use any other food than that supplied through these central establishments. He advocates, as already stated, reducing to a powder milk intended for adult consumption, which, though coming from a distance, can, he

asserts, be used with safety and without danger of interfering with the nutritive processes, the municipal milk supply being reserved entirely for the use of infants artificially fed.

While these averments coming from so eminent an authority on matters of pure food as the present Chief of the Federal Bureau of Chemistry are entitled to the fullest consideration, the committee is prepared to believe that the use of powdered milk as suggested would not be satisfactory to the ordinary consumer, and that it has not been scientifically demonstrated that milk may be reduced to powdered form and retain, when subsequently diluted, the proper proportion of butter fat and other ingredients in such status as to render the product as assimilable and nutritious as clean, raw milk, or properly pasteurized milk of the requisite degree of purity and cleanliness.

Among the advantages of pasteurization it may be stated that proper pasteurization under official supervision reduces to a minimum the number of pathogenic live bacteria and eliminates the danger of infection from tubercular, typhoid, scarlet fever, diphtheria, and other germs, as well as from diarrhea and other intestinal disorders, which are especially common in infants and younger children, particularly in the summer months, and which are so fruitful a cause of mortality. While the danger of tubercular infection through milk may be largely eliminated by the compulsory application of the tuberculin test, this expedient does not safeguard against the communication of typhoid fever, diphtheria, and other infectious diseases introduced into the milk by a bacillus carrier or through contamination in other ways in its handling from time of milking to the moment of consumption, nor against possible tubercular infection when handled by a person suffering with tuberculosis, or when kept amid surroundings frequented by tuberculous patients.

Pasteurization appears at the present time to be the only practicable solution of the milk problem. The objections raised to this treatment of milk seem to be either theoretical or such as may be readily overcome. Milk to be as clean as desired must be obtained from especially well-equipped dairy farms and handled exclusively by skilled and conscientious persons. The cost of installing such equipment and employing such a class of labor would necessarily result in a decided increase in the sale price of milk, while pasteurization, especially if done on a suitable scale, would not, it is believed, increase the price of milk more than a fraction of a cent per quart.

Since the date of the first attempt at commercial pasteurization this treatment of milk has been prescribed in many municipalities in the United States.

While it has been axiomatically averred that "pure milk is better than purified milk," and it is clearly recognized that milk cleanly produced is better than bacteria-laden and dirty milk, even when subjected to the process of pasteurization, yet in the existing conditions of dairy farming and the comparatively recent application of sanitary methods to the production of milk, a safe product can not, in the judgment of the committee, be assured without pasteurization, for while in its opinion the pasteurization even of cleanly produced milk does not impair to any appreciable degree its wholesomeness and attractiveness as an article of diet, pasteurization, properly administered, of uncleanly milk, or milk which has not been produced with

the utmost care and circumspection, is certain to render the product innocuous, and is consequently entitled to unqualified indorsement. The time may come when dairy farming will be systematized and advanced to such a state of perfection that pasteurization will be a needless recourse, but such a happy condition of affairs is not likely to ensue for many years to come, and until it eventuates pasteurization must of necessity be generally practiced as a means of safeguarding the public health and gradually, but effectively, decreasing the alarming rate of mortality resulting from tuberculosis, diphtheria, typhoid and scarlet fevers, and various gastrointestinal diseases, which latter present so formidable an obstacle to the immunity, especially of infant life, from disease and destruction.

There is a prevailing impression that pasteurization of milk adds merit to that important article of diet, but this is only true in so far as it negatives and nullifies the harmful effects of certain disease-breeding germs. Milk after pasteurization requires the same degree of care and attention to prevent contamination as is the case with raw milk, and the carelessness likely to result from this dependence upon its immunity to further contamination is, in the opinion of the committee, one of the weightiest arguments offered against pasteurization. This objection is far outweighed, however, in the minds of the committee, by the fact that pasteurization enables one to obtain milk—in the condition when it leaves the pasteurizing plant—practically, if not entirely, free from live disease-breeding organisms, and it then rests with the consumer whether he shall bestow upon it from that time on the intelligent care which is necessary to prevent its premature deterioration. It may be added that milk in the manner in which it leaves the pasteurizing plant, namely, in a sealed package, not to be opened until delivered to the home of the consumer, is much less liable to contamination after pasteurization than in its journey from the disease-breeding surroundings of the farm to the pasteurizer. Since, moreover, long series of laboratory experiments, as well as clinical observations, lead us to believe that properly pasteurized milk is quite as digestible as raw milk, the committee is prepared to recommend pasteurization as the only effective means under existing circumstances of diminishing, if not entirely eliminating, the danger of infection through the agency of milk with tuberculosis, typhoid fever, diphtheria, scarlet fever, and other diseases.

#### CHICAGO MILK ORDINANCE.

An ordinance of January 1, 1909, provides that all milk sold in Chicago, beginning January 1, 1914, shall be obtained from tuberculin-tested cows. During the interim of five years, milk not obtained from tuberculin-tested cows may be sold, provided it be pasteurized according to rules and regulations of the Chicago department of health. Under this ordinance, states Dr. F. O. Tonney,<sup>1</sup> director of the municipal laboratories of Chicago, about 54 per cent of the milk sold in Chicago is now pasteurized and 24 per cent is tuberculin tested, and it is anticipated that before the close of the present season (autumn of 1910) the remaining 22 per cent will be

<sup>1</sup> "Tuberculosis in Market Milk of Chicago," read in section on preventive medicine and public health of the American Medical Association, at St. Louis, June, 1910; *Journal of American Medical Association*, Vol. LV, No. 15, Oct. 8, 1910, p. 1252.

pasteurized, as also much of the tuberculin-tested product. During the summer of 1909, when only about 30 per cent of the milk used in Chicago was pasteurized, a decrease of 521 was noted during that brief period in the deaths from diarrheal diseases reported among children under 1 year of age. The average bacterial count of raw milk in 1909 was 5,547,502 per cubic centimeter, while in pasteurized samples taken from plants, a bacterial count of less than 200,000 was shown. The writer refers to the extreme importance of preventing the practice prevailing in some retail establishments of selling left-over samples from the previous day's delivery, which practice is responsible, in his opinion, for most of the high counts obtained in pasteurization.

Dr. Tonney contends that, while the effectiveness of pasteurization in preventing milk-borne tuberculosis is fully conceded, the milk situation in large cities involves so many other factors that tuberculosis of necessity may be regarded as only one among many sources of danger, several of which, in his judgment, are even more important from a public-health standpoint. In a large city, says he, there must always be present the element of distance between the producer and consumer, and this factor gives opportunity for the thousand and one sources of contamination occurring as a result of multiplicity of handling, time consumed in transit, improper handling during transit, etc., all of which factors tend to multiply enormously the common polluting agencies to which milk is subject. The final product which reaches the consumer, he continues, may therefore be dangerous from the standpoint of five or six groups of diseases, which he enumerates in the order of their importance, as follows: First, and by far the most deserving of attention, the group of infantile diarrheal diseases, which are responsible for about one-third of the death rate among children under 2 years of age in our large cities; second, typhoid fever; third, tuberculosis; fourth, scarlet fever; fifth, diphtheria; sixth, a group of miscellaneous infections not particularly important in this country, such as cholera, foot-and-mouth disease, milk sickness, and others. As tuberculosis, he observes, may be eradicated by strict application of the tuberculin test, so may these other infections be eradicated by the strict observance of sanitary rules in the production and handling of milk, and since improvement in this respect involves an educational campaign and the development of an adequate inspection system, he insists that the public, which is entitled to immediate protection, must turn to pasteurization, there being no other single agency of purification of such wide applicability. The feasibility of compulsory pasteurization has, he concludes, been demonstrated by the experience of the city of Chicago during the past 18 months.

Dr. Park assigns the same relative importance as Dr. Tonney to milk as an infectious factor in the following diseases, namely: (1) Typhoid fever, (2) tuberculosis (in children), (3) scarlet fever, (4) diphtheria.

Of all foodstuffs milk is the most difficult to preserve pure and handle with success. It requires not only intelligence, but a high degree of technical training, as well as unceasing vigilance, to produce clean and safe milk. Many believe that this end may be accomplished by official supervision and an effective system of inspection, but we can scarcely conceive of any system of surveillance of

the milk supply that will prevent its occasional contamination, and while pasteurization can not make bad milk good, it can, when properly applied, make bad milk harmless (except when derived from animals suffering with certain rare specific diseases).

It should be borne in mind though that pasteurization is not appropriately to be used for preserving unclean or old milk, but as a measure of safety against dangers which no other precaution can obviate. For this reason it is especially important that pasteurization should be practiced under proper supervision, so that not only may it be insured that the milk is maintained within the proper temperatures for the prescribed length of time, but what is equally important, that the milk, up to the moment when placed in the pasturizer, shall be cleanly milk and fresh milk and cool milk.

Dr. M. J. Rosenau, formerly director of the Hygienic Laboratory of the Public Health and Marine-Hospital Service and now director of the bacteriological laboratory of Harvard University, states<sup>1</sup> that "milk should be produced under clean conditions and kept clean and it would not then have to be purified. But," he continues, "we must guard against enemies as long as they exist. We would all like to do away with armies and navies, but present conditions demand their maintenance, and the same is true of harmful bacteria in milk; so long as the average market milk is bad and contains these insidious foes, the only protection we have is to destroy them with heat."

It has been contended by the milk producers and dealers in the hearings before the committee that pasteurization is objectionable for the reason that, unless carefully and scientifically done, its effect is to destroy the nutritive qualities of milk, and that, if compulsorily insisted upon, it would be directed largely toward preserving filthy, impure, and stale milk, instead of being properly employed as an agency for eliminating germs which are prejudicial to the health of the consumer. It was argued, moreover, that the mandatory pasteurization of all milk (except "certified" milk) sold to the Washington public would necessarily eliminate the small dealer—the merchant of modest means—from the business of supplying milk, and reduce the number engaged in this occupation to a few men of considerable means, who would thereupon enter into combination for the purpose of extorting unreasonable prices and foisting other exactions upon a helpless public.

#### COST OF INSTALLING PASTEURIZING PLANTS.

Examination by the committee into the subject of pasteurization evinces the fact that the installation of the ordinary pasteurizing plant of the city dealer involves an expenditure of upward of \$10,000.

With reference to the cost of establishing a suitable central plant for the pasteurization of the Washington milk supply, the committee appends a communication (Appendix AM) received in response to its inquiry of December 3, 1910 (Appendix AL), from Mr. Loton Horton, of the Sheffield Farms-Slawson-Decker Co., of New York City, stating that the company is at present constructing the second largest pasteurizing plant in New York City, with a

<sup>1</sup> Bulletin No. 56, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service, p. 641.

capacity for pasteurizing 100,000 quarts of milk in 6 hours, and manufacturing 100,000 pounds of ice in 24 hours, besides cooling all the milk that comes to the plant. He estimates that a proper building for handling our local supply would cost \$175,000, and the machinery possibly \$150,000, it being practicable to realize from the manufacture of ice alone, he remarks, a profit of at least 4 per cent on the whole investment, reducing the cost of pasteurization to a "very trifling sum."

The introduction of compulsory pasteurization, if applied to the agencies furnishing milk to the District of Columbia, would, in the judgment of the committee, necessarily result either in placing the milk business in the hands of a few responsible parties or in initiating the practice among the small dealers of purchasing their milk from pasteurizing agencies, instead of direct from the farmer as heretofore. It is likely that, if pasteurization be required by law, a number of additional efficient pasteurizing plants would be at once installed under private auspices, both for pasteurizing milk for the producer or distributor at a fixed charge and for collecting, pasteurizing, and distributing milk directly through their own respective agencies.

#### COST OF PASTEURIZATION.

As to the cost of pasteurization, it may be quoted from a communication received from one of the largest milk-producing agencies in the country that it is cheaper to pasteurize and bottle milk in the city in large plants than it is to bottle the milk in the country without pasteurization. Pasteurizing machinery can, it is said, be obtained from half a dozen or more concerns at a very low cost, and where the work may be done properly under official supervision as is possible in the city, the public receives the benefit of the purer milk supply without a corresponding advance in the retail price. The investigations of the committee lead it to believe that the entire milk supply of the District of Columbia may be pasteurized when adequate time has been afforded for installing a proper plant or plants of ample capacity, at a cost of not more than 1 cent per gallon.

#### EFFECT OF PASTEURIZATION ON THE NUTRITIVE AND DIGESTIVE QUALITIES OF MILK.

There is some difference of opinion as to the effect of proper pasteurization upon the nutritive and digestive qualities of milk, but the prevailing view among the authorities consulted by the committee is to the effect that there is little or no prejudicial influence in this respect. One of the persons consulted, however, alleges that the vitality of the milk is destroyed and another that the nutritive value is impaired by the destruction of the ferments or enzymes, while yet another contends that pasteurization renders the product less nutritive and harder to digest.

#### MULTIPLICATION OF GERMS IN RAW AND PASTEURIZED MILK.

While it is generally understood that harmful germs proliferate at least as rapidly in pasteurized milk as in raw milk, recent experiments by the Bureau of Animal Industry demonstrate that there is

practically no difference in the multiplication of germs in pasteurized milk and in clean raw milk of approximately the same bacterial content and kept under similar conditions. The important observation is made by the bureau that, while the rate of multiplication may be more rapid in pasteurized milk than in raw milk "with a higher bacterial content," this is because of the low number of bacteria in the pasteurized milk at the beginning of the test, so that the ratio of multiplication is much greater compared with the raw milk, in which the number of bacteria is already enormous.

#### VALUE OF PASTEURIZED MILK.

Dr. Rowland G. Freeman, of New York City, one of the foremost authorities in this country, who, indeed, enjoys an international reputation as an eminent specialist in the treatment of children's diseases, in an article published under date of January 29, 1910,<sup>1</sup> expresses the opinion that at the present time there can be no absolute security in any raw milk, and asks why, this being the case, we are not using heated milk, in which there is security.

The situation is succinctly set forth by Dr. G. Lloyd Magruder, a local physician, who has devoted himself for many years indefatigably to the improvement of the milk and water supplies of our community, as follows:

Even though the danger of contracting tuberculosis due to bovine tubercle bacilli from dairy products can be eliminated, if we can obtain milk from healthy cows, there still remains the danger of contracting tuberculosis due to human tubercle bacilli and other diseases from contaminated milk. Milk can be made safe, however, by the proper application of heat. \* \* \* Sterilization means the killing of all the germs that may be present in milk. Pasteurization means the destruction of the disease germs that are of more common occurrence in it, such as those of tuberculosis, typhoid fever, diphtheria, etc. The investigations \* \* \* have shown that the common or pathogenic bacteria are unable to retain their life and virulence when they are exposed to a temperature of 60° C. or 140° F. for a period of 20 minutes, and that the value of milk as an article of food is not perceptibly affected by the designated temperature.<sup>2</sup>

Opposition to pasteurized milk, even for infant use, is gradually disappearing, and it is becoming a matter of general acceptance that raw milk is apt to be dangerous and heated milk is the only safe milk for the use of mankind. It has been objected that in pasteurization some of the bacterial toxins or poisonous germs are not killed at the temperature ordinarily used, but Rosenau<sup>3</sup> observes (see Appendix F) that the true bacterial toxins are known to be destroyed by heating to a temperature of 60° C. for 20 minutes, and that if milk contains bacterial toxins not destroyed by pasteurization it will contain these same poisons if the milk be consumed in its raw state, the heating of the milk preventing at least the further formation of such injurious substances.

Theobald Smith, a recognized authority on the subject of milk in relation to health, in discussing Rotch's paper on "The pasteurization of milk for public sale,"<sup>4</sup> says:

It seems to me that the real difficulty of the present condition is the transmission of specific disease germs, which are not easily controlled by any amount

<sup>1</sup> Journal of the American Medical Association, Vol. LIV, No. 5.

<sup>2</sup> Further Observations on the Milk Supply of Washington, D. C., by G. Lloyd Magruder, M. D., read in the section on preventive medicine and public health, American Medical Association, St. Louis, Mo., June, 1910.

<sup>3</sup> Circular No. 153, Bureau of Animal Industry, U. S. Department of Agriculture.

<sup>4</sup> American Journal of Public Hygiene, Vol. XVII, May, 1907, p. 200.

of cleanliness, and these specific germs, one and all of them, may be destroyed by the average pasteurization.

W. T. Sedgwick, another acknowledged authority, observes as follows:<sup>1</sup>

When all is said and done, I agree with Prof. Smith that we have got to pasteurize milk. Cooked milk is the only safe, and always will remain the only safe, milk for the use of mankind. Little by little the idea is spreading that raw milk is apt to be dangerous milk.

While there is some variance among authorities whether it may be substantiated upon subsequent examination that milk has been properly pasteurized, the view is apparently well defined that this may be done. The Surgeon General of the Public Health and Marine-Hospital Service takes the ground, however, that this is not practicable except by a bacterial examination of the milk both before and after pasteurization. Dr. Melvin, Chief of the Bureau of Animal Industry, assents to the proposition that the bacterial count is a good index to the efficiency of pasteurization.

#### PASTEURIZATION DOES NOT DISPENSE WITH NECESSITY FOR TUBERCULIN TEST.

Authorities are practically a unit in the belief that pasteurization, if introduced, would not dispense with the necessity for the tuberculin test. The Chief of the Bureau of Animal Industry explains that the tuberculin test is an important function in eradicating tuberculosis of animals for the economic benefit of the live-stock industry, as well as for the conservation of the supply of milk. Dr. Park maintains the position that pasteurization relieves the necessity for the application of the tuberculin test so far as the safety of milk is concerned. Dr. Coit is emphatic in his view that pasteurization, if generally insisted upon, would not do away with the necessity for the tuberculin test, since, as he observes, tuberculosis is the most insidious germ carried by milk. Surg. Gen. Stokes, of the Navy, advocates the enforcement of the test coincidentally with pasteurization if introduced, for the reason that the eradication of bovine tuberculosis is a necessary sanitary measure. The committee begs to observe in this connection that, while pasteurization destroys the preponderant germ life of the milk, the dead germs are not removed from the product, and it is manifestly advantageous that the tuberculin test, as well as any other precautions tending to reduce to a minimum the amount of germ life existent in the milk offered for pasteurization, should be insisted upon. It is additionally urged that, while pasteurization destroys the tubercle bacilli, it does not remove the toxins, the formation of which should, therefore, be jealously avoided.

#### COMMUNICABILITY OF BOVINE TUBERCULOSIS TO HUMAN BEINGS.

Quite the contrary is the situation with reference to the effect of pasteurization, if compelled, in obviating the possible infection with tuberculosis through the medium of milk or meat from affected animals. There is staunch support among the authorities consulted by

<sup>1</sup> Journal of Massachusetts Association of Boards of Health, Vol. XIV, February, 1904, p. 41.

the committee for the pronouncement that the danger of contracting disease from milk contaminated up to the moment of pasteurization is removed by that process and that if the product be afterwards handled in accordance with well-defined precautions, including the maintenance of a temperature below 50° F., there is absolute safety in its ingestion and its potability is considerably enhanced. Dr. Melvin, Chief of the Bureau of Animal Industry, takes the positive ground that efficient pasteurization would greatly reduce the danger of all kinds of infection and minimize the prospects of subsequent contamination of the milk. Surg. Gen. Torney tersely notes that "it would prevent the transfer of these infections from the farm to the city." Ravenel corroborates this pronouncement when stating that proper enforcement of pasteurization would entirely prevent all infection, and Winslow supplements this with a caveat that the milk be kept clean after treatment. While this substantive approval of pasteurization as a means of purifying milk is largely concurred in by the health officers who have assisted the committee, there are a few exceptions. Dr. Kennedy, health officer at Atlanta, Ga., for example, states that, in his judgment, milk does not need pasteurization, and that for a city of the size of Atlanta pasteurization has been found by him to be harmful rather than beneficial in its results; and Dr. Goler, health officer of Rochester, N. Y., adds that pasteurization as practiced in that city is only used to preserve dirty milk. Dr. Levy, chief health officer at Richmond, Va., while harmonizing with the view that pasteurization would decrease the amount of infection from diphtheria, typhoid fever, scarlet fever, and tuberculosis "to the fullest extent if properly done," couples this affirmation with the admonition "that pasteurization may do great harm in other directions." Mr. Corbin Thompson, one of the representatives of the Dairymen's Association, takes the extreme view that infection with the diseases mentioned would not be diminished by compulsory pasteurization, but, on the contrary, would be increased.

#### BACILLUS CARRIERS.

Though it is generally admitted that cleanliness in the production, transportation, and distribution of milk is a potential factor in insuring against the causation of disease through the agency of milk, it is pointed out by the Chief of the Bureau of Animal Industry, the Surgeon General of the Navy, Surg. Gen. Wyman, of the Public Health and Marine-Hospital Service, and other advisers of the committee that while cleanliness will greatly reduce the danger of infection it will not entirely remove such danger, since it is now very generally recognized that the germs of disease may be conveyed by cleanly persons in their clothing or otherwise, and especially by persons known as "bacillus carriers" and those having "walking cases" of disease. It is also essential, of course, that the milk be initially derived from noninfected cows. It is the recognition of these possible sources of contamination and infection that furnishes the strongest argument in favor of pasteurization and the tuberculin test.

#### EFFECT OF PASTEURIZATION ON THE PRICE OF MILK.

In support of the prediction that pasteurization if generally compelled would not increase substantially or even perceptibly the retail price of milk, it may be cited that notwithstanding the ordinance

of the Chicago Department of Health enjoining the sale or delivery of any but pasteurized milk the price of milk delivered to householders in Chicago is now said to be only 8 cents per quart.

Dr. Park estimates that the proposed additional sanitary requirements for the improvement of the milk supply would have the following effect on the retail price of milk: The tuberculin test would occasion the loss of 15 per cent of cattle; pasteurization and the observance of a maximum bacterial count, the maintenance of temperatures not exceeding 50° F., and advanced stabling requirements would add one-half to 1 cent to the retail price of each quart of ordinary city milk.

It may reasonably be assumed, therefore, that an increase locally to 10 cents per quart the year round for good wholesome milk delivered for consumption in the District of Columbia would be ample to enable both producers and dealers to continue their operations at a satisfactory profit.

#### PRICES OF SEVERAL GRADES OF MILK.

The price charged for "certified" milk, which may fairly be said to approximate on the average 20 cents per quart, makes it impossible for the man of moderate means to avail himself of this grade of milk. While what is known as "inspected" milk can be produced at a lower price, this would necessarily still cost more than milk as ordinarily produced, namely, about 15 cents per quart, so that the masses would perforce resort to the third class of milk recommended by the Washington milk conference, namely, "pasteurized" milk, thus enabling them to secure a safe and wholesome supply of this important commodity at but a trifling advance in price over the present common market milk.

#### PASTEURIZATION TENDS TO PRESERVE MILK.

The same observations regarding raw milk as compared in its keeping qualities with condensed milk apply equally to pasteurized milk. It may be stated as an economic consideration, aside from the aspect of the public health, that pasteurization improves the keeping qualities of the milk, and it is estimated that the expense of installing a suitable equipment for pasteurizing, even if left to individual enterprise, would be compensated for by the averting of loss resulting otherwise from the souring of milk.

In order to meet the necessary requirements, pasteurizers should be efficient in operation, permitting a definite quantity of milk to be heated to a definite temperature for a definite length of time. The milk should be heated uniformly throughout, and the apparatus should be simple in construction, easily cleaned, and arranged to safeguard against reinfection of the milk. Provision should, furthermore, be made for rapid cooling. The pasteurization should be done under the immediate and alert supervision of health officials.

#### PASTEURIZATION IN OTHER JURISDICTIONS.

Pasteurization is being practiced, either compulsorily or otherwise, in a number of jurisdictions in this and foreign countries, notably in Germany, France, and Denmark. It was estimated in 1909 that 25

per cent of the total amount of milk supplied to the city of New York, aggregating approximately 1,500,000 quarts daily, was pasteurized, and that in the neighborhood of 123,250 of a total of 368,489 quarts of milk arriving in Boston daily was subjected to commercial pasteurization.

The rules adopted for the regulation of milk production and sale in the city of Chicago distinguish between "continuous" pasteurization—that is, a continuous flow of milk through the heating or heat-retaining chamber—and "held" pasteurization, which applies when the milk is retained during the pasteurization in such a manner that the process does not constitute a continuous flow; but in both instances it is required that the pasteurized product show that over 99 per cent of the bacteria and all pathogenic bacteria have been destroyed. The rules require a uniform heating to 140° F. for 20 minutes, to 150° F. for 15 minutes, to 155° F. for 5 minutes, to 160° F. for 1½ minutes, or to 165° F. for 1 minute, the time calculated from the period when the entire quantity reaches the specified temperatures, the pasteurized product to be immediately cooled thereafter to a temperature of 45° F. or less, without exposure to the air or other contamination.

The additional regulations for the sale and care of milk in New York City, adopted April 22, 1908, provide, inter alia, that pasteurization of milk must be carried on under a permit issued therefor by the board of health, that the milk be at once cooled and placed in sealed sterilized containers and delivered sealed, plainly marked "Pasteurized," with an indication of the date and hour when the pasteurization was completed, the degree of heat employed, and the length of time exposed to the heat. It is expressly enjoined that pasteurized milk be delivered to the consumer within 24 hours after pasteurization.

An examination into the requirements of this and other jurisdictions convinces the committee that the practice of compelling the pasteurization of all milk consumed in the District of Columbia (except "certified" milk) is not only a reasonable and desirable requirement, but is essentially necessary to the conservation of the public health.

#### LOCATION OF PASTEURIZING PLANTS.

The committee has been somewhat perplexed in arriving at a proper conclusion as to whether the proposed pasteurizing plants would be located to better advantage within the geographical limits of the District of Columbia or at such centrally situated points throughout the sections of Maryland and Virginia from which the milk supply of the District is principally received as would best accommodate the producers shipping to Washington.

As regards the convenience of the farmer, a correct solution of the matter would perhaps depend chiefly upon whether his farm happened to be located nearer to the railroad from which shipment is now made to Washington or nearer to the site of a proposed plant, since the situation would practically resolve itself into the determination whether he could reach the railroad station with greater facility than he could deliver his product over to the pasteurizing plant in his own locality. When we consider the element of labor, it is rea-

sonable to assume that such force as might be needed to conduct the operations of a given plant could be commanded at lower wages in the country than if the plant were located within the District. It is possible, furthermore, that if the plant be located in a rural community a number of farmers patronizing the same plant would make it practicable to concentrate their shipments and enable the securing of better rates for refrigerator-car service than could otherwise be obtained.

If it be insisted that the milk be maintained at a temperature not exceeding 50° F. from time of milking to time of delivery at the pasteurizing plant, there would be no appreciable deterioration of the milk when maintained at such temperature if the pasteurization be deferred until the milk reaches Washington instead of being practiced at the point of shipment. The establishment of the pasteurizing plant or plants within the boundaries of the District would manifestly facilitate the administration and inspection by the health department and involve less public expenditure than would otherwise be requisite. There is the additional consideration as to whether it would be feasible to establish a sufficient number of plants throughout the sections of the country in which the dairy farms are located to enable the farmers to conveniently send their supplies of milk to these plants. Dairy farms, and indeed farms generally, have been located with reference as a rule to their proximity to existing railroads and the transportation facilities thereby afforded. It is possible that without providing an impracticably large number of pasteurizing plants certain farms now sending their product to Washington would be entirely eliminated from the situation; though, on the other hand, it might be argued that the installation of such plants would serve as an impetus for the establishment of a number of new dairy farms, or the conversion of a number of general farms partly or wholly into dairy farms.

After carefully weighing the several considerations in favor of and opposed to the location of the proposed pasteurizing plants in the District, the committee concludes that, in its judgment, the interests of the public generally will be best subserved by requiring that the pasteurizing plant or plants be located within the limits of the District of Columbia, where they may be under the continuous supervision of representatives of the health department. This view, that the pasteurizing plant or plants should be located within the city or in close proximity rather than on the farm, is indorsed by an overwhelming majority of the authorities consulted by the committee.

#### PRIVATE LOCAL PLANTS NOW IN OPERATION.

The committee files herewith (Appendix AN) a list of the milk pasteurizing plants already in operation in the District of Columbia. It feels obliged to add in this connection that it can not state with definiteness whether all of these plants entirely conform in every respect with the specifications concerning the degree of heat, length of exposure, and other requisites for proper pasteurization.

#### MAINTENANCE OF PLANTS UNDER PUBLIC OR PRIVATE AUSPICES.

As to whether such pasteurizing plant or plants should be conducted under private auspices or maintained by the municipality, the committee feels that since it may be anticipated that this serv-

ice could be rendered with equal efficiency and doubtless as economically, if not more so, if left to private enterprise, and in view of the further consideration that, in its judgment, the State should not be charged with supplying the material wants of the citizen where this can be done with equal efficiency and economy through individual agency, there is no valid reason why the responsibility should be saddled upon the community. In the judgment of the committee the establishment of the proposed plant or plants under municipal ownership is, therefore, neither necessary nor desirable. The majority of those consulted by the committee on the question incline to the opinion that a municipal pasteurization plant or plants is neither practicable nor expedient.

In this connection the justice and propriety of permitting the condensing and pasteurizing plant which has already been established, with a considerable pecuniary outlay, at Frederick, Md., largely through the energy and public spirit of residents of Washington, and with a view to furnishing to the city a clean, wholesome milk supply (and possibly other plants already operating in connection with the local milk supply), to continue their operations in proving the Washington market, is urged by the committee.

#### SUGGESTION OF A MUNICIPAL DAIRY.

It has been suggested that a centralized dairy farm and distributing agency, conducted under municipal auspices, would constitute an advance in the methods of furnishing the District milk supply as at present handled. The committee is not prepared to look with favor upon such a proposal, for the present at least.

#### GENERAL MILK-DELIVERY SERVICE RECOMMENDED.

The committee ventures to suggest, however, as a means of lessening the cost of supplying milk to residents of Washington, and thereby offsetting to some extent the slightly increased cost of production, due to the proposed general insistence on the tuberculin test and pasteurization, that a general milk-delivery service be organized by the local dealers, and that a concerted effort be made in this manner to obviate largely the enormous duplication and waste of resources and labor resulting from the present individualistic system of delivery. As many as 40 milk wagons, with horses and drivers, may be conservatively estimated to be engaged in the actual delivery of milk to residents on opposite sides of a single city street from corner to corner. This enormous waste of energy could, in the judgment of the committee, be husbanded to decided material advantage. Such an organized delivery would be somewhat in the nature of the delivery system patronized in common by many of our local stores, though perhaps best owned and managed by the milk dealers themselves.

#### ALLEGED MONOPOLY OF MANUFACTURE OF PASTEURIZING MACHINERY.

With regard to the contention of the milk dealers that pasteurizing machines are possibly controlled by a monopoly, it has not transpired during the investigations of the committee that evidence of any

such combination has reached the attention of any person consulted. Dr. Prescott, of the Massachusetts Institute of Technology, disclaims knowledge of any "arrangement" which may exist between the different manufacturers, while the Bureau of Animal Industry proclaims that there are 8 or 10 pasteurizing machines on the market, with every appearance of strong competition in the sale of the different makes. Borden's Condensed Milk Co. observes in this particular that, since patents have expired on many of the machines, it would be very difficult to exert control over them, inasmuch as any manufacturing concern could undertake to place them on the market without infringement of patent rights, and each dealer could, in fact, manufacture his own pasteurizing apparatus.

### VIII. BACTERIAL CONTENT.

#### PRACTICABILITY AND DEFINITENESS OF BACTERIAL COUNT.

It has been argued before the committee that a prescribed bacterial content is not only commercially but scientifically impracticable, and that it is impossible to estimate with any degree of precision the number of bacteria in a given sample of milk. When the methods of ascertaining the bacterial content are inquired into, it is easy to understand how, by dilution with sterilized water of the sample of milk to be analyzed, and the counting of the number of observed bacteria in a minute portion of this diluted quantity, calculated with reference to the whole volume, a close approximation of the actual number of germs may be made. It may now be stated with positiveness that there is a comparative coincidence of the results obtained when the same media are employed and the same conditions of analysis followed. A standard for use in such examinations has been recommended by a committee of the American Association of Medical Milk Commissions for use in bacteriological examinations of certified milk.<sup>1</sup> Under the improved standards adopted for making bacteriological examinations, it may be stated with confidence that investigators working independently arrive at approximately the same conclusions.

While qualitative determinations of the bacterial species in milk would be a complex and difficult method to adopt as a routine procedure, it is otherwise with quantitative counts, which determinations are comparatively easy to obtain and are of invaluable assistance to the progressive dairyman. The committee is convinced, after an examination into this phase of the subject, that such latter deductions are scientifically practicable, and may be reasonably taken into account as evidencing unsatisfactory conditions of cleanliness, age, and antecedent temperature of milk offered for sale.

With reference to the discussion as to whether it is practicable, with due regard to the rights of the producer or dealer, to insist upon a prescribed bacterial count, Dr. Goler, health officer of Rochester, N. Y., remarks:

What right has the dealer to talk about right as against the lives of children?

<sup>1</sup> Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service, p. 453.

While Dr. Crichton, commissioner of health of Seattle, Wash., adds:

It is not right to the legitimate and honest dealer unless we do insist upon a bacterial count, because it gives a dishonest, filthy dealer a chance to sell dangerous milk and to unjustly compete with a man striving to produce good, pure, wholesome milk.

The feasibility of indicating the maximum number of bacteria allowable in milk offered for consumption is now almost universally accepted, provided, as suggested by the Chief of the Bureau of Animal Industry, the number fixed be not unreasonably low. Surg. Gen. Wyman observes that for pasteurized milk a maximum bacterial standard is indispensable, and probably even more important than inspection. The bacterial count is, he adds, an index to the efficiency of the methods used for the production of a safe milk and is a check likewise upon the efficiency of the inspection service.

#### NUMBER OF BACTERIA REASONABLY ALLOWABLE.

The general milk supply of the city of Washington averaged 11,270,000 bacteria per cubic centimeter in the summer of 1907 and 22,134,000 during the summer of 1906. While the number of bacteria in milk is not quite as important, from the standpoint of public health, as are the species represented and the nature of the bacterial products, it may be stated with satisfaction that cleanliness and a liberal use of ice will result in minimizing the total number of bacteria, and thus afford a degree of protection against the dangerous species and their toxic products. Milk containing few bacteria will contain proportionately few or no harmful varieties. And it should be added that most of the prejudicial bacteria do not thrive at all at the low temperature at which milk should be kept in order to keep down the total bacterial content. While milk freshly drawn under ordinary circumstances almost invariably contains bacteria, even when the most careful precautions are exercised against contamination the organisms in such carefully collected milk are shown to be harmless to animals used in laboratory tests, and we may assume that the presence of such organisms in reasonable numbers does not render milk harmful to man.

As to the maximum number of bacteria which should be specified as allowable, there is a considerable range of speculation, the figures suggested by the authorities consulted by the committee extending from 10,000 to 3,000,000 per cubic centimeter. A large percentage of those who have given the committee the benefit of their advice, however, favor the imposition of 100,000 as a maximum content. The committee is inclined to the belief, though, that at this stage in the development of a purer milk supply for the District of Columbia, the specification of that number would perhaps be unnecessarily restrictive, and recommends that, for the present at least, 500,000 be agreed upon as the maximum number allowable for raw milk (not certified), and 100,000 for pasteurized milk. In the judgment of the committee, it may develop in years to come that these numbers should be decreased, especially if pasteurization be uniformly insisted upon, and that the dairymen may then without difficulty readjust conditions to meet what would now be regarded as an onerous requirement. It has been demonstrated to the satisfaction of the com-

mittee that, with reasonable precautions, it is feasible to maintain an average content of 20,000 to 50,000 bacteria per cubic centimeter for raw milk, and the insistence, therefore, that raw milk delivered for consumption in our own community should contain not more than 500,000 bacteria per cubic centimeter is, in the opinion of the committee, a reasonable requirement and calculated to have an important influence in protecting the consumer from uncleanly and unwholesome milk.

This requirement as to number of bacteria per cubic centimeter applies, of course, to market milk, certified milk for infant feeding and other clinical purposes being obviously restricted to a much lower maximum, the standard established by Dr. Henry L. Coit, namely, 10,000 bacteria per cubic centimeter, being regarded by almost unanimous consent as the best for the latter purposes. The committee coincides in the feeling that this maximum number should be prescribed for the District of Columbia for certified milk.

Dr. William H. Park, of New York City, is authority for the statement that any intelligent farmer can, by the use of sufficient cleanliness and by applying adequate refrigeration with practically no increase in expense, supply milk 24 to 36 hours old which will not contain in each cubic centimeter over 50,000 to 100,000 bacteria. He adds, further, that when only moderate cleanliness is observed, such as can be employed by any farmer without increasing appreciably his expense (that is to say, by the employment of clean pails, straining cloths, cans, and bottles; clean hands and a fairly clean place for milking, and by maintaining in decent condition the cow's udder and flanks), the milk when first drawn will average in hot weather not over 30,000 and in cold weather not over 25,000 bacteria per cubic centimeter. This same milk, if cooled to and kept at a temperature of 50° F., will not contain at the end of 24 hours over 100,000 bacteria per cubic centimeter. Dr. Park further observes that the maximum number of bacteria to be determined upon as advantageously allowable depends on the size of the city or town, for the reason that the longer the haul the poorer the bacterial quality of the milk. In his judgment, certified milk should average under 10,000 bacteria per cubic centimeter; pasteurized, under 50,000; and common market milk, under 100,000 in winter and under 500,000 in summer.

Dr. Hamill, who has devoted large attention to the study of the relation of milk to the problems of public health, believes that it should be the aim of every municipality to so safeguard its milk supply as to attain a maximum standard of 100,000 bacteria to the cubic centimeter.

The practicability of establishing a maximum bacterial content for milk commercially used may be assured from the fact that Boston, Rochester, and other communities have prescribed standards ranging from 100,000 to 500,000 bacteria per cubic centimeter.

The regulations for the grading and sale of milk promulgated by the Boston Board of Health, specify, among other things, that no person shall sell or deliver any milk or cream containing more than 500,000 bacteria per cubic centimeter.

Among the rules regulating the pasteurization of milk and milk products adopted for the city of Chicago is the requirement that milk and skimmed milk shall not contain more than 100,000 bacteria per cubic centimeter from May 1 to September 30, and not over 50,000

bacteria per cubic centimeter between October 1 and April 30; also that cream and ice cream shall not contain more than 200,000 bacteria per cubic centimeter during the first-named period and not over 100,000 bacteria during the remainder of the year.

Dr. Woodward believes that, in the present state of the production and vending of milk, 500,000 bacteria per cubic centimeter represents a fair standard for good, raw milk. In the case of pasteurized milk, the standard should, in his judgment, be fixed not in excess of 50,000 bacteria per cubic centimeter. He goes on to add that, if bacteriological standards are to be fixed by law, it might be well to provide generally that no milk should be sold having a higher bacterial content than that claimed for it by the vendor.

Although a maximum bacterial count of 500,000 per cubic centimeter of raw milk is recommended by the committee as proper to be established for the District of Columbia, an examination of the limitations placed in other jurisdictions and of the opinions of recognized authorities on the subject induces the committee to the deduction that a specification of 100,000 bacteria per cubic centimeter would perhaps be better calculated to afford the desired assurance against possible infection from contaminated milk; but the committee defers in this regard to the judgment of the local health officer, and of the members of the Washington milk conference, who favored the fixing of 500,000 bacteria as the maximum allowable.

It has been represented before the committee that a maximum bacterial content should not be prescribed for the reason that it is physically impossible for the producer or dealer to verify or disprove the analyses depended upon for prosecution by officers of the law. While it is the practice in taking samples of milk to leave one portion with the dealer or storekeeper and retain the other for official examination, it is obvious that the sample reserved by the merchant might easily be so handled or contaminated that its bacterial content would differ from that shown by the analysis of the officials representing the Government; but such comparative analysis made at the instance of the dealer might in all probability be reasonably expected to result unfavorably to his interests, since, owing to the treatment accorded the milk, the sample reserved by the dealer for examination would likely show a higher bacterial count than that evidenced by the official analysis. The delay in obtaining the result of such bacterial examinations, in addition to the necessities of administration, affords an added reason why this consideration should not be permitted to interfere with the promulgation of a regulation or enactment of a law providing for a maximum content of 500,000 bacteria per cubic centimeter.

#### CONCLUSIVE HARMFULNESS OF HIGH BACTERIAL CONTENT.

There has been some question as to whether the harmfulness of a high bacterial content has been definitely established, but there can be no successful contradiction, in the minds of the committee, that such a showing unquestionably indicates insanitary conditions.

The authorities consulted by the committee agree that, as set forth by Dr. Levy, chief health officer of Richmond, Va., the bacterial count, when applied under standard conditions, furnishes thoroughly reliable comparative figures, affording positive indication that some-

thing is wrong—either dirty production, failure to cool the milk promptly and efficiently and to keep it cool, or that it has been kept too long.

In the report of the committee of the American Public Health Association suggesting standard methods for the bacteriological examination of milk, it is stated that—

A high bacterial count in milk indicates lack of cleanliness in production or lack of care after production. Age of the milk is also an important factor, and in interpreting results the distance milk has to be brought, etc., should be taken into consideration. Thus a count of 100,000 bacteria to a cubic centimeter should be considered a serious contamination in milk which may be delivered to the consumer within a few hours of production, while a count of no higher than 100,000 in milk produced at a distance and, say, 24 to 36 hours old is evidence of ordinarily good care. To produce a milk averaging under 10,000 bacteria to the cubic centimeter requires the utmost care and watchfulness of each detail.

The report, in referring to leucocytes, states that these bacteria are present in all normal milks, and that their number occasionally fluctuates greatly without apparent cause. Milk from animals suffering from udder inflammations, it asserts, most constantly shows a high leucocytic content, and is without question unfit for human consumption; and while a leucocytic count of 500,000 or more to the cubic centimeter in the case of a single animal may be transient and negligible, when found in mixed milk it is sufficient evidence to warrant the exclusion of such milk from the market until satisfactory veterinary inspection of the herd may be made.

Dr. Coit, the father of the American medical milk commissions, states that a high bacterial content may indicate, in addition to filthy dairy surroundings and careless collection and handling, a diseased udder. It does not, he maintains, require expensive equipment to obtain clean milk; in Kentucky, for example, five dairies, with whitewashed barns and ordinary domestic cleanliness, being approved and certified by a medical milk commission, with counts never above 4,000 bacteria per cubic centimeter.

#### STANDARDS FIXED IN PURSUANCE OF FEDERAL FOOD AND DRUGS ACT.

In pursuance of authority granted by the food and drugs act of 1906, the Bureau of Chemistry of the United States Department of Agriculture has prescribed the following requirements for market milk in interstate commerce:

It must be the fresh, clean, lacteal secretion obtained by the complete milking of healthy cows, properly fed and kept, excluding that obtained within 15 days before and 10 days after calving; and must contain not less than 8.5 per cent solids not fat and not less than 3.25 per cent of milk fat. Bacteriologically it must not contain more than 500,000 bacteria per cubic centimeter for market milk; not more than 100,000 for inspected milk; not more than 10,000 for certified milk.

In enforcing these standards, the kind of bacteria present in milk may modify judgment as to its quality, and, when practicable, sanitary inspection of dairies and creameries furnishing the product is also taken into consideration.

#### UNIFORM PROCEDURE IN BACTERIOLOGICAL EXAMINATIONS.

With a view to securing approximately uniform results as to the content shown by bacteriological examinations, a committee was ap-

pointed by the laboratory section of the American Public Health Association in 1905 to study the various methods used for the bacteriological examination of milk and to recommend a uniform procedure. In 1907 the committee presented a preliminary statement, treating the subject matter in considerable detail. In 1908 a report of progress was submitted to the annual meeting of the laboratory section covering some points on which no recommendations were made in the preliminary statement. These two preliminary reports have been favorably received and the technique recommended has been adopted. The final report presented in 1910 was practically but a restatement of methods theretofore tentatively recommended. The latest report is comprehensive in character, embracing recommendations on every feature connected with the bacteriological examination of milk, including carefully prepared directions concerning the collecting of samples, the quantity of milk required for analysis, collecting apparatus, means of identifying samples, temperature, media, plating, incubation and counting, milk sediments, tests for special bacteria, gas production, and interpretation of results.

The report explains fully a feature which is most mystifying to the layman, namely, the method of diluting the samples and estimating with reasonable accuracy the millions of bacteria often included in a single cubic centimeter of milk. Our curiosity is intensified when we are told that a cubic centimeter represents in volume about 16 drops, or one-fourth of a teaspoonful. The report suggests a uniform, systematic manner of stating the results of bacteriological counts, below 50,000 being distinguished by five-thousandths, between 50,000 and 100,000 by ten-thousandths, between 100,000 and 500,000 by fifty-thousandths, between 500,000 and 5,000,000 by hundred-thousandths, and above 5,000,000 by millions. The actual count under the microscope is facilitated by ruling off a square millimeter of the counting chamber into 400 smaller equal squares.

COMPULSORY PASTEURIZATION WOULD NOT DISPENSE WITH NECESSITY  
FOR PRESCRIBED BACTERIAL COUNT.

There is most substantial accord among the authorities consulted by the committee with the proposal that compulsory pasteurization should not be permitted to do away with the requirement of a prescribed bacterial content, which latter, in the judgment of those having knowledge of the subject, is an indispensable accompaniment to regulations compelling pasteurization. The bacterial count is an absolute index not only of the efficiency of pasteurization, but likewise of the conditions under which the milk has been kept after pasteurization. The Surgeon General of the Army observes that the necessity for a prescribed bacterial content is not thus obviated for the reason that pasteurization does not make dirty milk clean and does not destroy the toxins which may develop in old milk. Dr. Melvin aptly observes that the bacterial count is an important aid in bringing about sanitary conditions on dairy farms, and should not be abandoned even though compulsory pasteurization be adopted. Freeman remarks that compulsory pasteurization adds to the necessity for a prescribed bacterial content, for the reason that commercially pasteurized milk is usually recontaminated to a greater or less extent before it is disposed of. Dr. Winslow adduces that the advisability

of regulating the maximum bacterial content is not at all altered by compulsory pasteurization. The milk must, he asserts, be kept as clean as possible before pasteurization, then pasteurized for complete safety, and then properly handled afterwards. The Walker-Gordon Laboratory in this city states that, in its judgment, compulsory pasteurization would greatly increase the necessity for careful supervision of the bacterial content, so as to insure against the more dangerous organisms that might survive the pasteurization. Dr. Prescott, of the Massachusetts Institute of Technology, remarks that compulsory pasteurization would not eliminate the necessity for a prescribed bacterial content, but that it would make it possible to establish it at a lower level, say, 50,000 bacteria per cubic centimeter.

#### NECESSITY FOR ADDITIONAL PRECAUTIONS.

The necessity for additional requirements as to cleanliness, freshness and purity of milk, the failure to observe which may be detected by the bacterial count is apparent<sup>1</sup> when we realize that, in addition to being warm, much of the milk of Washington City is dirty,<sup>1</sup> 121 of the samples examined showing a visible deposit of dirt in the original container after standing several hours, which was found upon microscopic examination to be composed of fecal matter, hairs, straw, and all manner of extraneous substances that have no place in clean milk. When we consider that the solid impurities that reach the consumer are only a fraction of the total solid impurities with which milk has been in contact (since other larger bodies have been previously removed by the process of straining to which it is subjected before it is poured into the containers in which it is sold), we may readily appreciate the fact that the condition of milk offered for sale is even more dangerous than its superficial appearance indicates.

It is additionally urged by Dr. Woodward, health officer, that the bacteriological examination of milk as it reaches the city will enable the identification of farms which are persistently sending in milk containing such relatively large numbers of bacteria as to surely indicate faulty methods of milking and handling milk.

#### APPARENT ANOMALY AS REGARDS SOUR MILK.

It is a matter of curious interest why sour milk and its products are considered a safe food to be consumed raw, when stale sweet milk is looked upon with suspicion. This apparent anomaly may be explained by the circumstance that, for a long time after milk is drawn, all the bacteria in it increase in number, this increase being more or less rapid and depending chiefly on the temperature at which the milk is kept, and some of these bacteria may be the kinds that produce disease. Finally, however, when milk sours the harmless lactic-acid bacteria and the lactic acid which they produce tend to destroy the other microorganisms, including the disease-producing bacteria, so that by the time the milk is sour it is practically free from harmful germs.

<sup>1</sup> See Bulletin No. 35 of the Hygienic Laboratory, Public Health and Marine-Hospital Service, p. 71.

## IX. CARE OF MILK IN THE HOME.

## PRECAUTIONS RECOMMENDED.

Too much attention can not be given to the proper treatment of milk in the home, which subject is handled most capably in a bulletin issued by the Department of Agriculture as late as August 30, 1910,<sup>1</sup> in which it is set forth that the contamination of milk in the home results generally from (1) placing it in unclean vessels, (2) exposing it unnecessarily to the air, (3) failing to keep it cool up to the time of use, and (4) exposing it to flies. Among the items of care which should be scrupulously exercised by the housekeeper to prevent contamination of the milk, the following are particularized:

Milk from the grocer or baker, kept by the dealer in a can open much of the time and possibly without refrigeration, is dangerous and should be avoided. Never buy bulk milk from a grocery store. Never buy milk for the baby from a grocery store. Store milk has often been kept over from the day before. Such milk is dangerous as a food for babies.

If it is impossible to get bottled milk, do not set out over night an uncovered vessel to collect thousands of bacteria from the street dust before milk is put into it, but have the milk delivered personally to some member of the family if possible. If this be impracticable, set out a bowl covered with a plate, or, better still, use a glass preserving jar into which nothing but milk is put, which jar should have a glass top with the rubber band omitted. A pitcher can not be tightly covered on account of the projecting spout.

Milk tickets or written instructions intended for the dairyman are likely to become more or less soiled, and if used should not be placed in the bowl or jar.

The milk should never be exposed to the sun for any length of time. It frequently happens that milk delivered as early as 4 o'clock in the morning remains outdoors until 9 or 10 o'clock. Although this practice is to be condemned, if it be inconvenient to receive the milk soon after its delivery, the housekeeper should indicate to the driver a sheltered place or provide a covered box in which the milk pail or bottle may be left. It is important that the milk should be taken into the house as soon as possible after delivery, particularly in hot weather.

The milk should, upon receipt, be placed in the refrigerator at once and allowed to remain there when not using from it, constant endeavor being exercised to keep the milk at all times, except when actually on the table, at a temperature not exceeding 50° F., for the reason that harmful bacteria increase with astonishing rapidity once milk rises above this temperature. Unless the milk bottle is kept in actual contact with the ice, it will be colder at the bottom of the refrigerator than in the ice compartment, since the cold air settles rapidly.

Milk should be kept in the original bottle until needed for immediate consumption; do not pour it into a bowl or pitcher for keeping:

<sup>1</sup> "The Care of Milk and Its Use in the Home," by George M. Whitaker, L. A. Rogers, and Caroline L. Hunt, Farmers' Bulletin No. 413.

pour out only the amount which will be consumed at one meal; carefully wipe or rinse the bottle, especially its mouth, before pouring milk from it; see that dust or dirt which may have gathered thereon or on the cap will not get into the milk; do not pour back into the bottle milk which has been exposed to the air by being placed in other vessels; keep the bottle covered with the paper cap as long as milk is in it and when not actually pouring from it; do not expose uncovered milk in the refrigerator; if the paper cap has been mutilated, cover the bottle with an inverted tumbler. Keep the refrigerator clean and sweet; see that the outlet for water formed by the melting ice is kept open and that the space under the ice rack is clean. The refrigerator should be scalded each week.

As soon as the milk bottle is empty rinse it in lukewarm water and place it in an inverted position to drain. Do not use it for any other purpose than for milk.

All utensils with which milk comes in contact should be rinsed, washed, and scalded every time they are used; do not employ for this purpose dishwater which has been used for washing other utensils or wipe them with an ordinary dish towel—it is better to boil them in clean water and set them away undried.

Remember that exposure of milk to open air invites contamination, not only from odors and bacteria-laden dust, but also from flies, which scavengers are a prolific source of contagion in conveying germs of typhoid fever and other diseases from the sick room or from excreta to the milk.

Do not keep milk over 24 hours even if it seems to be sweet, since milk may become unfit for human food and deleterious to health before it sours.

The foregoing suggestions should be observed with regard to pasteurized milk, as well as with ordinary raw milk, for while efficient pasteurization destroys disease germs and affords a safeguard against certain dangers, it can not be regarded as an insurance against future contamination of milk.

To the foregoing might appropriately be added the following:

Do not boil the milk—that is to say, allow it to attain a temperature as high as 212° F.—since the milk is devitalized thereby, and not only its nutrition but its digestibility is impaired.

Do not allow the milk to stand in the kitchen, where the temperature is likely to increase rapidly.

Do not mix “old” and “new” milk together; that is to say, do not subject the new supply to contamination with the increased number of bacteria which may be expected to exist in the supply previously received.

If a case of typhoid fever or other contagious disease breaks out in your house notify the health authorities (through your physician) at once, and also your milkman. During such illness do not allow the dairyman to take away milk bottles from your house until after recovery of the patient, since one of these bottles might otherwise be the means of carrying the disease to some other household.

It should be recognized as the duty of every householder, especially of every parent, to ascertain at the health department in the District Building the record of the dairyman from whom his or her supply of

milk is received. It may not be generally known that every consumer of milk is privileged to consult at the health office the record of his individual dairyman, affording an available and easily accessible means of protecting himself and his family from greater imminence of danger from infection through the agency of milk than may otherwise be necessary. It has been the practice for some years past to maintain, by the use of score cards, a tangible record of the intelligent cleanliness exercised by each local dairyman in the conduct of his business, and the committee recommends, especially where there are children in a family, that the parent avail himself by consulting the health office records of this means of ascertaining whether his family is securing the quality of milk to which it is entitled.

As previously indicated, the committee is disposed to recommend, as suggested by the Washington milk conference of 1907 and by the special committee on the Straus Laboratory recently appointed by the District Commissioners, that these records of the health department be periodically published in the daily press.

#### OBSERVANCE OF PRECAUTIONS BY CONSUMERS.

An inquiry propounded by the committee as to whether, in the view of persons consulted, requirements could reasonably be made by the District authorities compelling consumers to exercise caution in handling milk when received at the home, develops an expression of the belief that such a proposal would be impracticable. Borden's Condensed Milk Co., however, offers the suggestion, in this connection, that consumers be compelled to thoroughly clean and scald any and all utensils containing milk, which containers are to be returned to the dealer. The Chief of the Bureau of Animal Industry observes that educational work is believed to be the best method of inducing consumers to exercise caution in handling milk, and invites attention to the recently published bulletin of the Department of Agriculture, above referred to, which is well adapted for this purpose and which is being widely circulated.<sup>1</sup>

### X. INFANT FEEDING AND INFANTS' MILK DEPOTS.

#### COW'S MILK AS INFANT FOOD.

The dairy cow fills a unique place under the conditions of our present civilization, since her living body is the source of milk, the most important of all human foods and absolutely essential for all infants during the first few years of life (except while nursed at the mother's breast). Even when children have matured beyond the period during which milk is an essential article of food, its use as a beverage and in the manufacture of butter, cheese, and ice cream is an almost indispensable element in their dietary.

The complex demands of modern living and the necessity on the part of many mothers of earning a livelihood, often making it impracticable for them during the hours of daily toil to nourish their offspring, has created in recent years an essential demand for cow's

<sup>1</sup> "Care of Milk and Its Use in the Home," Farmers' Bulletin No. 413, U. S. Department of Agriculture.

milk for infant feeding, prepared in some cases in accordance with certain prescribed formulæ intended to approximate as nearly as possible the composition of mother's milk.

#### ESTABLISHMENT OF INFANTS' MILK DEPOTS.

To meet this necessity, milk depots have been established, largely under philanthropic auspices, in many of the principal cities of America and Europe. The first depot in the United States was instituted in 1889. The movement was accelerated in 1892, when Dr. Henry L. Coit, of Newark, N. J., formulated a plan for the production of pure milk under the auspices of medical milk commissions. In 1893 the Medical Society of Essex County, N. J., adopted the plan and organized the first medical milk commission in the United States. The commission contracted with a dairyman<sup>1</sup> (for terms of agreement see Appendix AO) to produce milk according to the standards of purity formulated by Dr. Coit in connection with the original plan.

A recent report by Asst. Surg. Gen. J. W. Kerr, of the United States Public Health and Marine-Hospital Service,<sup>2</sup> presented before the American Association of Medical Milk Commissions on June 6, 1910, recites that 28 cities in the United States are now supplied with infants' milk depots and milk dispensaries for the relief of the poor, many of these institutions maintaining substations for the distribution of milk and imparting advice with respect to infant hygiene.

It may be noted in this connection that the local Straus pasteurization laboratory has six substations geographically distributed with a view to meeting the convenience of the largest number of patrons of the poorer classes. The milk is received at the local laboratory before 8.30 a. m., and is modified and pasteurized before 11 a. m., affording a much more rapid delivery into the hands of the consumer than is the practice among local dairies in the distribution of unmodified and unpasteurized milk. A physician is in attendance also during certain hours daily to indicate the formula best suited for each particular infant.

#### CERTIFIED MILK.

The standards of purity formulated by Dr. Coit in 1893 gave rise to the term "Certified milk," and the precedent then established has since been followed in many cities of the country, not less than 63 commissioners having since been organized to encourage the production of pure milk for clinical purposes. Without the establishment of these voluntary supervisory commissions it would be impossible to provide practically for the production of certified milk, which latter high-grade product has grown to be so important a factor in facilitating the healthy growth of infants and in accelerating the recuperation of invalids.

Specific bacterial standards for pure milk have been adopted, limiting the number of bacteria allowable and inhibiting the presence of pathogenic organisms. The numerical standard fixed in most

<sup>1</sup> Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service, March, 1909, pp. 615-619, inclusive.

<sup>2</sup> Public Health Reports, No. 50, Washington, 1910.

cases for certified milk is a maximum of 10,000 bacteria per cubic centimeter. The requirements fixed upon for certified milk contemplate especially that none but healthy cows shall be employed; that extraneous contamination of their milk shall be reduced to a minimum; that the milk shall be cooled to 45° F. to prevent bacterial growth; and that it shall reach the consumer before noticeable bacterial changes have occurred therein.

BREAST FEEDING DECIDEDLY PREFERABLE TO BOTTLE FEEDING.

The committee wishes to emphasize in the most forceful manner the extreme importance of feeding, at the mother's breast, as opposed to artificial feeding with cow's milk. It is a well-known fact that the rate of mortality during the first year of infants fed on human breast milk is markedly less than among bottle-fed babies. The milk of the cow is directly responsible for the death of a very considerable percentage of infants. Nature did not intend the young of one species to be raised upon the milk of another, much less did it intend that that milk should be dirty, stale, and bacteria-laden.

Cow's milk may be prejudicial to health either because the milk is physiologically unsuitable, as for infant feeding, or because it has become a medium of infection through contamination with various disease germs. Milk of inferior nutritive value, furthermore, must indirectly have a deleterious influence on the health of the infant, and particularly so when, as in the case of babies, milk is exclusively used as food. During the first year of its life a child consumes, it is estimated, about 500 quarts of milk. There is abundant evidence to show that the proportion of deaths among infants would be greatly reduced if they received the food nature designed for them, namely, mother's milk. An eminent authority on the relation of mortality to artificial feeding of infants concludes that, taking the period of the first year of life, the number of deaths resulting from epidemic diarrhea among breast-fed babies is not much more than one-tenth the number occurring among artificially-fed infants. There is no doubt that the nursing of all infants by healthy mothers would contribute tremendously to the reduction of the infantile death rate. It has been said that there is only one other period in life in which the chance of death is greater than in the case of infants under 1 year of age, and that is in persons over 90 years old. This comparison emphasizes the extreme importance of providing milk, especially for infant consumption, which shall be physiologically suitable for assimilation and as free as possible from impurities.

It should be animadverted to in this connection as emphasizing the important influence of providing milk free from impurification, that during the period elapsing since the passage of the local milk-inspection law in 1895, the annual death rate of infants in the District of Columbia has decreased from 194 per 100,000 population to 86 per 100,000.<sup>1</sup> This marked diminution may fairly be attributed in large measure to the beneficent effects of this law.

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<sup>1</sup>72 per 1,000 in 1909, increasing to 86 in 1910.

## MODIFIED MILK.

The term "Modified milk" is claimed to have been originally used by the Walker-Gordon Laboratories, to describe milks that have by the addition of water and milk sugar, and at times barley water and limewater, been mechanically changed in their chemical constituents to fill physicians' prescriptions, and to increase or decrease these constituents according to an exact method, so that physicians may be enabled to order a milk that can be adjusted to meet the needs of the individual case for which it is prescribed. If the child be artificially fed, there is reason to believe that milk, when modified to conform as nearly as possible to the composition of mother's milk, comes nearest to supplying the demands of the infant, and it is to meet this very considerable and constantly increasing demand that certain formulæ have been prepared for feeding the infant during the successive stages of its early existence.

## NUTRITIVENESS OF MODIFIED MILK.

No adequate comparison can be made between modified milk (raw or pasteurized) and ordinary market milk as regards its nutritive qualities, since milk is customarily modified according to physicians' prescriptions for special use, and while designed in many instances to furnish a more easily digested and assimilated food than whole milk, is supposably, in other instances, less digestible than milk in its natural state. Aside from its facility of digestion ordinarily, modified milk is prescribed with a view to furnishing the maximum amount of nutritive food which may be absorbed without prejudice. Modified milk may, it should be added, contain a greater or less proportion of each nutrient found in raw milk. Its use is especially recommended for infants, invalids, and convalescents. The Straus Laboratory, of this city, contends that modified milk is as nutritious and more so than raw milk, since it is an attempt to reproduce mother's milk as closely as possible, and is changed to suit the varying ages and strength of babies.

Dr. G. Lloyd Magruder, of this city, has addressed a letter to President Taft, asking that the Department of Agriculture and the Public Health and Marine-Hospital Service of the Treasury Department be directed to investigate the relative merits of raw and pasteurized milk for infant feeding. It is believed that a careful examination into this important subject by these departments of the United States Government would be of inestimable value in affording an authoritative basis for harmonizing the differences of opinion which have existed for many years past on this vital question.

## SUSCEPTIBILITY OF MODIFIED MILK TO DETERIORATION.

As to the relative susceptibility to deterioration, Dr. Melvin states that there is probably no difference between modified and whole (raw or pasteurized) milk in this respect, if both are obtained and handled under similar conditions.

## RELATIVE COST OF MODIFIED MILK.

Modified milk is as a rule higher in price than whole milk, being naturally more expensive since it is prepared in accordance with physicians' formulas, and requires expert knowledge in its modification. The Straus Laboratory in Washington states that the additional ingredients called for, the time required, and the necessity of trained help in modifying makes its cost much more than would be demanded for whole milk. This statement is corroborated by the Walker-Gordon Laboratory of this city, which announces that modified milk is much more expensive in that intelligent persons must be trained for its preparation. The health officer of Cleveland, Ohio, reports that it costs from 2 to 9 cents per quart in excess of ordinary market milk.

The following schedule of prices for whole milk, modified milk, and barley water, sold by the Washington branch of the Straus Pasteurized Milk Laboratories, has been furnished through the courtesy of Miss Reba J. Hurn, local representative:

Whole milk: Per pint, 4 cents; per quart, 8 cents.

Modified milk:

No. 1, 8-ounce bottle,  $1\frac{1}{2}$  cents; per quart, 6 cents, on same basis.

No. 2, 6-ounce bottle,  $1\frac{1}{2}$  cents; per quart, 8 cents, on same basis.

Six bottles a day's feeding.

No. 3, 3-ounce bottle, 1 cent; per quart,  $10\frac{2}{3}$  cents, on same basis.

No. 4, 3-ounce bottle, 1 cent; per quart,  $10\frac{2}{3}$  cents, on same basis.

Eight bottles a day's feeding.

Barley water:

3-ounce bottle, 1 cent; per quart,  $10\frac{2}{3}$  cents, on same basis.

6-ounce bottle,  $1\frac{1}{2}$  cents; per quart, 8 cents, on same basis.

Park asserts that even if it were possible to bring all milk up to a prescribed standard of purity, which would make it safe to be ingested unheated by an infant, it would in his judgment be an absolutely unwise procedure on account of the cost, which would be increased far more than the value of the milk for most purposes for which this commodity is used. "Most of us who have studied the question," he says, "believe that proper pasteurization under rigid inspection is the method by which a safe, wholesome milk supply can be provided."

## INFANTS' MILK DEPOTS.

The committee refers with especial pleasure to the magnificent work being accomplished by infants' milk depots throughout the country and the decided stimulus accorded to the movement by the public-spirited generosity of Mr. Nathan Straus, of New York City, whose practical philanthropy has resulted, either directly or incidentally, in instituting since 1892 10 principal depots for the distribution of modified and pasteurized milk.<sup>1</sup>

It is interesting to note that, prior to the movement inaugurated by Mr. Straus in New York City in 1893 for dispensing pasteurized milk, the annual death rate of children under 5 years of age in the metropolis was 96.2 in every 1,000, and in June, July, and August (when exceptional care was required to be taken to properly cool the

<sup>1</sup> Straus depots have been established in New York City, Chicago, Philadelphia, St. Louis, Newark, N. J., and Washington; also in Munich, Karlsruhe, and Sandhausen, Germany, and Dublin, Ireland. Mr. Straus donated, besides, the plant installed at the depot, already in operation, at Liverpool, England.

milk) the death rate was 136.4 for each 1,000. With the increased use and distribution of pasteurized milk the death rate in New York City had already in 1906 dropped to 55 per 1,000, and for the months of June, July, and August of that year averaged 62.7 per 1,000. The milk supply was from the same farms and the same kinds of herds as before, and distributed in the same way, the only difference being that the bottles were sterilized and the bacteria in the old, dirty, warm milk had been killed by the heat applied to pasteurize it, this being followed by proper cooling. The extent of the work of the New York agency may be appreciated when it is stated that in the year 1906 17 of these Straus stations dispensed 3,142,252 bottles and 1,078,405 glasses of pasteurized milk.

The milk of the Straus pasteurizing laboratories is prepared in accordance with formulæ recommended by the foremost specialists in the treatment of children's diseases, Formula No. 1, prescribed by Dr. Arthur R. Green, containing milk, cane sugar, salt, and oat water; Formula No. 2, by Dr. Rowland G. Freeman, containing milk, limewater, milk sugar, and filtered water; Formula No. 3, by Dr. A. Jacobi, comprising milk, barley water, cane sugar, and table salt; Formula No. 4, by Dr. Freeman, consisting of skimmed milk, milk sugar, limewater, and filtered water; and Formula No. 5, by Dr. Green, including cream, milk, limewater, milk sugar, and filtered water. The several formulæ are prescribed in sequence for infants at successive stages of their development, from date of birth to time of weaning or later. Barley water, prepared in accordance with a specific formula, is also separately supplied by these laboratories. A more detailed statement of the formulæ employed by the Straus local infants' milk depot is submitted herewith (Appendix AP).

The committee has inspected the Washington Straus depot and is impressed with its importance in conserving the life and health of infants who, for one reason or another, are obliged to be fed other than at the mother's breast. While it is not deemed wise to encourage the artificial feeding of babies, the necessity for the maintenance of this establishment or some similar agencies must be conceded. In other communities depots of this character have been instituted at the initial expense of Mr. Straus and other philanthropists, and later taken over and maintained at public or private expense under the supervision generally of municipal health officials or medical milk commissions. It is understood that, having demonstrated locally the great usefulness of this enterprise, its promoter will, unless its maintenance be assumed by our municipality or by private subscription, close its doors and deprive the citizens of Washington, rich and poor alike, of this splendid instrumentality for reducing the death rate of infants in this community.

The committee adverts to the fact that apparent indifference has been manifested on the part of Washington physicians generally, toward utilizing the facilities afforded by the Straus Laboratory for supplying modified milk for infant feeding. It is hoped that this seeming apathy toward the use of modified milk prepared under scientific, skillful direction, will be superseded gradually by active, earnest cooperation on the part of the medical fraternity in supporting this worthy foundation, or similar establishments operating on a commercial basis, which latter, it is understood, are prepared to render efficient service to the public in this direction.

## DISPOSAL OF LOCAL STRAUS DEPOT.

At the suggestion of the Washington representative of the Straus Pasteurizing Laboratories, a public hearing was held by the District Commissioners on November 30, 1910, to discuss what action should be taken with regard to the proffer to the District government by Mr. Straus of the plant established at 1319 H Street N.W., in this city, with the sole restriction that milk furnished therefrom should be dispensed as a charity and not as an ordinary commercial enterprise. At the close of the hearing, the commissioners appointed a committee to examine into the matter and make recommendations as to the proper course to be pursued by them in the premises. This committee was composed of Gen. George M. Sternberg (chairman), Mr. E. J. Stellwagen, Mr. Hennen Jennings, Dr. George M. Kober, Mr. Arthur C. Moses, Mr. Walter S. Ufford, Mr. George S. Wilson, Dr. H. F. Sawtelle, and Mr. J. Louis Willige. The committee, in its report submitted under date of December 7, 1910, a copy of which is appended (Appendix AQ), recommends to the commissioners that Mr. Straus be prevailed upon, if possible, to continue the existing plant until such time as provision may be made for furnishing an ample and safe supply of pasteurized and modified milk through commercial channels under the direct supervision of the District health department, the committee deeming it impracticable for the District government itself to undertake the management of such a plant with advantage. The committee suggests the desirability, however, of utilizing the existing plant for the conduct, under the Department of Agriculture or the Public Health and Marine-Hospital Service, of investigations relative to the value of pasteurized and modified milk for infant feeding.

In the event that the Straus Laboratory be not continued as a charity, it is suggested that the providing of proper food for infants among the indigent classes be supported by generous contributions toward the funds for maintaining such existing agencies as the diet kitchen, the Citizen's Relief Association, the Associated Charities, and the Instructive Visiting Nurse Society.

The report proceeds to recommend prompt and adequate legislation for supplying a clean, pure, wholesome milk supply for the Nation's Capital, and urges that the inmates of foundling asylums, hospitals, and other institutions supported wholly or in part from public funds be furnished with milk conforming to the classification recommended by the Washington milk conference in 1907. It is further advocated, as favored by the conference, that the health officer be required to publish the ratings of dairies, which information it is understood is currently in the possession of the health department, but up to the present time not published, though conveniently accessible to any citizen of Washington who may call at the District Building for the purpose of consulting the records.

The report concludes with an indorsement of the recent recommendation submitted by the health officer that six visiting nurses be appointed to give instruction in the public schools regarding matters affecting the health of pupils.

Since the above hearing, Mr. Straus addressed a letter to Senator Gallinger, chairman of the Senate Committee on the District of Columbia, stating his willingness to continue the laboratory in Wash-

ington several months after January 1, 1911, if requisite in order to allow opportunity for Congress to take over the establishment under governmental control.

As a result of the recent agitation on the subject, a bill (S. 9716) was introduced in the Senate by Mr. Gallinger authorizing the acceptance by the United States Government as a gift, of the Nathan Straus Pasteurized Milk Laboratory. The bill was referred to the Senate District Committee, from which it has not yet been reported. The measure proposes to appropriate the sum of \$15,000, or so much thereof as may be necessary, to be immediately available for expenditure until June 30, 1912, in the maintenance and operation of the laboratory, the sum allotted to be expended under the supervision of the Surgeon General of the Public Health and Marine-Hospital Service "for the purpose of demonstrating, with the cooperation of the health officer of the District of Columbia, the practical utility of infants' milk depots in the reduction of infant mortality." A copy of the bill is subjoined (Appendix AR).

While the chamber of commerce committee appreciates to the fullest extent the valuable results achieved through the benefaction of Mr. Straus in placing this practical object lesson before the eyes of our community, it feels obliged to advert at the same time to the fact that essentially important work in educating the public to an appreciation of the value of and necessity for a sanitary milk supply, especially for infant feeding, has been carried on for many years by the Department of Agriculture and the Public Health and Marine-Hospital Service and by Dr. G. Lloyd Magruder, Dr. George M. Kober, Dr. Woodward, the District health officer, Gen. George M. Sternberg, Mr. Emile Berliner, and other well-known public-spirited Washingtonians.

As an evidence of the practical work accomplished locally in this direction the committee appends (Appendix AS) a report on the Infants' and Children's Dispensary connected with the Settlement House of southwest Washington, covering the period from April 13, to October 1, 1908, two years before the establishment of the local Straus Laboratory. This dispensary has been continuously in existence since its organization and is doing excellent work. During the first five and one-half months of its career there were treated in the dispensary 261 infants and children. During this period 41 babies were supplied with modified milk. Modified milk was also dispensed at this early date by the Neighborhood House, also located in southwest Washington.

The committee feels that, so far as ministering to the material wants of infants in this jurisdiction in providing a proper supply of pasteurized and modified milk is concerned, this can probably be accomplished at much less expense through the utilization of existing commercial agencies, such as the establishments of Mr. George M. Oyster, jr., the Walker-Gordon Laboratory, and the White Cross Milk Co., than by the maintenance of the plant so generously installed by Mr. Straus. It is strongly advocated, however, that a special fund be inaugurated by popular subscription, liberally endowed and supported by our citizens and possibly supplemented by appropriations from Congress, to be devoted exclusively to reimbursing such commercial agencies for pasteurized and modified milk furnished upon order in deserving cases to infants whose parents are

unable to provide, in part or wholly, the cost of the necessary supply of wholesome and nutritious milk, appropriately suited to the infant's needs.

While (in the absence of facilities for securing milk prepared at regularly established depots in accordance with specially adopted formulæ) pasteurization at home of milk for infants' use, in apparatus of which several economical patterns are obtainable in the open market, is qualifiedly recommended, its preparation in this way requires such intelligent and careful manipulation that it is, in the opinion of the committee, better and cheaper to purchase milk already pasteurized under competent supervision, from infants' milk depots or from properly equipped commercial establishments.

#### IMPORTANT FUNCTION OF VISITING NURSES.

In this connection the committee feels that a noteworthy adjunct of the local Straus Laboratory, and one which could hardly be expected to obtain in association with a commercial agency furnishing modified milk on a purely business basis, is the stationing of a registered physician at the laboratory at certain specified hours, to give advice free of charge to parents concerning the proper treatment of infants and to prescribe the formula of milk best suited for the infant at the particular period of its growth. Commendable service is rendered in this direction by the Instructive Visiting Nurse Society, which details nurses to the several settlement houses and to the homes of parents for the purpose of imparting practical instruction regarding the bathing, clothing, feeding, and other care of infants. The extreme efficacy of this practical information and active assistance extended by the Instructive Visiting Nurse Society in reducing infant mortality is especially recognized, authorities agreeing that proper clothing, bathing, and medical attention constitute as important a factor in the successful rearing-of the infant as the provision of suitable food in appropriate measure.

Dr. Woodward especially recommends that arrangements be made for the instruction of mothers in caring for their infants. This can, he stated, be done in no other connection so well as in conjunction with the free distribution of milk to persons unable to pay for it and the distribution of milk at reduced prices to persons who are unable to pay the ordinary market price for milk of proper quality and composition.

The committee recurs to the fact that the superior value of maternal nursing can not be overestimated, it being stated on reliable authority that were mothers able universally to nurse their children from one-third to one-half of the deaths of infants would be prevented, the enormous loss of life occurring among artificially fed infants being undoubtedly due in major portion to bad milk and its improper use as an article of diet. Mothers should be encouraged in every possible way to nurse their infants, regardless of financial or social status, for it has been conclusively proved by extended series of careful systematic investigations that the mortality among bottle-fed infants is vastly greater than among those that are breast fed. When breast feeding is clearly impossible, however, a fulsome supply of pure cow's milk, modified to meet the special needs of the infant, should be rendered available for both rich and poor, and mothers

should be instructed at the same time regarding the special requirements necessary to successful artificial feeding, including the care of milk in the home. From both economic and sanitary viewpoints infants' milk depots should be provided for improving the physical well-being of the children who are destined to become active, procreating members of the population of the future.

## XI. PREPARED MILKS.

### WHAT MAY BE PROPERLY CLASSED AS PREPARED MILKS.

Dr. H. W. Wiley, Chief of the Bureau of Chemistry, Department of Agriculture, in defining prepared milk, states that there is a wide variation of ideas which may be properly entertained concerning "prepared" milk, but that he is inclined to the following:

Natural milk which has not been treated other than by straining, cooling, and bottling would not be entitled to the term "prepared milk." All milk which has been modified in its composition in any way by changing the properties of its ingredients or by sterilization or pasteurization should be designated as prepared milk. Milk which is used in connection with other foods in a dried or semiliquid state, is not prepared milk, but milk used in compounding other foods.

For the purposes of this report, however, the committee is pleased to regard prepared milk as embracing condensed, evaporated, and powdered milks. As a matter of convenience, skim milk is also included within this chapter.

### CONDENSED OR EVAPORATED MILK.

Condensed or evaporated milk may, according to information furnished by the Bureau of Animal Industry, be defined as milk from which a considerable portion of water has been evaporated, and to which, in the case of sweetened condensed milk, sugar (sucrose) has been added.

Condensed milk, synonymously known as evaporated milk, is defined in the Standards of Purity for Food Products,<sup>1</sup> issued by the Secretary of Agriculture in pursuance of authority given by Congress in the food and drugs act of June 30, 1906, as follows:

Condensed milk, evaporated milk, is milk from which a considerable portion of water has been evaporated, and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat.

Surg. Gen. Wyman is authority for the statement that in the United States Borden's "Eagle" brand of condensed milk may be taken as a type which is said to be prepared by heating fresh cows' milk to 100° C. to destroy the bacteria and evaporating the remaining milk in a vacuum at a low temperature to a little less than one-quarter of its original volume, the finished product being usually preserved in tin cans, after having added about 6 ounces of cane sugar per pint.

Sweetened condensed milk is defined in the Standards of Purity for Food Products<sup>1</sup> as follows:

Sweetened condensed milk is milk from which a considerable portion of water has been evaporated, and to which sugar (sucrose) has been added, and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat.

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture.

It will be remembered that condensed milk, unsweetened, must contain, to meet the requirements of the Federal pure food and drugs act, the same minimum percentage of solids (including milk fat) as sweetened condensed milk.

Considerable agitation has been discernible in many communities concerning the relative merits of these prepared milks compared, especially so far as their nutritiveness and digestibility are concerned, with raw or properly pasteurized milk. It is stated by the Bureau of Animal Industry that some prepared milks are not as nutritious as raw or properly pasteurized milk, this depending largely upon the character and method of preparation, Surg. Gen. Wyman believing that the proper solution of this question involves the consideration of the individual preparation.

#### NUTRITIVENESS OF CONDENSED MILKS.

According to Dr. Wyman condensed milk in the United States is usually low in fat content and excessively rich in sugar. Properly diluted, he says, the best grades of condensed milk ought to contain the same nutriment as the original milk from which it was made, plus or minus whatever is added or removed when finally put up in packages. He adds the caveat, however, that this does not imply the same food value as the original milk.

It is declared by Winslow that substitutes are much more dangerous for infants than pasteurized milk, while Dr. Prescott, of the Massachusetts Institute of Technology, asserts that condensed milk is not as well balanced a ration as raw milk, since it is likely to be deficient in fats. Dr. Crichton, commissioner of health of Seattle, Wash., observes that most prepared milks are not as nutritious as raw or properly pasteurized milk; that they are harder to digest; are customarily made from inferior milk, impure in many instances, and containing sugar in unknown quantities, and are consequently unsatisfactory as food for children and unappetizing and disagreeable in taste.

In comparing the nutritiveness of raw and properly pasteurized milk as opposed to prepared milks, Dr. Coit, rating raw milk at 100, assigns a value of 20 to condensed milk and 10 to powdered milk.

On the other hand, Borden's Condensed Milk Co. asserts that prepared milk of a recognized standard brand, manufactured and cared for under conditions existing in high-grade factories, is practically a concentrated "properly pasteurized milk" and has all the nutritive qualities of such milk. "Used in the manner in which it is," states this company, "it undoubtedly is as nutritious, or at least so nearly so, as to be on a most debatable ground."

#### SUSCEPTIBILITY OF CONDENSED MILKS TO DETERIORATION.

What are known as "condensed" or "evaporated" milks have been somewhat largely represented in our markets for many years past. These milks are customarily prepared by evaporating the water from whole milk until a consistency is reached which (generally, though not necessarily, by the addition of sugar) tends to preserve the milk, its viscosity rendering impossible the multiplication of pathogenic germs and effectually safeguarding the product

from deterioration, even when the receptacle is kept open for a reasonable length of time. It should be observed, however, that when diluted to the consistency of liquid milk, as commonly used on the table, sweetened condensed milk is in certain respects nearly as susceptible to contamination from various sources as raw or pasteurized milk, and when exposed to the air its use should consequently, as a matter of security, be circumscribed with the same precautions as are recommended for the treatment of raw or pasteurized milk.

In the judgment of authorities consulted by the committee, condensed milk is not so susceptible to deterioration as raw milk, especially if a considerable amount of sugar be added. Condensed milk will, according to Dr. Melvin, keep much longer than raw or pasteurized milk, even after being opened, and there is authority for the statement that if sealed it should resist deterioration indefinitely. Surg. Gen. Wyman of the Public Health and Marine-Hospital Service specifies that condensed milk either deteriorates or at times contains toxic substances, children having been made very ill from using cans of a certain brand. Such brands as contain a high percentage of sugar ought, he observes, to keep much better than raw milk, on account of the well-known preserving properties of sugar. Mr. Scott, inspector of milk of Providence, R. I., offers the assurance that condensed milk is undoubtedly not as susceptible to deterioration as raw milk, "because if evaporated to the proper density, the bacteria can not grow, as food can not be absorbed by them."

#### EFFECT OF SANITARY RESTRICTIONS ON DEMAND FOR PREPARED MILKS.

It has been suggested that insistence upon additional requirements concerning milk, such as the tuberculin test, maintenance of low temperatures, etc., would lead to the use of prepared milks and other substitutes for raw or pasteurized milk. The committee has endeavored to elicit information from as many sources as possible tending to prove or disprove this assertion. There has been an apparent reluctance on the part of most of the health officers and experts consulted by the committee to vouchsafe an opinion on this point, and while approximately 30 per cent of those approached are strong in the belief that the public will not be compelled to resort to such preparations, one authority believes that there would be a tendency in that direction, while another inclines to the assumption that such substitutes would be very considerably used.

The Bureau of Animal Industry ventures the assertion that, if the requirements be gradually introduced, there would probably be no influence on the market in this direction, but that sudden enforcement might make it necessary for a limited time to use prepared milks. The health officer of Atlanta, Ga., states that no such results have transpired in that city, but that on the other hand bad milk certainly leads to this expedient. The health officer of Lynchburg, Va., takes an optimistic view of the situation, and refers to the fact that judicious inspection in that city has resulted in an extremely enlarged demand for fresh milk, the consumption being almost thrice what it was some time ago. The health officer of Topeka, Kans., observes that people naturally prefer the fresh article when they can get it.

## PRICE OF PREPARED MILKS.

The committee has deemed it important in weighing the probable effect of promulgating regulations for the further improvement of our milk supply, not only to arrive at some concrete idea of the probable extent of consequent utilization of prepared milks as substitutes for the natural product, but also to inquire into their ingredients and to ascertain the prices commanded by these preparations when diluted for use, for comparison with the cost of the raw or pasteurized product of corresponding volume. There is a somewhat general impression prevailing among persons consulted by the committee that the prepared milks are higher in price than the current market rates for raw or pasteurized milk, and that they would probably offer no inducement to buyers in competition with the fresh product. Investigations made by the Boston Board of Health show that if condensed milk is diluted with only enough water to constitute milk of the Massachusetts standard, the cost exceeds the price of ordinary milk and in some instances equals the price of inspected milk and exceeds that of some brands of certified milk.

The conclusion is reached by the Bureau of Animal Industry that condensed milk can not be employed economically where whole milk is procurable. The health officer of Richmond, Va., is authority for the statement that prepared milks are much higher in cost than raw milk at 10 cents per quart, the prevailing Richmond price. Borden's Condensed Milk Co. says that on the average, when prepared milks are increased to equal volume with whole milk and contain the same ratio of solids, their cost is approximately the same and in some cases lower.

## CONCENTRATED MILK.

What is known as "concentrated" milk, supplied by the White Cross Milk Co. to the people of Washington, is derived by placing normal milk in a concentrator maintained at a temperature not exceeding 140° F. A blast of filtered air is then forced through the milk with great velocity for a period of about three hours, during which period the harmful bacteria are destroyed and the greater part of the water is carried off by evaporation, the quantity of milk being reduced to one-fourth of its original volume. This process not only removes the pathogenic germs from the milk, but preserves its natural flavor, and the condensation makes it a much less favorable medium for subsequent contamination and for the proliferation of pathogenic microorganisms. The rather recent commercial practice of concentrating milk in this manner has the advantage of reducing the cost of transportation on account of the reduced bulk, enables a single dairy wagon to quadruple its capacity, and serves to preserve the milk for a longer period than is possible with raw milk, and in other respects makes it practicable to supply this important product at substantially the same retail price as demanded for raw milk of ordinary quality. Concentrated milk is especially suited for shipment into distant lands where raw milk is unobtainable, and for use on steamers at sea. The fact that it lends itself readily to dilution makes it useful also, when slightly thinned, as a substitute for cream in coffee. Another advantage resulting from the introduction of this

process is the feasibility of locating condensers at points too remote from centers of population to make the shipment of sweet raw milk mechanically possible, and thus reducing it to a state in which it may be transported for longer distances and compete in price with the raw product supplied by dairy farms in proximity to the cities, the smaller bulk compensating for the longer distance of transportation.

#### POWDERED MILKS.

Whole and skim milk is being reduced to powdered form for use by bakers, confectioners, and others, its reduction to this form making it especially adaptable to preservation without deterioration for very considerable periods of time. It may be stated in behalf of the skimmed product that, while it lacks the amount of butter fat and when powdered is in many cases totally deficient in this component of whole milk, it possesses, with imperceptibly diminished degree, the other ingredients of whole milk which are essential factors in its nutrient value. While what are known as powdered milks are principally restricted to the evaporated product relieved of its butter fat (though certain makes of powdered milk are represented to contain a due proportion of butter fat as well as the other constituents of whole milk, except, of course, the water, which has been removed), their utilization for economic purposes is fast being realized, and it may be claimed strongly in their favor that they are in many respects free from contamination, which is an ever-present source of danger when whole milk or milk in its raw state in liquid form is handled, especially in bulk. It is believed that the powdered product is destined eventually to fulfill a demand on the part of the poorer classes, who are enabled to procure milk in this form, when diluted volume for volume, at a cheaper cost than otherwise.

#### SKIM (SKIMMED) OR SEPARATED MILK.

Skim milk is defined in the Standards of Purity for Food Products,<sup>1</sup> issued by Secretary of Agriculture in pursuance of authority given by Congress in the food and drugs act of June 30, 1906, as follows:

Skim milk is milk from which a part or all of the cream has been removed and contains not less than 9.25 per cent of milk solids.

Condensed skim milk is defined in the Standards of Purity for Food Products<sup>1</sup> as "milk from which a considerable portion of water has been evaporated." It is doubtless to be understood under this definition that the milk has been partially or wholly relieved of its cream before condensing.

#### CONSIDERABLE ECONOMIC VALUE OF SKIM MILK.

There is much popular misapprehension as to the efficaciousness of skim milk, which has for years past enjoyed a very considerable degree of opprobrium on account of its being offered for sale as whole milk, thus defrauding the purchaser of the full amount of butter fat,

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture,

removed in the separation of cream, to which he is entitled. It is a matter of interesting information, however, that skim milk is beginning to play an important part in the economic latter-day consumption of milk. There are many farms throughout the vast territory of the United States situated so remote from the centers of population that the transportation of milk derived from their herds in its raw state to available markets is utterly impracticable, the cost of transportation and the length of time necessarily consumed en route making it impossible to compete with the product of farms more advantageously located geographically with reference to commercial centers. For this reason an enormous amount of raw milk, after the cream has been separated for butter making, has been fed to hogs and other farm animals. This vast waste product, relatively speaking, is now, by the process of aeration, being partially condensed or powdered, making it profitable, on account of its reduced bulk and better keeping qualities, for transportation to market.

In favor of skim milk it may be supplemented that a much larger number of bacteria are found in cream than in the bottom milk, one sample of milk examined containing 500 times as many bacteria in the cream. When milk is placed in the generally used centrifugal separator, the great mass of bacteria rise with the cream, a lesser number being carried down with the sediment. The intermediate milk, therefore, contains markedly fewer bacteria per cubic centimeter than the cream or sediment layers.

## XII. MILK PRODUCTS.

A discussion of the local milk situation would be incomplete without an allusion to the conditions affecting milk products, namely, butter, buttermilk, cheese, ice cream, and oleomargarine. It has been conclusively demonstrated that pathogenic organisms persist in these products with virulence, often for many months, and that it is of the utmost importance that milk employed in the preparation of these products be clean and wholesome, and meet in every particular the requirements demanded of milk in its natural state. Tubercle bacilli concealed in butter, buttermilk, and other dairy products are distributed throughout these products in such a way as to insure their ingestion by the consumer wherever the sale of milk from tuberculous cows is permitted.

### CREAM.

The same conditions affecting milk apply, generally speaking, to cream, which is merely cow's milk with an excessive amount of fat, the other ingredients being substantially the same in character and amount as in raw milk.

Cream is defined in the Standards of Purity for Food Products,<sup>1</sup> issued by the Secretary of Agriculture in pursuance of authority given by Congress in the food and drugs act of June 30, 1906, as follows:

Cream is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains not less than 18 per cent of milk fat.

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture,

Evaporated or clotted cream is defined in the Standards of Purity for Food Products<sup>1</sup> as "Cream from which a considerable portion of water has been evaporated." This product is often referred to, locally at least, as "double cream."

#### ICE CREAM.

The conditions under which ice cream is manufactured in many instances in the District of Columbia are not at all satisfactory, and radical improvements are necessary to insure purity and freedom from contamination. Many cases of violent poisoning are due to insanitary conditions surrounding the ice-cream factory, to the storage of the product for an improper length of time, and to the lack of care in keeping the utensils and receptacles cleanly and not sterilizing them to destroy bacterial life. The danger of ptomaine poisoning from cream and ice cream may be entirely obviated by using a wholesome raw product, manufacturing it in perfectly clean surroundings, and disposing of it within a reasonable length of time after manufacture. Cream and ice cream sold in the District have been shown by examination to contain a number of bacteria far in excess of what should be found in such products derived from pure, uncontaminated, fresh materials.

Thickeners do not appear to be generally used in the production of ice cream in the District. The sooner ice cream is consumed after making the better, and the chief objection to the use of thickeners is that it enables the ice cream to be kept for a longer period of time than is healthful. It also aids in the expansion of the volume of cream to proportions entirely beyond the actual amount of nourishment represented. Inasmuch as ice cream is sold exclusively by volume and not by weight, this expansion can only be regarded as a deception practiced upon the consumer. The use of such substances in the manufacture of ice cream is not a commercial necessity, and if permitted, thickeners should be restricted to materials which are wholesome and unobjectionable, and the fact that they have been employed should be required to be plainly stated on the label of the package or other receptacle in which ice cream is sold.

Since, furthermore, ice cream is definitely understood by the public to contain certain ingredients, and is prescribed frequently by physicians as a diet for invalids and convalescents, the term should be reserved solely for the frozen product composed of pure, fresh cream, sugar, and flavor. It should be required, moreover, that ice cream represent a definite percentage of butter fat corresponding to the established standards, 12 per cent being recommended for ice cream flavored with fruits, and 14 per cent as requisite for the vanilla type of ice cream.

It is believed that the specification of these requirements to control the manufacture of ice cream for sale and consumption in the District of Columbia would materially assist in conserving the health of the public from injury from this source of infection.<sup>2</sup>

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture.

<sup>2</sup> The committee is indebted for this information to the interesting and comprehensive chapter on "Ice cream," by Dr. Harvey W. Wiley, Chief of the Bureau of Chemistry, U. S. Department of Agriculture, in Bulletin No 56 of the Hygienic Laboratory, Public Health and Marine-Hospital Service, p. 251.

## BUTTERMILK.

Buttermilk is defined in the Standards of Purity for Food Products,<sup>1</sup> issued by the Secretary of Agriculture in pursuance of authority by Congress in the food and drugs act of June 30, 1906, as "The product that remains when butter is removed from milk or cream in the process of churning."

## NECESSITY FOR MAINTAINING MILK PRODUCTS AT LOW TEMPERATURES.

In response to an inquiry addressed to the Bureau of Animal Industry as to whether there is reason for requiring that butter, cheese, and other milk products be maintained at low temperatures, the committee is informed that while low temperatures retard and inhibit the growth and multiplication of pathogenic germs they can not be relied upon to destroy such germs, and the requirement that dairy products be held at low temperatures would therefore not remove the danger. The bureau recommends the pasteurization of cream or milk before making into butter or cheese as the best method of accomplishing the object desired.

## REMEDIAL LEGISLATION RECOMMENDED.

Reference is made elsewhere in this report (p. 76) to the resolutions unanimously adopted by the board of directors of the local Association for the Prevention of Tuberculosis on December 27, 1910 (Appendix AE), reciting that it has been shown by indisputable evidence that typhoid fever and other diseases are traceable to contaminated dairy products, and urging that Congress investigate the relation of dairy products to the public health with a view to the enactment of remedial legislation.

## XIII. SUMMARY—RECOMMENDATIONS.

The recommendations of the committee may be summarized as follows:

1. That unless washing, bottling, and capping machines, and other apparatus and the maintenance of a separate salesroom be uniformly insisted upon, no demerit be recorded by the health department against the small dealer not possessing these appurtenances.

2. That the requirement of concrete floors (over which a movable wooden or other covering may be placed) be continued in force.

3. That specific approval be secured from Congress for proposed changes of large importance in the regulations affecting our local milk industry.

4. That Congress provide a suitable increase in the number of inspectors to fully meet the requirements of the milk-inspection service.

That the regulations issued by the District Commissioners on April 21, 1903, prescribing under penalty that any person in the District of Columbia who receives milk or cream for sale shall, immediately after emptying the receptacle in which such milk or cream has been received, thoroughly rinse such receptacle so as to

<sup>1</sup> Circular No. 19, Bureau of Chemistry, U. S. Department of Agriculture.

free the same from all remnants of milk and of cream, or cause such receptacle to be so rinsed, be amended by eliminating the words "for sale," so as to extend this requirement to consumers and all other persons, as well as to dealers.

5. That all cases of communicable disease among dairy farmers and their assistants, outside the District of Columbia furnishing milk to the Washington market, be required to be reported to the District health department. (The act of March 2, 1895, already authorizes the health officer to suspend or revoke permits for shipping into the District milk from dairy farms exposed to infection by diphtheria, scarlet fever, tuberculosis, typhoid fever, and other infectious and contagious diseases.)

6. That the health department continue its method of exacting a reasonable standard as opposed to an ideal standard for rating dairies and dairy farms.

7. That no investigation be authorized of the administration of the District health department as proposed by the Dairymen's Association, the department being, in the view of the committee, singularly free from conditions demanding such an investigation.

8. That the classification of milk suggested by Dr. A. D. Melvin and recommended by the Washington milk conference of 1907 be approved for the District of Columbia by specific legislation.

9. That the additional recommendations of the Washington milk conference of 1907 be approved for the District of Columbia, except that regulations intended to safeguard the District milk supply, if of large importance, be specifically authorized by Congress; that the necessary plant or plants for pasteurizing the local milk supply be not maintained by the District government; that all milk not "certified" or "inspected," intended for local consumption, be required to be pasteurized; that in pasteurization milk be required to be heated to a temperature of 145° F. for 20 minutes or 140° F. for 30 minutes; that milk, even from tuberculin-tested cows, unless "certified" or "inspected," be compulsorily subjected to pasteurization; that the health department be required to publish periodically, though not daily, the ratings of dairies and dairy farms; and that parents and guardians be urged to use only "certified" milk or properly pasteurized or "modified" milk as a food for infants, at least under the age of 3 years. It is believed that the requirements specified will dispense with the necessity of boiling milk to be consumed.

10. That all milk supplied for the use of hospitals, foundling asylums, and other institutions within the District of Columbia supported wholly or in part by public funds, be required to comply with the classification recommended by the Washington milk conference of 1907, subject to the exceptions noted by this committee under recommendation 9. It is understood that the recent order of the District Commissioners under date of November 8, 1910, specifies that milk for such institutions be either properly pasteurized or derived from tuberculin-tested herds. The committee recommends that the District Commissioners issue promptly an amendment to this order specifying that raw milk even from tuberculin-tested herds be required to be pasteurized (unless "certified" or "inspected" in conformity with the provisions of the classification of the Washington milk conference of 1907), since the tuberculin test insures only against tuberculosis.

11. That favorable action be had on Senate bill 4986, introduced by Mr. Gallinger on January 10, 1910, authorizing, among its provisions, the commissioners to promulgate and amend from time to time regulations governing the production and sale of milk, cream, and ice cream in the District of Columbia. As above recommended, however, changes of large importance in the regulations governing the milk supply should, in the judgment of the committee, be the subject of specific legislation by Congress.

12. That the action of the Department of Agriculture in compelling all milk furnished to employees at the several buildings under the control of the department within the District to Columbia to comply with the classification recommended by the Washington milk conference as defined in Circular No. 114 of the Bureau of Animal Industry be extended to embrace all executive departments and independent establishments of the Government located at Washington.

13. That a similar order be issued by the District Commissioners covering milk furnished to employees in buildings under the control of the District government.

That the suggestions, 21 in number, by Mr. E. H. Webster, for improved sanitary conditions on dairy farms, set forth in Appendix O of this report, be adopted generally in separate jurisdictions throughout the United States.

That the current regulations of the District health department governing dairies and dairy farms be periodically printed on muslin or similar inexpensive fabric and required by regulation to be kept conspicuously posted in all dairies and barns from which milk is supplied for distribution in the District of Columbia.

14. That legislation be enacted by Congress requiring all tuberculin manufactured in one State and offered for sale in another to measure up to a prescribed standard.

15. That official applications of the tuberculin test to farm animals be restricted to authorized veterinarians or other skilled persons under the supervision of the Federal Government, so far as this coincides with the powers granted by the Federal Constitution for the regulation of interstate commerce.

16. That any attempts to adulterate or otherwise impair the efficiency of tuberculin as a diagnostic agent be severely punished, and that such punishment extend with equal force to persons convicted of inoculating cattle with the intent and purpose of rendering them immune to reaction under the tuberculin test.

17. That every druggist or other person dispensing tuberculin be compelled to register each sale and maintain a detailed record of all such transactions for the scrutiny of supervising officials of Federal and State governments.

18. That every veterinarian or other practitioner applying the tuberculin test be compelled by law to make an accurate report thereof to the duly constituted authority, tagging or otherwise identifying each animal tested so as to enable an intelligent observance of the provisions of the statutes and ordinances governing such matters.

19. That, as recommended by the International Commission on the Control of Bovine Tuberculosis, all contact between tuberculous and healthy cattle and between healthy cattle and stables, cars, etc., which may contain live tubercle bacilli be prevented, live-stock shippers

being enjoined to see that all cars used in the shipment of cattle are thoroughly cleansed and disinfected before use.

20. That the sale or exchange of animals affected with tuberculosis, except for immediate slaughter or for breeding purposes under official supervision, be inhibited under penalty of law.

21. That all animals exposed to tuberculosis be retested at intervals of six months to one year.

22. That the tuberculin test be not applied to any animal having a temperature higher than normal.

23. That any animal having given one distinct reaction to tuberculin be thereafter regarded as tuberculous, though if the disease be arrested, as evidenced by later successful withstanding of the tuberculin test, such fact be taken into account.

24. That a positive reaction to tuberculin in any properly conducted test, official or otherwise, in any animal in any herd, shall be considered evidence sufficient upon which to declare the herd to be infected until such time as a subsequent test or elimination of animals shown to be diseased shall demonstrate the herd to be free from tuberculosis.

25. That owners and veterinarians be compelled by law to report the existence of tuberculosis in a herd, whether such information result from clinical examination or from the tuberculin test.

26. That some system of marking, for purpose of identification, be adopted with regard to all cattle 3 years old or over shipped for slaughter.

27. That, except when purchases are made from disease-free herds tested by a properly qualified individual, persons buying for breeding purposes or milk production limit their purchases to animals successfully withstanding the tuberculin test, and that in order to facilitate the compliance with this suggestion official authorities adopt such regulations as will prevent the entry into their respective territories of cattle for breeding purposes or milk production unless accompanied by satisfactory tuberculin-test charts.

28. That, with a view to securing uniformity in legislation regarding the control and eradication of bovine tuberculosis, the laws of the United States, Canada, and other American countries governing the admission of animals from without their borders be made stringent and as uniform as possible, as well as those regulating the interstate and interprovincial movement of cattle.

29. That in order to make cattle as resistant as possible to infection with tuberculosis, they be stabled in clean, disinfected, and properly ventilated and lighted barns, giving them abundant clean water, nutritious food, and a sufficient amount of daily exercise in the open air; and that such other conditions be provided as are well known to contribute to the health of animals, including the twice daily removal of manure from stables and the installation of water-tight floors and proper drainage.

30. That the expense of applying the tuberculin test, when compulsorily made, devolve upon the Government (State or municipal). That in accordance with the "half-and-half" principle of appropriating for the needs of the District Government, the cost, so far as the testing of cattle located within the District boundaries supplying milk to the Washington market is concerned, be provided one-half

from the Federal Treasury and one-half from the revenues of the District of Columbia.

31. That, in the judgment of the committee, the scale of compensation to owners for cattle condemned as a result of the tuberculin test, set forth in the order of the District Commissioners dated November 26, 1909, "For the suppression and prevention of tuberculosis in cattle," which scheme of compensation coincides with the views of the officials of the United States Department of Agriculture, be approved as best adapted to insure justice to the herd owner.

32. While the committee unqualifiedly favors the application of the tuberculin test, it especially recommends that the test be applied gradually, the herds supplying milk to the District being inspected seriatim with such gradualness as may be intelligently calculated to enable the replacement of infected animals with healthy ones, thus avoiding a possible shortage in the District milk supply. For this purpose it is proposed by the committee that a period of approximately two years, or say January 1, 1913, might appropriately and advantageously be fixed for the introduction of the test compulsorily among herds supplying milk for the Washington market.

33. That milk, from the time of cooling immediately after derived from the cow, until actual delivery at the residence of the consumer, be required to be maintained at a temperature not exceeding 50° F. (provided it be feasible to secure the necessary refrigerator-car service for transportation from the farm to the city). This requirement, in the judgment of the committee, should be gradually put into force. The maintenance of a temperature not exceeding 50° F. should be required, furthermore, in the handling of cream, and of milk and cream used in the manufacture of butter, cheese, and ice cream.

34. That the establishment of ice houses on dairy farms for the storage of a sufficient supply to maintain, during the warm season from April 1 (or earlier) to November 1 (or later in exceptional instances of mild weather), milk at a temperature not exceeding 50° F., and the installation of an adequate service of refrigerator cars or effectually jacketed cans necessary to maintain a temperature continuously below 50° F., be insisted upon, provided it be determined after detailed examination of items of expense that refrigerator-car service is a rational economic possibility.

35. That to meet the restrictions proposed in recommendation numbered 33, milk be required to be kept refrigerated while on delivery wagons.

36. That the pasteurization of all milk, not "certified" or "inspected" in conformance with the requirements of the classification recommended by the Washington milk conference of 1907, be insisted upon, and that for this purpose it be required that an exposure of the milk uniformly at a temperature of 140° F. (60° C.) continuously for a period of 30 minutes (or 145° F. for a period of 20 minutes) be enforced, with the understanding that the periods of 30 or 20 minutes referred to shall not include the interval during which the milk is attaining the specified temperature. That compulsory pasteurization as proposed be arranged to take effect on January 1, 1913.

37. That what is known as "flash" or "continuous" pasteurization be not permitted, since it is mechanically impossible to subject

the milk uniformly to the requisite amount of heat during the short interval generally determined upon for this method of pasteurization.

38. That a provision of law be enacted and rigidly enforced prohibiting the sale of milk, especially in retail establishments, left over from the previous day's delivery.

39. That in addition to the compulsory pasteurization of milk, not "certified" or "inspected" in accordance with the specifications of the Washington milk conference of 1907, the tuberculin test and the proposed specification of a maximum bacterial content and a maximum temperature of milk offered for sale in the District of Columbia be also insisted upon.

40. That pasteurization be required to be done under permit issued by the District health department, and that the milk be at once cooled and placed in sealed sterilized containers and delivered sealed, plainly marked "Pasteurized," with an indication on the label of the date and hour when the pasteurization was completed; furthermore, that pasteurized milk be delivered to the consumer within 24 hours after pasteurization.

41. That unless the provision of an adequate refrigerator-car service proves impracticable, making it impossible to maintain milk in transit at 50° F. or less, the plant or plants for pasteurizing the District milk supply (with the exception of one already established at considerable expense by the White Cross Milk Co. at Frederick, Md., and possibly others already in operation in connection with the local milk supply) be required to be located within the limits of the District of Columbia.

42. That the contemplated pasteurizing plant or plants be conducted under private auspices and not maintained by the District government, the establishment of such plants under municipal ownership being, in the opinion of the committee, neither necessary nor desirable.

43. That a general milk delivery service be organized by local dairymen with a view to eliminating unnecessary expenditure in delivering milk owing to duplication of capital invested and labor involved.

44. That, for the present at least, 500,000 be agreed upon as the maximum number of bacteria allowable for raw milk (not "certified"), 100,000 for pasteurized milk, and 10,000 for "certified" milk offered for sale in the District of Columbia.

45. That in the judgment of the committee a high bacterial content, especially if repeated in the milk from a given farm, unquestionably indicates insanitary conditions—either uncleanness on the farm, maintenance at a temperature above 50° F., staleness of the milk, or a diseased condition of the cow's udder from which the milk furnished is partially derived.

46. That milk be not permitted to be sold in bulk at grocery or similar retail establishments; that the public be admonished not to buy "bulk" milk from a retail store (not a dairy), and that milk for babies' use be not purchased from grocery or other establishments where it may possibly have been kept over from the day before.

47. That the furnishing of pasteurized and modified milk for infant feeding can probably be accomplished at much less expense

through existing commercial agencies than by the maintenance of the local Straus Pasteurizing Laboratory.

48. That in the event that the local Straus Infants' Milk Depot be not continued as a charity, a fund be liberally supported by the public, perhaps aided by congressional appropriations, from which modified milk or other proper food for infants among the indigent classes may be furnished. Such fund could perhaps be best administered in connection with existing agencies such as the diet kitchen, the Citizen's Relief Association, the Associated Charities, and the Instructive Visiting Nurse Society.

49. That in the judgment of the committee it is better to purchase milk already pasteurized under competent supervision from infants' milk depots or from properly equipped commercial establishments, than to attempt its pasteurization at home in apparatus of which several economical patterns are obtainable on the market.

50. That every encouragement should be extended by the residents of Washington to the Instructive Visiting Nurse Society, which is, through giving practical instructions to parents and others at the home of the infant concerning its proper feeding, bathing, clothing, etc., accomplishing marvelous results in reducing infant mortality in the District of Columbia, and that every facility be offered for the instruction of mothers in caring for their infants.

51. That the excellent work being done by what are known as "settlement houses" in educating the indigent classes to a proper recognition of the value of appropriate food for infants' use, and in otherwise encouraging the proper treatment and development of infants of the dependent poor, be liberally assisted by our citizens.

52. That mothers, regardless of their financial or social status, be encouraged in every possible way to nurse their infants, it having been conclusively proved by extended series of careful investigations, that the mortality among bottle-fed infants is vastly greater than among those that are breast fed.

53. That when breast feeding is clearly impossible, however, a fulsome supply of pure cow's milk, modified to meet the special needs of the infant, be rendered available for both rich and poor, and that mothers be instructed in the same connection regarding the special requirements necessary to successful artificial feeding.

53½. That the President of the United States be requested to direct the Department of Agriculture and the Bureau of Public Health and Marine-Hospital Service of the Treasury Department in cooperation, to investigate the relative value of raw and pasteurized milk for infant feeding, with a view to arriving at a finally authoritative settlement of this controversial subject among sanitarians and physicians generally. It is believed that the solution of this question as regards infant feeding would also have an important influence in determining the relative merits of raw and pasteurized milk for adult consumption.

54. That the precautions concerning the care of milk in the home, suggested on pages 116 to 118, inclusive, of this report, be diligently observed by consumers of milk.

55. That milk intended for use in preparing milk products, namely, butter, buttermilk, cheese, ice cream, and oleomargarine, be required to comply with the stipulations herein specified for milk in its raw or pasteurized state.

56. That the designation "ice cream" be reserved solely for the frozen product composed of pure, fresh cream, sugar, and a flavor; that it represent a definite percentage of butter fat corresponding to the established standards, namely, 12 per cent for ice cream flavored with fruits, and 14 per cent for the vanilla type of ice cream; and that it be required to be manufactured in cleanly, sanitary surroundings and disposed of within a reasonable length of time after manufacture; furthermore, that the use of thickeners, if permitted, be restricted to materials which are wholesome and unobjectionable, and the fact that they have been employed be required to be plainly stated on the label of the package or other receptacle in which ice cream is sold.

57. That in order to bring the public to a proper appreciation of the importance of clean, wholesome milk, and the necessity for intelligent care in its treatment in the household, a brief circular be prepared and distributed by the health department containing suggestions for the proper care of milk in the home, along the lines indicated in the committee's recommendations on this subject.

58. That this report, if approved by the chamber, be transmitted to the Senate and House of Representatives with a request that it be printed and that its recommendations, so far as applicable to the District of Columbia and likewise so far as pertinent to the Federal powers over food commodities entering into interstate commerce, be embodied in suitable legislation; that a copy of the report be forwarded to the District Commissioners; and that the publishers of the Washington newspapers be appealed to to promote as fully as practicable the dissemination among the local public of information concerning sanitary milk production and its preponderant advantages to the community.

59. That a special committee be appointed by the chamber to urge before the Commissioners of the District and before the committees of Congress the expediency of the proposed legislation.

Respectfully submitted.

J. LOUIS WILLIGE, *Chairman.*

GEO. W. WHITE.

BENJ. W. GUY.

T. C. DULIN.

WM. D. HOOVER.

JANUARY 30, 1911.



## APPENDIXES.

### APPENDIX A.

SERIES OF QUESTIONS ADDRESSED BY THE SPECIAL COMMITTEE OF THE WASHINGTON CHAMBER OF COMMERCE TO HEALTH OFFICERS, ETC., ELICITING INFORMATION CONCERNING THE SUBJECT OF ITS INQUIRY.

THE WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C., November 8, 1910.*

DEAR SIR: In order that the special committee appointed by the chamber of commerce to investigate the milk situation in the District of Columbia may have the fullest information obtainable for use in its deliberations, I venture to inclose a list of questions, with the request that you will kindly furnish responses to such of the inquiries as you may find it practicable to answer.

Assuring you that any information that you may be good enough to supply will be of great value to the committee in arriving at intelligent conclusions, I am, thanking you in advance for your courtesy,

Respectfully, yours,

J. LOUIS WILLIGE, *Chairman.*

INFORMATION REQUESTED BY SPECIAL COMMITTEE APPOINTED BY WASHINGTON CHAMBER OF COMMERCE TO INVESTIGATE THE MILK SITUATION IN THE DISTRICT OF COLUMBIA.

#### TUBERCULIN TEST.

1. What advantages in your judgment will result from the enforcement of the tuberculin test?
2. To what extent is the tuberculin test reliable?
3. What effect in your judgment would its enforcement have on the price of cattle?
4. In your judgment, should the expense of the test be defrayed by the Government or the owner?
5. What is the approximate expense of applying the tuberculin test?
6. What length of time is required in applying the test?
7. Granting that the test should be applied only by governmental authorities or qualified agents duly authorized thereby, would it be practicable and advisable to restrict the use of tuberculin and its application to such authorized officials or agents?
8. Should the owner be compensated for cattle condemned, and on what basis of payment?
9. In the absence of compulsory pasteurization, should tests other than the tuberculin test be required to safeguard against typhoid, diphtheria, and other deleterious germs?
10. Assuming that the tuberculin test is indicative only of tuberculous conditions, are there any other tests which should be applied for the detection of typhoid, diphtheria, scarlet fever, or other germs?

#### BACTERIAL COUNT.

1. Is the bacterial count reliable, and an indication of unsatisfactory conditions?
2. Do bacteriologists working independently arrive at approximately the same results in examining samples of a given milking?

3. Is it feasible to indicate the maximum number of bacteria allowable?
4. What number in your judgment should be specified in this connection?
5. Is it possible for the producer or dealer to verify or disprove the bacterial count reported?
6. What does a high bacterial content indicate?
7. Is the harmfulness of a high bacterial count scientifically established beyond question?
8. Is it practicable, with due regard to the rights of the producer or dealer to insist upon a prescribed bacterial count?

#### MAINTENANCE OF LOW TEMPERATURES.

1. At what maximum temperature should milk be kept to give the best results for commercial uses?
2. Is it commercially practicable to maintain a maximum temperature of 50° F., from time of milking to city delivery to consumer?
3. Should hours be prescribed for the city delivery so as to prevent increase of temperature while deposited on door steps, etc.?
4. Could requirements reasonably be made compelling consumers to exercise caution in handling of milk?
5. If so, specify what requirements?
6. To what extent is the failure to preserve a maximum temperature of 50° F. deleterious to milk?

#### PASTEURIZATION.

1. At what temperature should pasteurization be accomplished?
2. Is pasteurization commercially practicable?
3. What effect has pasteurization upon the nutritive and digestive qualities of milk?
4. What effect has pasteurization upon the beneficial and prejudicial germs in milk?
5. Does pasteurization tend to preserve milk?
6. Do harmful germs multiply as rapidly in pasteurized as in raw milk?
7. Are pasteurizing machines controlled, so far as you know, by a monopoly?
8. Is a municipal pasteurization plant (or plants), in your judgment, practicable and desirable?
9. Should the plant (or plants) be located in the city or on the farm?
10. Is it possible by scientific observation to ascertain definitely whether milk has been properly pasteurized or not?
11. Would pasteurization, if generally insisted upon, dispense with the necessity of the tuberculin test?
12. Would compulsory pasteurization obviate in any way the necessity for a prescribed bacterial content?

#### GENERAL.

1. To what extent, in your judgment, is milk a factor in diphtheria, typhoid, fever, scarlet fever, and tuberculosis infection?
2. To what extent, in your judgment, will this infection be diminished by the enforcement of the tuberculin test?
3. To what extent, in your judgment, would this infection be decreased by compulsory pasteurization?
4. To what extent is this infection influenced by the prescribed conditions of cleanliness on a farm and in the handling and the distribution of milk?
5. What effect, in your judgment, will insistence upon the tuberculin test, pasteurization, the bacterial count, the maintenance of a temperature not exceeding 50° F., and requirements as to stabling and cleanliness in the production and distribution of milk have upon the retail price of milk?
6. Will the insistence upon these requirements result in a temporary or permanent milk famine?
7. To what extent would such insistence lead to the use of prepared milks and other substitutes for raw or pasteurized milk?
8. Are these prepared milks as nutritious as raw or properly pasteurized milk?
9. How do prepared milks (including evaporated, condensed, and powdered) compare in price by volume with raw or pasteurized milk?

10. Have you seen any evidence or indication of a milk trust or combine to control raw-milk production or milk supply of the District of Columbia or elsewhere?

11. Have you seen indications of a trust to control the production or distribution of prepared, condensed, concentrated, or other forms of milk other than the raw milk in the District of Columbia or elsewhere?

12. Is it practicable, in your judgment, to maintain a temperature not exceeding 50° F. on delivery wagons?

13. What is condensed milk?

14. Is it as nutritious as raw milk?

15. Is it as susceptible to deterioration as raw milk?

16. Is it as susceptible to deterioration as pasteurized milk?

17. What are the advantages of concentrated milk?

18. Is modified milk as nutritious as raw milk?

19. Is it as digestible as raw milk?

20. Is it as susceptible to deterioration as raw milk?

21. Is it as susceptible to deterioration as pasteurized milk?

22. How does its price compare with that of raw milk?

23. What effect does freezing have on the qualities of milk?

24. Have attempts been made, so far as you know, to secure legislation from Congress governing the production, transportation, or distribution of milk or milk products throughout the United States under the authority for regulating commerce between the several States?

#### HEALTH DEPARTMENTS.

1. Please state what regulations, if any, relating to the production, transportation, and delivery of milk have been promulgated in your jurisdiction, and also what State or municipal laws or ordinances have been adopted relating to the same subject?

2. Is the compulsory insistence on the tuberculin test, in your judgment, practicable and advisable?

3. Is the insistence on a maximum temperature of 50° F. from the time of production to the delivery to the consumer practicable and desirable?

4. Is a prescribed bacterial count feasible and advisable?

5. If so, what maximum number of bacteria should be specified?

6. Is pasteurization, in your judgment, advantageous?

7. Does pasteurization tend to preserve milk?

8. Is compulsory pasteurization, in your judgment, practicable and advisable?

9. What effect, in your judgment, would compulsory pasteurization have upon the wholesale and retail price of milk in winter and summer?

10. Is the requirement that cows be stabled on concrete floors practicable?

11. Does such requirement tend to cause rheumatism in the animal?

12. What other requirements in addition to the foregoing would you suggest with a view to improving condition of milk?

13. Kindly furnish copies of any data in your possession relating to the regulation of milk production, distribution, and consumption which may be serviceable in the investigations of the chamber of commerce committee.

14. Are there any regulations in your jurisdiction governing the sale of prepared, condensed, modified, or powdered milks?

## APPENDIX B.

ADDRESSES TO WHICH SERIES OF INQUIRIES RELATING TO PRODUCTION, TRANSPORTATION, AND DISTRIBUTION OF MILK AND ITS RELATION TO THE PUBLIC HEALTH WERE MAILED.

#### OFFICIALS OF UNITED STATES GOVERNMENT.

Dr. George H. Torney, Surgeon General, United States Army.

Dr. C. F. Stokes, Surgeon General, United States Navy.

Dr. Walter Wyman, Surgeon General, United States Public Health and Marine-Hospital Service, Treasury Department.

United States Department of Agriculture—Bureau of Animal Industry: Dr. A. D. Melvin, Chief; Dr. A. M. Farrington, Assistant Chief; Dr. John R. Mohler, Chief of Pathological Division; Dr. R. W. Hickman, Chief of Quarantine Division; Dr. E. C. Schroeder, Superintendent of Experiment Station; Mr. B. H. Rawl, Chief of Dairy Division; Mr. L. A. Rogers, in charge of research laboratories, Dairy Division; Dr. George M. Whitaker, in charge of market milk investigations, Dairy Division. Bureau of Chemistry: Dr. Harvey W. Wiley, Chief.

## HEALTH OFFICERS.

- Albany, N. Y.<sup>1</sup>  
 Allegheny, Pa.<sup>1</sup>  
 Anaconda, Mont.<sup>1</sup>  
 Annapolis, Md.<sup>1</sup>  
 Ann Arbor, Mich.: James F. Breakey, health officer.  
 Atchison, Kans.<sup>1</sup>  
 Atlanta, Ga.: Dr. J. P. Kennedy, health officer.  
 Atlantic City, N. J.<sup>1</sup>  
 Augusta, Me.<sup>1</sup>  
 Austin, Tex.<sup>1</sup>  
 Baltimore, Md.: Dr. James Bosley, commissioner of health.  
 Birmingham, Ala.: E. M. Duncan, bacteriologist and chief inspector, board of health.  
 Bismarck, N. Dak.  
 Boise City, Idaho.<sup>1</sup>  
 Boston, Mass.<sup>1</sup>  
 Bridgeport, Conn.<sup>1</sup>  
 Buffalo, N. Y.<sup>1</sup>  
 Burlington, Vt.: Hugh L. Thomson, milk inspector, and Vermont State food chemist.  
 Carson City, Nev.<sup>1</sup>  
 Charlotte, N. C.<sup>1</sup>  
 Cheyenne, Wyo.<sup>1</sup>  
 Chicago, Ill.<sup>1</sup>  
 Cleveland, Ohio: C. W. Eddy, chief veterinarian.  
 Columbia, S. C.<sup>1</sup>  
 Columbus, Ohio: Dr. J. W. Clemmer, health officer.  
 Concord, N. H.<sup>1</sup>  
 Dayton, Ohio.<sup>1</sup>  
 Denver, Colo.<sup>1</sup>  
 Detroit, Mich.: Dr. Guy L. Kiefer, health officer.  
 Des Moines, Iowa.<sup>1</sup>  
 Dover, Del.<sup>1</sup>  
 Fall River, Mass.<sup>1</sup>  
 Fargo, N. Dak.<sup>1</sup>  
 Frankfort, Ky.<sup>1</sup>  
 Galveston, Tex.<sup>1</sup>  
 Grand Rapids, Mich.<sup>1</sup>  
 Guthrie, Okla.<sup>1</sup>  
 Harrisburg, Pa.<sup>1</sup>  
 Hartford, Conn.<sup>1</sup>  
 Houston, Tex.<sup>1</sup>  
 Indianapolis, Ind.<sup>1</sup>  
 Jacksonville, Fla.: Dr. Joseph Y. Porter, State health officer; Dr. C. E. Terry, health officer.  
 Jeffersonville, Mo.<sup>1</sup>  
 Kansas City, Mo.: Dr. Walter S. Wheeler, health commissioner.  
 Lansing, Mich.<sup>1</sup>  
 Little Rock, Ark.<sup>1</sup>  
 Los Angeles, Cal.: George H. Hart, chief milk inspector.  
 Louisville, Ky.<sup>1</sup>  
 Lynchburg, Va.: Dr. Mosby G. Perrow, health officer.  
 Madison, Wis.<sup>1</sup>  
 Memphis, Tenn.<sup>1</sup>

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<sup>1</sup>No response received.

Minneapolis, Minn.<sup>1</sup>  
 Milwaukee, Wis.<sup>1</sup>  
 Mobile, Ala.<sup>1</sup>  
 Montclair, N. J.: Dr. C. H. Wells, health officer.  
 Montpelier, Vt.<sup>1</sup>  
 Nashville, Tenn.<sup>1</sup>  
 Newark, N. J.<sup>1</sup>  
 New Orleans, La.<sup>1</sup>  
 Newport, R. I.<sup>1</sup>  
 New York, N. Y.<sup>1</sup>  
 Oklahoma City, Okla.<sup>1</sup>  
 Olympia, Wash.<sup>1</sup>  
 Omaha, Nebr.<sup>1</sup>  
 Paterson, N. J.<sup>1</sup>  
 Philadelphia, Pa.<sup>1</sup>  
 Pittsburg, Pa.<sup>1</sup>  
 Portland, Me.<sup>1</sup>  
 Portland, Oreg.: C. H. Wheeler, health officer.  
 Providence, R. I.: Walter O. Scott, inspector of milk.  
 Raleigh, N. C.<sup>1</sup>  
 Richmond, Va.: Dr. E. C. Levy, chief health officer.  
 Rochester, N. Y.: Dr. George W. Goler, health officer.  
 Salem, Oreg.<sup>1</sup>  
 San Francisco, Cal.: Dr. W. F. McNutt, jr., health officer.  
 Savannah, Ga.<sup>1</sup>  
 Scranton, Pa.: J. M. Wainwright, city bacteriologist.  
 Seattle, Wash.: Dr. J. E. Crichton, commissioner of health.  
 Springfield, Mass.<sup>1</sup>  
 Springfield, Ill.<sup>1</sup>  
 St. Joseph, Mo.<sup>1</sup>  
 St. Louis, Mo.<sup>1</sup>  
 St. Paul, Minn.<sup>1</sup>  
 Syracuse, N. Y.: Dr. D. M. Totman, health officer.  
 Tallahassee, Fla.<sup>1</sup>  
 Toledo, Ohio.<sup>1</sup>  
 Topeka, Kans.: Dr. George F. Babb, dairy and milk inspector.  
 Trenton, N. J.<sup>1</sup>  
 Washington, D. C.: Dr. William C. Woodward, health officer.  
 Wheeling, W. Va.: Dr. William Hay McLain, commissioner of health.  
 Wilmington, Del.<sup>1</sup>  
 Worcester, Mass.<sup>1</sup>

## SPECIALISTS ON SANITARY MILK PRODUCTION.

Dr. Hermann M. Biggs, general medical officer, department of health, New York City.<sup>1</sup>  
 Dr. Henry L. Coit, Newark, N. J.  
 Dr. Rowland G. Freeman, New York City.  
 Dr. T. Alexander Geddes, Kensington, Md.  
 Dr. Samuel McC. Hamill, Philadelphia, Pa.  
 Dr. William H. Park, New York City.  
 Dr. S. C. Prescott, Massachusetts Institute of Technology, Boston, Mass.  
 Dr. Mazyck P. Ravenel, University of Wisconsin, Madison, Wis.  
 Dr. V. C. Vaughan, University of Michigan, Ann Arbor, Mich.  
 Prof. Frank F. Wesbrook, University of Minnesota, Minneapolis, Minn.<sup>1</sup>  
 Dr. C. E. A. Winslow, New York City.

## PRODUCERS' AND DEALERS' ASSOCIATIONS.

Dairymen's Association of the District of Columbia, Maryland, and Virginia;  
 W. A. Hartraft, president; A. S. Trundle, treasurer and representative.  
 Milk Producers' Association of Maryland, Virginia, and the District of Columbia;  
 John Thomas, president, Ednor, Md.

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<sup>1</sup> No response received.

## DAIRIES AND MILK COMPANIES.

Borden's Condensed Milk Co., New York City.  
 Nathan Straus Pasteurized Milk Laboratories, Washington, D. C.; Miss Reba J. Hurn, manager.  
 Sharon Dairy, Washington, D. C.; Corbin Thompson, proprietor.  
 Sheffield Farms-Slawson Decker Co., New York City; Loton Horton, president.  
 Walker-Gordon Laboratory, Washington, D. C.  
 White Cross Milk Co., of New York City.  
 White Cross Milk Co., of Baltimore and Washington; J. M. Houston, bacteriologist.

## TRANSPORTATION COMPANIES.

New York Central & Hudson River R. R. Co.; W. C. Brown, president.  
 Pennsylvania Railroad Co.; J. R. Wood, passenger traffic manager.  
 Baltimore & Ohio Railroad Co.<sup>1</sup>  
 Southern Railway Co.; W. W. Finley, president.  
 Chesapeake & Ohio Railway Co.<sup>1</sup>  
 Atlantic Coast Line.<sup>1</sup>  
 Seaboard Air Line.<sup>1</sup>

## APPENDIX C.

RESPONSES RECEIVED FROM PHYSICIANS, HEALTH OFFICERS, DEALERS, MANUFACTURERS, AND OTHERS QUALIFIED TO SPEAK AUTHORITATIVELY ON THE SEVERAL SUBJECTS EMBRACED WITHIN THE INQUIRY OF THE SPECIAL COMMITTEE APPOINTED BY THE WASHINGTON CHAMBER OF COMMERCE TO INVESTIGATE THE MILK SITUATION IN THE DISTRICT OF COLUMBIA.

## TUBERCULIN TEST.

QUESTION 1.—*What advantages in your judgment will result from the enforcement of the tuberculin test?*

## ANSWERS.

The principal advantage resulting from the enforcement of the tuberculin test is the elimination of the germs of tuberculosis from milk and the consequent elimination of a great source of danger to the health of consumers, especially infants. This test can also be used in a rational way to eradicate tuberculosis from cattle with good economic results to the live-stock industry. (Chief Bureau of Animal Industry.)

Gradual eradication of tuberculosis in dairy cattle. (Surgeon General U. S. Army.)

It will give us an accurate estimate of the amount of tuberculosis present in a given herd of cattle. (Surgeon General U. S. Navy.)

The enforcement of the tuberculin test would reduce the amount of tuberculosis among dairy cattle, and free the milk supply from tubercle bacilli, with the probable result that the incidence of tuberculosis among hogs fed on creamery skimmed milk would be reduced and the incidence of infection with the bovine tubercle bacilli among human beings would be practically eliminated. (Surgeon General Public Health and Marine-Hospital Service.)

The removal of the greater part of tuberculosis from the herds and the removal of all advanced cases. Animals should only be added to herds after reliable test. (Dr. William H. Parks, New York, N. Y.)

Eventual eradication of bovine tuberculosis. (Dr. Henry L. Coit, Newark, N. J.)

<sup>1</sup> No response received.

A marked diminution in infant mortality. (Dr. R. G. Freeman, New York, N. Y.)

Eradication of tuberculous cows from dairy herds, and consequent protection of children against bovine infection. (Dr. M. P. Ravenel, Madison, Wis.)

Decrease in tuberculosis, human and bovine. (Dr. C. E. A. Winslow, New York, N. Y.)

Establishing a dairy herd free from tuberculosis. Removing one of the most important sources of infection from tuberculosis to human beings. Of great advantage to owners of herds from an economic standpoint, by increasing the health and efficiency of the individual animals, it taking more food stuff to produce results in a tuberculous animal than one which is not tuberculous. This is true especially where glands of the intestinal tract are involved. In countries in Europe, where tuberculosis is prevalent, I have found a large per cent of nonbreeding heifers, in herds, containing a high per cent of tuberculous animals. (Dr. T. A. Geddes, Kensington, Md.)

Elimination of tubercular cattle. (Health officer Afn Arbor, Mich.)

We have been investigating the matter of tuberculosis in our dairies for the past two or three years, and are not yet prepared to give definite answers to these questions. (Health officer Atlanta, Ga.)

Besides lessening the number of cases of tuberculosis, we would obtain better sanitary conditions for the cows. (Health officer Baltimore, Md.)

Safeguarding of public health from the danger of infection from bovine tuberculosis. Also the eradication of tuberculosis from dairy animals. (Health officer Birmingham, Ala.)

Sale of less milk from tuberculous cows. (Health officer Bismarck, N. Dak.)

Eradication of bovine tuberculosis and consequent diminution of possibility of infection of people using raw milk. (Health officer Cleveland, Ohio.)

The prevention of the conveyance of bovine tuberculosis to man; (2) the economic interest of the dairyman in preserving the health of cattle. (Health officer Columbus, Ohio.)

Decrease in tubercle infected milk. (Health officer Detroit, Mich.)

It will eventually rid the herd of tuberculosis with all the train of benefits that follow. Its reaction on the human health will be such as to be expected from the use of milk from healthy instead of diseased cattle. (State board of health, Fla.)

Elimination of some cases of tuberculosis and the discovery of other diseases as a result of the inspection. (Health officer Jacksonville, Fla.)

Eliminate all diseased cows from herd. (Health officer Kansas City, Mo.)

A great advantage, if you can enforce it. It is hard to enforce and should be introduced gradually, say by publishing in monthly reports the dairies that are tested. (Health officer Lynchburg, Va.)

Less human tuberculosis among children, especially of the surgical forms. Better general health of the herds. Less loss to the farmer after he once has a tuberculosis-free herd. (Health officer Montclair, N. J.)

The removal of diseased cattle from market. The removal of tuberculosis germs from milk, and giving us better meat for table use. (Health officer Portland, Oreg.)

Milk from diseased cattle would be reduced to a minimum. (Health officer Providence, R. I.)

If enforced fully it will necessarily exclude all milk from tuberculous cows. (Health officer Richmond, Va.)

The removal of open tuberculosis and the resultant clearing up of cows and stables that always follows the test. (Health officer Rochester, N. Y.)

A very considerable advantage. Probably lessening tuberculosis in the human. (Health officer Seattle, Wash.)

The saving of herds and the production of safer milk. (Health officer Syracuse, N. Y.)

Elimination of danger of infection of man by bovine tuberculosis. Aid in education of the people to greater caution among themselves in respect to human tuberculosis. (Health officer Topeka, Kans.)

Would remove to a very great extent the danger of tuberculous infection in milk and would tend toward a more careful handling of milk generally. (Straus Laboratory, Washington, D. C.)

I think the disadvantage would more than counteract the advantage. (John Thomas, Ednor, Md., president Milk Producers' Association.)

None; on the contrary, milk consumers will be compelled to pay an exorbitant price for milk. (Sharon Dairy, District of Columbia.)

We do not approve of the enforcement of the tuberculin test for many reasons, some of which will appear more fully in our answers to subsequent questions.

Our first reason for disapproval of the enforcement of the tuberculin test is that the scientific world has not yet fully accepted the belief that bovine tuberculosis is transmissible to human beings. Exhaustive examinations have been conducted upon this subject, both abroad and in our country, for several years. It is claimed by scientists of the highest standing that no primary case of tuberculosis from purely bovine sources has been conclusively demonstrated. Turning to the facts produced by those who claim to have discovered the bovine bacillus in human beings, we believe that we can sum up the result of their investigations in the statement that those who claim that human beings are liable to contract tuberculosis from bovine sources through the ingestion of milk admit that such cases are very limited in number; and none are claimed to have been definitely proved where the contagion has affected a child over 5 years old, and so small a number of infants under 5 years as to be negligible.

Second. The enforcement of the tuberculin test and the slaughter of reacting cows would necessarily increase the price of milk. The immediate results of this increase of price would be to deprive many people of one of their chief staples of food and the probable loss of human lives among children who would be apt to die as the result of inanition.

It is possible that, from an economic point of view, the country will some day come to the enforcement of the tuberculin test throughout the whole country, but in the present state of the dairy business a general enforcement of that test and the slaughter of the reacting cows would produce, first, a great financial injury to the dairy business, and, second and more serious, a loss to the people of the country in depriving a great majority of a large portion of their milk supply. When the time has arrived for the enforcement of the test throughout the country we believe that if properly and honestly enforced it will produce economic results in helping to protect the dairymen from the loss which now follows one of the contagious diseases to which animals are liable. (Borden's Condensed Milk Co., New York, N. Y.)

Properly applied, the tuberculin test would eradicate tuberculosis from dairy herds and most probably cause a marked reduction of this disease among children. (Walker-Gordon Laboratory.)

Decrease of tuberculosis. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

A higher quality of milk and feeling of security in the community that one danger is largely overcome. (Dr. S. C. Prescott, Boston, Mass.)

It would give milk free from tubercle bacilli. Ultimate eradication of tuberculosis from dairy cattle. (Health officer Los Angeles, Cal.)

None at this time. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Assist in prevention of spread of bovine tuberculosis. (Health officer San Francisco, Cal.)

It would create more demand for raw milk and lessen the need for pasteurized milk; also less demand for pasteurized milk would necessitate cleaner milk. (Health officer St. Joseph, Mo.)

Ultimately the eradication of tuberculosis from cattle. (Health officer Wheeling, W. Va.)

It will protect the producer from severe losses from tuberculosis in his herd that must necessarily follow without the test. It will protect children from infection. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

To allay the fears of the milk consumer, regarding transmission to humans. (Health officer Scranton, Pa.)

#### QUESTION 2.—*To what extent is the tuberculin test reliable?*

#### ANSWERS.

The tuberculin test applied by a competent person with properly prepared tuberculin is exceedingly reliable in the detection of tuberculosis and is by far the most reliable agent known for this purpose. This test makes it possible to detect tuberculosis in cattle at an early stage when the disease could not be discovered in the living animals by other means. The few generalized and advanced cases that do not react to tuberculin can be easily detected by visual examination. The results of tests made by State and Federal officers with tuberculin prepared by the Bureau of Animal Industry covering a period of over 15 years show that the lesions of tuberculosis were demonstrated in 98.39 per cent of reacting cattle which were slaughtered. In the recent work of test-

ing all cattle in the District of Columbia 321 reacting animals were slaughtered and lesions of tuberculosis were found on post-mortem examination in all but 5, the percentage of accuracy being 98.44. Laboratory experiments were made by the Bureau of Animal Industry during the past year in testing by microscopic examination and animal inoculation the glands of cattle which had reacted to the tuberculin test, but in which lesions were not found by ordinary post-mortem examination; and in more than half of the cases tubercle bacilli were positively identified. This shows that tuberculosis was really present in these carcasses, but in an incipient form, the lesions being too slight for detection by ordinary post-mortem examination. It therefore seems that the percentage of accuracy of the tuberculin test is even higher than is indicated by the figures above given. (Chief Bureau of Animal Industry.)

I agree with resolution No. 2 of International Commission of American Veterinary Medical Association that "tuberculin properly used is an accurate and reliable diagnostic agent for the detection of active tuberculosis in cattle. (Surgeon General U. S. Army.)

In 97 per cent of those giving a positive reaction tuberculosis has been found to be present. (Surgeon General U. S. Navy.)

The tuberculin test is a very reliable means of determining active tuberculosis in cows tested. (Surgeon General Public Health and Marine-Hospital Service.)

Very reliable when test temperatures taken for 18 hours after injections, and all cattle showing either doubtful or typical reactions are removed. Even slight rises of temperatures which rise and fall gradually are very suspicious, e. g., 101.6, 101.9, 102.2, 102.3, 101.8, 101.7, 101.4. (Dr. William H. Park, New York, N. Y.)

If the source of the cattle is known and recent tuberculinization has not been made, the tuberculin test is almost infallible in the hands of an expert inspector. (Dr. Henry L. Coit, Newark, N. J.)

A positive result is of great value. A negative result of less value. (Dr. R. G. Freeman, New York, N. Y.)

Within 3 per cent. Long series carefully done show better than this. (Dr. M. P. Ravenel, Madison, Wis.)

Under the following conditions I consider the tuberculin test practically infallible: Use United States Department of Agriculture tuberculin. The animal must show a normal range of temperature preceding the injection of tuberculin and must be kept in a normal, quiet condition during the entire test. It is very important that the animal to be tested has not been tampered with before or during the application of the test, as many unscrupulous owners prepare their animals by the different methods that do defeat the object of the test. A great deal of criticism heard as to the unreliability and absence of uniform results of the tuberculin tests can be attributed to the fact that the animal to be tested has been tampered with prior to the application of the test. The veterinarian applying the test should have had a large experience in animal temperatures. He should have had experience with temperatures and physical symptoms presented by animals that have been tampered with, or in other words, doped. He should be familiar with the high temperature that occasionally appears from causes other than the reaction due to the presence of the tuberculin, which appears at a time he expects a typical tuberculous reaction. This oftentimes causes confusion to the veterinarian of little experience. (Dr. T. A. Geddes, Kensington, Md.)

Practically always. (Health officer Ann Arbor, Mich.)

I do not know. (Health officer Baltimore, Md.)

In our application of the test all reacting animals showed tubercular lesions on post-mortem. Statistics compiled by investigators give 98 to 99 per cent positive when tests are applied by competent men. (Health officer Birmingham, Ala.)

Nearly all infected animals react, especially those with active disease. (Health officer Bismarck, N. Dak.)

Infallible if properly applied with reliable tuberculin. (Health officer Cleveland, Ohio.)

Successful and dependable in 97 per cent of cases in experienced hands. (Health officer Columbus, Ohio.)

Negative except in tubercular cases. (Health officer Detroit, Mich.)

Yes. (State board of health, Florida.)

I have not had enough experience with it to say. (Health officer Jacksonville, Fla.)

To about 95 per cent. (Health officer Kansas City, Mo.)

In the tests in Lynchburg it has been found reliable in every instance. (Health officer Lynchburg, Va.)

Entirely so in the hands of a skilled veterinarian. Of course cases that can be detected by physical examination should not be tested. (Health officer Montclair, N. J.)

Two c. c. per cow unless private tests have been made, and then 3 c. c. Out of 8,000 tests not one mistake has been made, i. e., each cow killed showed tubercular lesions. (Health officer Portland, Oreg.)

Most reliable test we have. Ninety-seven per cent of cases can be detected. (Health officer Providence, R. I.)

Almost absolutely so. (Health officer Richmond, Va.)

Ninety-seven per cent. (Health officer Rochester, N. Y.)

Ninety-eight per cent. (Health officer Seattle, Wash.)

Only by competent men, backed by State authority. (Health officer Syracuse, N. Y.)

Practically absolute when tests are studied with good judgment as to other associated conditions of the animal. (Health officer Topeka, Kans.)

According to scientists, about 98 per cent of condemned cattle are infected. (Straus Laboratory, Washington, D. C.)

Not sufficiently perfected to be infallible. (John Thomas, Ednor, Md., president, Milk Producers Association.)

Uncertain. Best authorities agree that the tuberculin test is not a reliable diagnostic for tuberculosis. (Sharon Dairy, Washington, D. C.)

We believe it has been shown that the tuberculin test is reliable to show that the cows either have or have had tuberculosis in over 90 per cent of the cases.

In order to be able to rely upon the tuberculin test we believe that all the following conditions must be strictly complied with:

(1) The owner of the cow must be absolutely honest toward the veterinarian.

(2) The test must extend over a period of several months, so that the possibility of previous dosing of the cow can be eliminated.

(3) The state of health of the cow and the conditions surrounding it must be known to the veterinarian by personal examination.

(4) The veterinarian must be skilled in administering tuberculin. (NOTE.—We believe that only a very few veterinarians and mostly those who have had great experience are competent to administer the dose and get accurate results.)

(5) The tuberculin must have been prepared with the greatest care, and the veterinarians must know what the strength of the tuberculin is. (NOTE.—Commercial tuberculin is of varying strength and sometimes impure.)

(6) The dose of tuberculin must be of the right amount and strength. If there is an overdose of tuberculin the cows, although healthy, would react. (NOTE.—The tuberculin test is so delicate and so liable to err that it should be used to corroborate the clinical evidence of disease and not as a sole test of the presence of the disease in apparently healthy cows.)

(7) Animals suffering from diseases other than tuberculosis will react upon the injection of tuberculin.

We believe the following are the inaccuracies of the tuberculin test:

(1) A cow which may have had at some time during her life a slight infection of tuberculosis and had entirely recovered, and the lesion calcified and healed, will still react to the tuberculin test, although she is perfectly healthy at the time of the test.

(2) A diseased cow which has been injected with tuberculin within a period of three months previous to the test will not react.

(3) A diseased cow, which is fed with febrifuge (antiperitic), just before the dose, will not react.

(4) Healthy cows, if excited at the time of the test, will react.

(5) If the test is administered in hot weather, and the cows are driven from the fields into the stable during the time of the test, healthy cows may react.

(6) In advanced cases of tuberculosis no reaction is obtained upon the injection of tuberculin.

(7) A cow may not react if infected during the period of incubation, which ranges from 8 to 50 days.

(8) It may be that timothy bacilli will cause reaction, and those bacilli, so far as we know, are harmless.

It is believed by many authorities that the injection of tuberculin is dangerous to healthy cows, in that it may cause latent tuberculosis to develop into

active tuberculosis, or so weaken its resistive power that it becomes more liable to take the infection.

We consider, however, that the greatest objection to the reliability of the tuberculin test to show that the cow is diseased with active tuberculosis is the fact that cows which have practically recovered from the infection, where the lesions are encysted and calcified, react as typically as cows that are actively diseased.

We have the results of a tuberculin test and a post-mortem examination of reacting animals of two herds, made officially under the New York State Department of Agriculture, which may be stated generally as follows:

In one herd 44 cows were tested and 24 reacted. None of them had any lesions of the udder. Of these 24, 4 carcasses were condemned as having generalized tuberculosis and were tanked; the remaining 20 carcasses were passed as fit for food; in all but one there was not more than one or two glands affected, and all of these glands calcified. In one (which was particularly picked out for special demonstration and slaughter at the Tompkins County Fair at Ithaca), when it came to be slaughtered no lesions were found whatever, so that the net result of the condemning of 24 cows of that herd was that 4 of them were badly affected.

Two of these cows had been condemned on physical examination before the examination of the tuberculin test, so that had they been taken out of the herd the tuberculin test would have condemned 50 per cent of that herd, and of that 50 per cent only 1 per cent were badly affected.

In the second herd there were 56 cows and 10 calves tested. Eleven cows and four calves passed the tuberculin test. Eight animals were selected by physical examination as being infected before testing by tuberculin. Fifty-one were slaughtered. In 4 of them no lesions could be found, and 39 carcasses were passed for food, and 6 were condemned as having generalized tuberculosis, and the carcasses were tanked. In 28 all the lesions were found to be calcified; the cows were fine, big cows and good milkers.

These two herds were not selected, but were herds which were tested and condemned under the New York State department of agriculture. We had nothing to do with it, but we were allowed to attend and to take note of the results.

It is only fair to say that the United States Government experts claim that no one can tell when cows that contain calcified lesions may not develop active tuberculosis again under unfavorable conditions or sickness, such as pneumonia, and that therefore they are dangerous and should be removed from the herds.

We hold, however, that in view of the fact that so many human beings have, at some time or other, been actively affected by tuberculosis, and have recovered and lived long and useful lives and died of other diseases, we think it is but fair to give any cow whose vitality was sufficient to calcify the lesions the benefit of the conclusion that probably, if she had not been killed, she would have remained a valuable producer of milk for a number of years unless, of course, taken sick. In that case she would not be fit to be a milk producer, but such sickness would be evident to the dairyman.

Therefore we believe, after a very careful study of the whole situation, that the reaction following the tuberculin test is not a reliable means of determining whether the cow is then suffering from active tuberculosis. (Borden's Condensed Milk Co., New York, N. Y.)

In 3,000 tests less than one-half to 1 per cent of the temperature readings have been doubtful. All reactions confirmed by post-mortem, and have no reason to suppose that in more than three cases have infected animals passed as sound. (Walker-Gordon Laboratory, Washington, D. C.)

Almost absolute. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Very reliable when carried out with intelligence and care. (Dr. S. C. Prescott, Boston, Mass.)

Reliable in over 97 per cent of the cases when tested by competent men. (Health officer Los Angeles, Cal.)

Very great extent. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

If carefully done, almost infallible. According to Bang, error is only 3.3 per cent. (Health officer San Francisco, Cal.)

The reliability depends upon the skill and honesty of the person making the test. (Health officer St. Joseph, Mo.)

About 96 per cent. (Health officer Wheeling, W. Va.)

To a fraction of 1 per cent, if properly applied. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

To show presence of first infection. (Health officer Scranton, Pa.)

QUESTION 3.—*What effect in your judgment would its enforcement have on the price of cattle?*

## ANSWERS.

The prices of cows, as well as prices of other things, have increased all over the country within recent years, regardless of whether or not the tuberculin test has been applied. The statistics of the Department of Agriculture show that the average value of milch cows on January 1, 1908, was \$30.67 per head, while the average value on January 1, 1910, was \$35.79 per head, an increase of 16.7 per cent in two years. While it is possible that the price of cows might be affected if the tuberculin test were applied simultaneously over a large part of the country and all reacting animals slaughtered, it is believed that the gradual application of the test, followed by slaughter, carried out in a small area, would have no perceptible effect upon prices. As the milk of tuberculous cows is unquestionably dangerous to human health and life, a slight increase in the price of cows and in the cost of milk should certainly not be considered as an adequate reason for refusing to take steps to remove this danger. Cows affected with tuberculosis are usually not as productive as healthy cows, and their value as milk producers would probably steadily decrease, hence the removal of cows of this class would not be as great a loss as might appear at first. (Chief Bureau of Animal Industry.)

Ultimately little or none. (Surgeon General U. S. Army.)

It would undoubtedly raise it. (Surgeon General U. S. Navy.)

Enforcement of the tuberculin test would probably increase temporarily the price of healthy dairy cows. (Surgeon General Public Health and Marine-Hospital Service.)

I would at first separate the reacting cattle when in sufficient numbers to be practicable, and use their milk pasteurized. This would lessen effect on price. (Dr. William H. Park, New York, N. Y.)

Its enforcement would increase the price of cattle from 25 to 50 per cent. (Dr. Henry L. Coit, Newark, N. J.)

Little or none. (Dr. R. G. Freeman, New York, N. Y.)

Not able to answer. A healthy cow is worth more than a sick one. Eventually no effect should be produced. (Dr. M. P. Ravenel, Madison, Wis.)

Have not statistics. (Dr. T. A. Geddes, Kensington, Md.)

Slight increase. (Health officer Ann Arbor, Mich.)

I do not know. (Health officer Baltimore, Md.)

Locally tuberculous-free cows are estimated to be worth from \$2 to \$5 more than cows that have not successfully passed the test. (Health officer Birmingham, Ala.)

No appreciable effect. (Health officer Bismarck, N. Dak.)

Would depend upon degree and rapidity of enforcement; probably raise the price of tuberculin-tested cattle materially. (Health officer Cleveland, Ohio.)

Increased valuation. (Health officer Columbus, Ohio.)

Temporary rise. (Health officer Detroit, Mich.)

The immediate effect would be to raise the price, but the remote effect would be to conserve the health and vitality of the cattle and consequently reduce the price. (State board of health Florida.)

None at all here, as it is done without cost to the dairyman, and few diseased cows are found in this locality. (Health officer Jacksonville, Fla.)

This question is not specific. Do you mean milk cows; if so, yes. (Health officer Kansas City, Mo.)

Very little. (Health officer Lynchburg, Va.)

Have no experience, but would judge that price of known sound cattle would be higher than of possibly diseased cattle. Ultimate price in a few years ought to be as low as at present if tuberculosis is eradicated. (Health officer Montclair, N. J.)

Temporary increase, but later will not affect except that the buyer of milk cows would feel safe in his investment. (Health officer Portland, Oreg.)

At first might increase price. (Health officer Providence, R. I.)

Depends upon circumstances. If a few cities insist on test, the price of tuberculin-tested cows (which alone we would have to consider) would be the same as for tuberculin-tested cows everywhere else. (Health officer Richmond, Va.)

I do not know. It has had no effect as yet. (Health officer Rochester, N. Y.)  
Probably somewhat—not very great—because the life of cows as a whole would be lengthened; therefore progeny would be entailed. (Health officer Seattle, Wash.)

It would increase the price. (Health officer Syracuse, N. Y.)

Little, if any. (Health officer Topeka, Kans.)

Owing to the prevalence of tuberculosis among cattle, the enforcement of the tuberculin test would undoubtedly raise the price of healthy cows. (Straus Laboratory, Washington, D. C.)

It would increase the price 20 to 30 per cent. (Sharon Dairy, District of Columbia.)

Raise the price 25 per cent. (John Thomas, Ednor, Md., president Milk Producers' Association.)

We believe that it would very greatly increase the price of cattle, and our judgment is based upon our investigations of what has taken place in Massachusetts and other States where they have attempted to enforce the test. (Borden's Condensed Milk Co., New York, N. Y.)

In my judgment the enforcement of the tuberculin test would very materially increase the price of dairy cattle. (Walker-Gordon Laboratory, Washington, D. C.)

Increase. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

It would increase the price of milch cows and probably of other cattle as well. (Dr. S. C. Prescott, Boston, Mass.)

Depends on how reactors are handled. (Health officer Los Angeles, Cal.)

Twenty-five to 50 per cent. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Increase. (Health officer San Francisco, Cal.)

It might cause a temporary rise in price of tested cows and might, if extensively enforced, affect the general price of cattle. (Health officer St. Joseph, Mo.)

Price would advance for the time being. (Health officer, Wheeling, W. Va.)

It would undoubtedly increase the price of cattle for a few years. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

Create higher prices. (Health officer Scranton, Pa.)

QUESTION 4.—*In your judgment, should the expense of the test be defrayed by the Government or the owner?*

#### ANSWERS.

The Government or the State should bear the expense of making the tuberculin test when this is officially required in the interest of the public health. The Department of Agriculture is willing to test without charge herds supplying milk to the District of Columbia, and will extend similar cooperation to State and city authorities elsewhere so far as possible. (Chief Bureau of Animal Industry.)

It would be desirable in the interest of public health for the State governments to assume the expense. (Surgeon General U. S. Army.)

By the Government. (Surgeon General U. S. Navy.)

The question as to whether the Government should bear the expense of applying the tuberculin test is one of policy, regarding which I am not in a position to give an opinion at the present time. (Surgeon General Public Health and Marine-Hospital Service.)

At first by State, then later by farmers. (Dr. William H. Park, New York, N. Y.)

The expense should be defrayed by the Government through its own inspectors, although owners are learning that it is a pecuniary advantage to have clean cattle. (Dr. Henry L. Coit, Newark, N. J.)

Owner. (Dr. R. G. Freeman, New York, N. Y.)

Owner. It is easier to introduce it by free tests, or at least a sharing of the expense, but this should be temporary. (Dr. M. P. Ravenel, Madison, Wis.)

There is not the slightest doubt in my mind that an attempt to eradicate tuberculosis in our herds will come. I favor the method that will bring such an attempt the quickest, whether it be the Government, State, or county

authorities. I feel sure that if the campaign of education be inaugurated so that the farmer could be educated and shown where he could benefit, he would willingly assume his share of cost. As for the Government to undertake the eradication of tuberculosis without some local help, it would be an enormous task. (Dr. T. A. Geddes, Kensington, Md.)

Government. (Health officer Ann Arbor, Mich.)

By the Government. (Health officer Baltimore, Md.)

Either by National, State, or municipal Government. (Health officer Birmingham, Ala.)

Owner. (Health officer Bismarck, N. Dak.)

Should be divided between owner and State government. (Health officer Cleveland, Ohio.)

Both. (Health officer Columbus, Ohio.)

Government. (Health officer Detroit, Mich.)

By the Government. (Health officer Jacksonville, Fla.)

Government or State, by competent officers. (Health officer Kansas City, Mo.)

Would be cheaper for the Government and probably better. (Health officer Lynchburg, Va.)

Test by Government or city. Loss of cattle to be met by owner, the same as the loss of any other diseased animal. (Health officer Montclair, N. J.)

By the Government, either municipal, State, or United States, preferably State, with partial remuneration for condemned cows. (Health officer Portland, Oreg.)

If people want clean milk, should pay for it. The expense of test should be borne by Government. (Health officer Providence, R. I.)

In a general way by Government, but imposition would then have to be carefully guarded against. (Health officer Richmond, Va.)

The owner and Government should share the expense. (Health officer Rochester, N. Y.)

I believe the period should be fixed within which all cattle destroyed should be in some manner paid for by the State. After such period all diseased stock should fall as a loss against the owner. (Health officer Seattle, Wash.)

By the State. (Health officer Syracuse, N. Y.)

A part by each. (Health officer Topeka, Kans.)

It is a movement for the protection of the public health, therefore the expense should be borne by the public, i. e., the Government. (Straus Laboratory, Washington, D. C.)

Two-thirds by the Government; one-third by the owner. (John Thomas Ednor, Md., president Milk Producers' Association.)

If compulsory, by the Government; if voluntary, by the owner. (Sharon Dairy, Washington, D. C.)

We have been advised of so many instances of fraudulent tests and fraudulent records that we are of the opinion that the tuberculin test, if required, should be applied by the Government, and its expense defrayed by the Government; and that it should be applied only by veterinarians who have had large experience, and are of high standing and entirely beyond reproach with regard to honesty.

In addition, the enforcement of the test is for the public good or necessity, and the expense should therefore be borne by the Government. (Borden's Condensed Milk Co., New York, N. Y.)

The method now followed by the State of Pennsylvania seems quite practical. Under it the test is optional with the owner, and is made at expense of State. The owner receives two-thirds of appraised value of cattle condemned, but not in excess of \$75 per head. (Walker-Gordon Laboratory, Washington, D. C.)

Divided. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I think the cattle owner should be sufficiently interested in protection of his herd to pay actual cost of test. I admit that many are not. (Dr. S. C. Prescott, Boston, Mass.)

By the Government. (Health officer Los Angeles, Cal.)

The Government at this time and for some years in part to come, unless the owner got more money for his product, which would mean higher price to the consumer. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Both, if possible. (Health officer San Francisco, Cal.)

An average allowance should be made for each cow tested for a certain period after the law becomes effective, and thereafter the loss by condemnation should be borne by the owner. (Health officer St. Joseph, Mo.)

By the Government. (Health officer Wheeling, W. Va.)

In most cases by the Government. Owners should be allowed to pay for the test, if they will have it applied by competent persons. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)  
Government. (Health officer Scranton, Pa.)

QUESTION 5.—*What is the approximate expense of applying the tuberculin test?*

## ANSWERS.

The expense of applying the tuberculin test would vary considerably with the number of cows in each herd, the distances separating herds, etc. In case the testing is not done by the Government without charge, as above suggested, it could probably be done at an average cost of about \$1 per cow. (Chief Bureau of Animal Industry.)

I have no exact information on this subject, but the process is a simple one and should be inexpensive. (Surgeon General U. S. Army.)

Must vary under a variety of conditions. (Surgeon General U. S. Navy.)

Slight, if done in large numbers and by suitable persons. (Dr. S. C. Prescott, Boston, Mass.)

At private tests, when in numbers, about \$1 per head. (Dr. William H. Park, New York, N. Y.)

The expense depends upon the size of the herd; it costs as much to test two cows as a dozen. The expense is chiefly in the time of the veterinarians. (Dr. Henry L. Coit, Newark, N. J.)

Varies with size of herd. (Dr. R. G. Freeman, New York, N. Y.)

Depends on size of herd and thickness of population. Should not exceed 50 cents per head ordinarily.

On our results of herds of about 50 cows the expense of the test would cost approximately 44 cents per animal. Larger herds the expense would be largely reduced, while there would be an increase on smaller herds. (Health officer Birmingham, Ala.)

Two dollars. (Health officer Bismarck, N. Dak.)

Depends on local conditions and customs. (Health officer Cleveland, Ohio.)

About \$1 per capita. (Health officer Columbus, Ohio.)

Depends on herd, location, etc. (Health officer Detroit, Mich.)

Depends upon size of herd. Average herd of 30 cows, from 50 cents to \$1. (Health officer Kansas City, Mo.)

When the herd reaches 30 or more the actual expense per cow is little. One herd of 150 cows in Lynchburg had only one reaction, a fine Jersey. On killing, one lung was sadly affected. (Health officer Lynchburg, Va.)

Depends on the size of the herd. It will take a veterinarian the best part of a day to test a herd, whether of 10 or 50 cows. (Health officer Montclair, N. J.)

Governed by conditions; large herds can be tested at relatively less expense than small ones; that is, it takes as much time to test 20 cows as it does 50. (Health officer Portland, Oreg.)

Depends upon the number of cows in herd and distance farms are apart. (Health officer Providence, R. I.)

Depends on what is meant by this question. If mere cost of injection and passing or reaction, cost for large herds should be light per cow. If "applying test" includes doing away with reacting animals, cost is very great, and for all cows supplying a city the cost is enormous to somebody. (Health officer Richmond, Va.)

Very small, depending on size of herds. (Health officer Rochester, N. Y.)

It costs the department \$5 per day for our veterinarian, \$3 for a helper, and 9 cents a dose for tuberculin. If one cow only was tested, you could cut out, of course, the helper. The cost for testing a herd would be nothing like this. (Health officer Seattle, Wash.)

Depending on size of herds. A large herd can be tested as easily as a small one, and if the work be systematized one herd a day could be tested at expense of, say, \$5. (Health officer Topeka, Kans.)

It depends much upon the size of the herd. A herd of 50 cows can be tuberculin tested as cheap as 1 cow. The only additional expense, the amount of tuberculin used. (Sharon Dairy, District of Columbia.)

It is practically impossible to make any suggestion as to the approximate expense, unless the conditions under which it is to be applied are given. In general, however, if the work is done by a veterinary practitioner and the herd

is not over 3 miles distant from his office, it can be done for \$15 on the basis of 25 cows in the herd, and for \$20 for 50 to 75 cows in a herd, and for \$25 for 100 cows in a herd, including the cost of tuberculin, which is about 5 cents per dose.

If the work was done by a State veterinarian it would then cost whatever his salary per diem was, including what the necessary traveling and hotel expense would amount to. (Borden's Condensed Milk Co., New York, N. Y.)

As one competent man is required to test a single cow, but can in the same time test 100 cows, it is quite impossible to fix an approximate figure for the expense. (Walker-Gordon Laboratory, Washington, D. C.)

It depends on number of cattle to be tested and whether test is made by practicing veterinarian or by Government or State officer (25 cents to \$5 a head). (Health officer Los Angeles, Cal.)

The cost of testing is slight; the loss of cattle to the owner may be heavy. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Very little (about 50 cents), but besides two days' labor. (Health officer San Francisco, Cal.)

I do not know. (Health officer Wheeling, W. Va.)

An experienced man can test as many as 100 head in one night. He should receive approximately \$40 for such a night's work. A few animals may be tested for less money, but probably not less than \$15 for one animal. The Pennsylvania Live Stock Sanitary Board allows \$5 per day and expenses. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

Depends upon conditions—whether single animal or herd. (Health officer Scranton, Pa.)

QUESTION 6.—*What length of time is required in applying the test?*

ANSWERS.

The time required for making the tuberculin test is on the average about 24 hours, covering parts of two days. (Chief Bureau of Animal Industry.)

I believe it requires two or three days to test a herd. (Surgeon General U. S. Army.)

Between two and three days. (Surgeon General U. S. Navy.)

Forty-eight hours. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Two days for a herd of moderate size (50 to 100). (Dr. William H. Park, New York, N. Y.)

Twenty-two hours. (Dr. Henry L. Coit, Newark, N. J.)

Twenty-four hours. Nonreacting animals do not require quite so long. (Dr. M. P. Ravenel, Madison, Wis.)

Thirty hours. (Dr. T. A. Geddes, Kensington, Md.)

Test can be completed within 32 hours after the commencement of the work. The temperatures should be taken until at least 20 hours after the injection of the tuberculin. (Health officer Birmingham, Ala.)

Two days. (Health officer Bismarck, N. Dak.)

Two days to each herd. (Health officer Cleveland, Ohio.)

At least 27 hours. (Health officer Cleveland, Ohio.)

Twenty-four to 36 hours. (Health officer Detroit, Mich.)

Twenty-four to 48 hours. (State Board of Health, Florida.)

About 48 hours. (Health officer Jacksonville, Fla.)

Forty-eight hours. (Health officer Kansas City, Mo.)

See any authority on the subject. Inject at 6 to 8 p. m., and take temperatures until about 2 p. m. on following day. (Health officer Montclair, N. J.)

Not less than 36 hours. (Health officer Portland, Oreg.)

Inject tuberculin in evening, and about daylight next day take temperatures every 2 hours for 12 to 15 hours. (Health officer Providence, R. I.)

One to two days. (Health officer Rochester, N. Y.)

Twenty-four hours. (Sharon Dairy, District of Columbia.)

One half of each of two days. (Health officer Topeka, Kans.)

Twenty-four hours. (Sharon Dairy, D. C.)

Ordinarily the tuberculin test requires about 44 hours after the veterinary has arrived at the farm, but, as above stated, must be repeated after an interval of six months to be complete. (Borden's Condensed Milk Co., New York, N. Y.)

The tester should give two full days' time, but temperature measurements should be taken for two days prior to this to prevent testing an animal whose temperatures are showing marked variation. (Walker-Gordon Laboratory, Washington, D. C.)

One or two days. Should be repeated after three or six months. (Dr. S. C. Prescott, Boston, Mass.)

From 18 to 24 hours. (Health officer Los Angeles, Cal.)

Two days. One day previous in taking temperatures before injection, and one day noting results. (Health officer San Francisco, Cal.)

Approximately two days. (Health officer, Wheeling, W. Va.)

Twenty-four hours. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

About 24 hours. (Health officer Scranton, Pa.)

QUESTION 7.—*Granting that the test should be applied only by governmental authorities or qualified agents duly authorized thereby, would it be practicable and advisable to restrict the use of tuberculin and its application to such authorized officials or agents?*

## ANSWERS.

Yes. (Chief Bureau of Animal Industry.)

Restriction is not necessary, but only the certificate of authorized officials or agents should be recognized. (Surgeon General U. S. Army.)

Yes. (Surgeon General U. S. Navy.)

The tuberculin test should be administered by governmental authorities, or certainly under their supervision. (Surgeon General Public Health and Marine-Hospital Service.)

I believe not, because of the difficulty and expense when in out-of-the-way places. I believe reacting cattle should be reported in confidential way to authorities. (Dr. William H. Park, New York, N. Y.)

Yes; if the work was done in conjunction with the State authorities. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

Animals often show irregular temperatures during test that have been filled up with tuberculin previous to such testing. Repeatedly injecting tuberculin in animals to be presented for an authentic test is one of the many methods that is used to defeat the object of the test. I would certainly restrict the use of tuberculin. (Dr. T. A. Geddes, Kensington, Md.)

No. (Health officer Ann Arbor, Mich.)

Yes. (Health officer Baltimore, Md.)

I think not. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Very desirable, but not practical in some States owing to their laws. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

No. Health officer Detroit, Mich.)

Not necessary, I think. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Yes. (Health officer Lynchburg, Va.)

It would be most advisable if this could be done, as it would stop a lot of crooked work. (Health officer, Montclair, N. J.)

No. The test being very simple, owners often test their cows for their own individual protection. (Health officer Portland, Oreg.)

The test should be applied by Government agents or licensed veterinarians. (Health officer Providence, R. I.)

This would have to be done. (Health officer Richmond, Va.)

Yes. (Health officer Rochester, N. Y.)

Decidedly and most emphatically yes. A tuberculin test is valueless, in my judgment, unless you know that the stock has never been tested; and in any event know exactly what occurred. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Yes. (Straus Laboratory, Washington, D. C.)

If the test must be made, it should be applied by competent men. (John Thomas, Ednor, Md., president Milk Producers' Association.)

Yes, the Government should control the tuberculin, and only qualified veterinarians should be allowed to use it, and they should be required to report to the Government how it was used. (Sharon Dairy, District of Columbia.)

No, by no means. To take tuberculin away from the profession, assuming that such a thing could be done, and restrict its use entirely to Government agents would be an unfair discrimination against the needs and rights of the individual cattle owners and an unjust restriction on the scope and rights of the veterinary profession. (Borden's Condensed Milk Co., New York, N. Y.)

It should be practical, and it would unquestionably be advisable, to restrict application of this test to qualified and trustworthy persons, as it is a well-known fact that after one injection an animal may not again react to a similar injection, even six months later. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I see no reason why an owner of cattle should not make this test if he wishes and has the requisite knowledge. (Dr. S. C. Prescott, Boston, Mass.)

Decidedly advisable. Doubt if it would be practical to exclude registered veterinarians from its use. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

Yes. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Yes. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

QUESTION 8.—*Should the owner be compensated for cattle condemned, and on what basis of payment?*

#### ANSWERS.

Owners should be compensated at least in part for cattle condemned. The basis of condemnation in the recent work in the the District of Columbia is shown by the accompanying copy of the order of the commissioners. In brief, cattle were appraised before slaughter, the appraisal not to exceed \$75 for a pure-bred or registered animal, or \$50 for a grade or unregistered animal. Eighty per cent of the appraised value, less the amount realized as salvage, was paid on cattle whose carcasses were passed for food on post-mortem inspection, and 40 per cent less salvage in the case of cattle condemned for offal. If a reacting animal showed no lesions of tuberculosis on post-mortem examination, the full appraised value less salvage was paid. It is believed that the respective States, where cattle are owned, should make provision for compensation for cattle slaughtered as a result of the tuberculin test in those States. Several Sates have laws providing for such compensation. (Chief Bureau of Animal Industry.)

Compensation is desirable; certainly in the beginning. One-half the value of the animal would be a fair basis. Surgeon General U. S. Army.)

The fullest compensation should be allowed for cattle wholly condemned. (Surgeon General U. S. Navy.)

Compensation, or part compensation, for cattle destroyed on account of tuberculosis is provided for in certain States, some of them being New York, Kansas, Connecticut, Missouri, Vermont, and the District of Columbia. Such compensation appears to be just, but it follows that owners of cattle should be required to observe those sanitary measures necessary to protect their herds from tuberculosis. (Surgeon General Public Health and Marine-Hospital Service.)

Yes; for those in good condition; not for others. (Dr. William H. Park, New York, N. Y.)

Yes; on the basis of two-thirds their value. (Dr. Henry L. Coit, Newark, N. J.)

Yes; part value. (Dr. R. G. Freeman, New York, N. Y.)

Yes; as a temporary measure. Two-thirds value, with fixed maximum, is fair basis. (Dr. M. P. Ravenel, Madison, Wis.)

I hardly feel able to give an opinion of any value to so weighty a question. The facts that are not to be disputed are that tuberculosis is present in our herds of cattle and swine. Twenty years ago the percentage was much less than it is to-day, the increase, especially among hogs, being generally alarming. Hogs are generally infected through cattle. The facts are before us

that the longer we delay the more tuberculous animals we will have to deal with; also the greater number of animals to be compensated for should State or Nation compensate. Heavier would fall the blow on the farmer or owner of diseased cattle would he have to stand the loss. In England cattle found tuberculous on post-mortem by meat inspectors and condemned, are compensated for by a form of insurance arranged among the farmers and the butchers. I believe in compensation by State or Nation, as this would do away with a great deal of crookedness, it would tend to obtain cooperation of the parties interested, and aid most emphatically in the ultimate elimination of tuberculosis from our dairy herds. It has been my experience in England that men with tuberculous cattle will never welcome the tuberculin test until it pays them to do so. (Dr. T. A. Geddes, Kensington, Md.)

Theoretically, no; possibly yes, at first. (Health officer Ann Arbor, Mich.)

If the owner has provided the best sanitary condition for his cattle the expense should be borne by the Government. If he has not provided such conditions, then by the owner. (Health officer Baltimore, Md.)

I think the owner should be reimbursed on a basis of about two-thirds appraised value of animals condemned. (Health officer Birmingham, Ala.)

Yes; one-half. (Health officer Bismarck, N. Dak.)

Fifty per cent of appraised value, together with privilege of selling for immediate slaughter under proper inspection, should be given. (Health officer Cleveland, Ohio.)

Yes; in Ohio the State pays one-half the appraised value. (Health officer Columbus, Ohio.)

Percentage. (Health officer Detroit, Mich.)

No. (State board of health, Florida.)

Yes; at as nearly the market price as possible. (Health officer Jacksonville, Fla.)

Upon the basis for which they are assessed; two-thirds valuation. (Health officer Kansas City, Mo.)

Should be compensated to about 50 per cent of a price previously agreed on.

Owner gets his price for selling a good milk, and he should stand his loss the same as he would if potatoes or any other crop went bad. He would not ask Government to pay for diseased chickens that he could not market. (Health officer Montclair, N. J.)

Yes. I think for this purpose a stated valuation should be placed on the cow, and 60 per cent of said valuation be paid by State. (Health officer Portland, Oreg.)

Full value. (Health officer Providence, R. I.)

Yes. In whole or in part, but every safeguard would be necessary. (Health officer Richmond, Va.)

No; but New York State pays 80 per cent for cattle with localized lesions, 50 per cent for general lesions. (Health officer Rochester, N. Y.)

Yes. Because under our laws a clean herd may be contaminated from outside sources. I can not answer intelligently this question in the space allotted. (Health officer Seattle, Wash.)

Yes; by appraisal. (Health officer Syracuse, N. Y.)

Such compensation makes a better feeling of owner toward Government, and as the work is for the benefit of the whole people the latter, represented by the Government, should bear at least part of the expense, say one-half fair valuation each in case of apparently good cows, less share by Government in case of very poor. (Health officer Topeka, Kans.)

Yes. Do not know. (Straus Laboratory, Washington, D. C.)

Yes. On a basis fixed by disinterested appraisers. (John Thomas, Ednor, Md., president Milk Producers' Association.)

If compulsory the Government should pay. If voluntary the owner should pay. (Sharon Dairy, District of Columbia.)

If the tuberculin test is to be enforced at once and in a drastic way without first giving the dairymen a year or more notice of its enforcement, with the privilege of cleaning up their herds as best they can before its application, we think that the owner should be compensated for all cattle condemned, and that the basis of payment should be regulated to a certain extent by the condition of the animal when slaughtered. For instance, if a cow is found to have been only recently infected, or that the lesions are all encysted and calcified, the owner should receive full value for such cow. If, however, the cow is in bad

shape, and there are many tuberculous lesions, and the owner might have eliminated that cow by physical inspection, we think that then the amount to be paid should be on a rapidly descending scale.

The method now followed by the State of Pennsylvania seems quite practical. Under it the test is optional with the owner and is made at expense of State. The owner receives two-thirds of appraised value of cattle condemned, but not in excess of \$75 per head. (Walker-Gordon Laboratory, Washington, D. C.)

In part, but I can not say how much. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

A broad question. I think the Bang system should be introduced so that mildly infected cattle might be isolated and used for breeding (once). Badly infected cows should be killed at once and a fair value (beef value?) paid. (Dr. S. C. Prescott, Boston, Mass.)

Yes, at least for the first two or three tests. Seventy-five per cent of appraised valuation less returns from offal in condemned animals and from meat in passed animals. (Health officer Los Angeles, Cal.)

He should be compensated in full now. Later, if he gets more for his milk, he should stand the expense. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

An average allowance should be made for each cow tested for a certain period after the law becomes effective, an thereafter the loss by condemnation should be borne by the owner. (Health officer St. Joseph, Mo.)

He should be compensated. Personally, I think he should receive about 75 per cent of the value. (Health officer Wheeling, W. Va.)

The present Pennsylvania plan is quite satisfactory. The State to allow three-fourths of the appraised value of the animal. The animal to be killed under inspection. The meat sold, if passed by the inspector, the owner receiving not more than 5 cents per pound, dressed weight, provided the amount received from the State and the butcher does not exceed 90 per cent of the appraised value of the animal. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

Yes. Ninety per cent of actual value. (Health officer Scranton, Pa.)

*QUESTION 9.—In the absence of compulsory pasteurization, should tests other than the tuberculin test be required to safeguard against typhoid, diphtheria, and other deleterious germs?*

#### ANSWERS.

The tuberculin test only guards milk against infection with cattle tuberculosis. It would still be necessary to take other precautions against the infection of typhoid fever, diphtheria, and other communicable diseases. Very few infectious diseases besides tuberculosis are communicable to people from cows. The danger of other diseases arises from contamination through the water supply or by persons handling the milk. There should be an occasional inspection of premises, attendants, methods of handling milk, etc., and an examination of the water supply. The families of those handling the milk should also be subjected to examination to guard against the spread of contagious diseases, and there should also be a requirement of compulsory notification of the health officer on the appearance of any contagious disease among attendants or their families. The score-card system of dairy inspection should be used. (Chief Bureau of Animal Industry.)

The sense of the question is not clear. Cows are not subject to typhoid fever and diphtheria. (Surgeon General U. S. Army.)

It is not practicable to apply other tests effectively. (Surgeon General U. S. Navy.)

In the absence of compulsory pasteurization, thorough inspection should be made, both of the dairy and those having to do with the handling of the milk, to prevent its contamination with the infection of typhoid fever, diphtheria, and scarlet fever. (Surgeon General Public Health and Marine-Hospital Service.)

General hygienic rules; examination of feces before return of typhoid convalescents; inspection of wells; and report of all suspected communicable diseases. (Dr. William H. Park, New York, N. Y.)

The tuberculin test, without efficient pasteurization or other sanitary precautions, would not be a sufficient safeguard. (Dr. Henry L. Coit, Newark, N. J.)

Yes; low bacterial count and clean conditions at dairy and healthy employees. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

There are no practical tests. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

Yes. (Health officer Baltimore, Md.)

No; there is no practical test of dairy cows for typhoid or diphtheria. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

None are practical under existing conditions. (Health officer Cleveland, Ohio.)

Using the word "test" in the sense of activities, I should answer: Enforcement of dairy regulations reenforced by laboratory findings. (Health officer Columbus, Ohio.)

Rigid inspection. (Health officer Detroit, Mich.)

Typhoid fever, diphtheria, scarlet fever are not safeguarded by any test applied to cattle, but the source of distribution is to be found and guarded in personnel of those handling the milk. (State board of health, Florida.)

No; competent dairy inspection and a dairy register of infectious diseases. (Health officer Jacksonville, Fla.)

Do not think so; latter produced by contact. (Health officer Kansas City, Mo.)

Don't understand this question. How would you test? For instance, a cow does not have typhoid. (Health officer Lynchburg, Va.)

I am not aware of any tests that could be used in actual practice. (Health officer Montclair, N. J.)

Tuberculin test indicates tuberculosis; does not affect typhoid, diphtheria, or scarlet fever. (Health officer Portland, Oreg.)

See inclosures. [Appendix G.] (Health officer Providence, R. I.)

No other tests possible that I know of. Competent inspection and insistence of rule [Appendix G] and immediate study of all reported cases of these diseases (with reference to milk included) accomplish a great deal. (Health officer Richmond, Va.)

No; the determination of outbreaks of milk-borne typhoid and diphtheria can be determined in other ways. (Health officer Rochester, N. Y.)

No; I think not. I believe inspection by our sanitary and medical department covers this feature fully, at least in this city. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Only such tests as carefully-organized inspection of dairies supplemented by good laboratory work should give. (Health officer Topeka, Kans.)

Very strict inspection would be necessary, and experience shows that to be often inefficient. (Straus Laboratory, Washington, D. C.)

A thorough physical test should be maintained. (John Thomas, Ednor, Md., president Milk Producers' Association.)

Bacteriologists say the discovery of disease germs is speculative. Pasteurization would not make it any safer. (Sharon Dairy, District of Columbia.)

There are no tests applicable in cattle for typhoid or diphtheria, as cattle do not suffer from true or pseudo forms of typhoid or diphtheria, these diseases being of human type. The only safeguard in cases of this nature is proper and frequent sanitary inspection of all dairies and their surroundings, and scientific sanitary handling of the milk from cow to consumer. We pay the dairyman for his milk as if he delivered it, so as to remove any incentive to deliver milk while any person on his farm is ill with a contagious disease. (Borden's Condensed Milk Co., New York, N. Y.)

I know of no tests for the different germs of disease that it would be practical to apply. (Walker-Gordon Laboratory, Washington, D. C.)

Cleanliness. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I believe that constant inspection should be maintained, including examination of farms, water supplies, cows, barns, utensils, and milk itself. (Dr. S. C. Prescott, Boston, Mass.)

No. Have good sanitary inspection at dairies. (Health officer Los Angeles, Cal.)

No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Yes; if it can be done practically. (Health officer San Francisco, Cal.)

I think that strict rules regulating the handling of milk from the time it is milked until it reaches the consumer, and sufficient inspection to see that the rules are enforced, would accomplish more than any test. (Health officer St. Joseph, Mo.)

No person with a contagious disease should be allowed to handle milk at any time. (Health officer Wheeling, W. Va.)

I know of no test that would prove beneficial except a thorough system of milk inspection. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

QUESTION 10.—*Assuming that the tuberculin test is indicative only of tuberculous conditions, are there any other tests which should be applied for the detection of typhoid, diphtheria, scarlet fever, or other germs?*

## ANSWERS.

The tuberculin test only guards milk against infection with cattle tuberculosis. It would still be necessary to take other precautions against the infection of typhoid fever, diphtheria, and other communicable diseases. Very few infectious diseases besides tuberculosis are communicable to people from cows. The danger of other diseases arises from contamination through the water supply or by persons handling the milk. There should be an occasional inspection of premises, attendants, methods of handling milk, etc., and an examination of the water supply. The families of those handling the milk should also be subjected to examination to guard against the spread of contagious diseases, and there should also be a requirement of compulsory notification of the health officer on the appearance of any contagious disease among attendants or their families. The score-card system of dairy inspection should be used. (Chief Bureau of Animal Industry.)

Meaning of question not clear. Cows are not subject to typhoid fever and diphtheria. (Surgeon General U. S. Army.)

There are no tests that could be applied for the certain detection of typhoid, diphtheria, and scarlet fever germs. (Surgeon General U. S. Navy.)

The infection of typhoid fever, diphtheria, and scarlet fever does not come from the cow itself, but from those who milk the cow and handle the milk. Hence, provision against these infections should be made by inspection of the personnel of the dairy. (Surgeon General Public Health and Marine-Hospital Service.)

None worth while. Number of bacteria and presence of large numbers of colon bacilli of some value as indicating general conditions. (Dr. William H. Park, New York, N. Y.)

Dairy hygiene with respect to typhoid, diphtheria, and scarlet fever carriers is the only efficient means of safeguarding the public against these infectious diseases. (Dr. Henry L. Coit, Newark, N. J.)

Yes; low bacterial count and clean conditions at dairy and healthy employees. (Dr. R. G. Freeman, New York, N. Y.)

Inspection of premises and operatives at frequent intervals, cultures from throats of operatives, and numerical examination of milk, with microscopic examination of sediment, will go far to protect against other diseases. (Dr. M. P. Ravenel, Madison, Wis.)

There are no practical tests. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

The supervision of competent inspectors about the only safeguard. (Health officer Baltimore, Md.)

There is not, so far as my knowledge goes. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

None which are practical. (Health officer Cleveland, Ohio.)

Like No. 9, this question is vague; there is little or no question in the efficiency of the tubercular test. There is no like test for the detection of typhoid, diphtheria, etc. Besides, it is unnecessary to test for these diseases as they are not subject to them. (Health officer Columbus, Ohio.)

Not specific. (Health officer Detroit, Mich.)

No. (Health board State of Florida.)

Culture tests, plating, etc. (Health officer Jacksonville, Fla.)

Not to cow. This calls for a bacterial examination of milk which would give evidence of germs. (Health officer Kansas City, Mo.)

Not that I ever heard of. (Health officer Lynchburg, Va.)

Nothing practical to my knowledge. (Health officer Montclair, N. J.)

None to my knowledge with reference to cows. The milk should be safeguarded in other ways. (Health officer Portland, Oreg.)

Standards of cleanliness of milk should be established, foreign substances should be prohibited, viz, filth, bacteria in excessive numbers, and proper temperature standards should be provided. (Health officer Providence, R. I.)

No other tests possible that I know of. Competent inspection and insistence of rules and immediate study of all reported cases of these diseases (with reference to milk included) accomplish a great deal. (Health officer Richmond, Va.)

None at present known. (Health officer Rochester, N. Y.)

At this stage of bacteriological science efficiency and rapidity, examination of the home where milk is produced and of those handling is the best method. In five years there will be no excuse for the existence of diphtheria and a bad excuse for the existence of scarlet fever. Both have been practically banished from this city. Typhoid fever is at very low ebb also. (Health officer Seattle, Wash.)

Careful, competent investigation of all cases. (Health officer Syracuse, N. Y.)

Only such tests as a carefully organized inspection of dairies supplemented by good laboratory work should give. (Health officer Topeka, Kans.)

Not to my knowledge. (Sharon Dairy, Washington, D. C.)

As cattle do not suffer from typhoid, diphtheria, or scarlet fever, a more positive safeguard would be in all cases where there was reason to suspect that any of these diseases existed at a dairy whose product was regularly put on the market to make a reaction test from blood of the person suspected as having one of these diseases, either of typhoid or diphtheria, and who was connected with the dairy, by use of Widal's serum test for typhoid and the isolation of Klebs-Loeffler bacillus for diphtheria. As to scarlet fever, it would have to be detected on presentation of clinical symptoms of the disease in the individual. These additional safeguards are sometimes resorted to as a protection against the transmission of human diseases through milk. (Borden's Condensed Milk Co., New York, N. Y.)

I know of no tests for the different germs of disease that it would be practical to make. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

It is my belief that by suitable educational campaign the producers can be brought to feel their responsibility in part at least, so that they will report cases as above. Examination of the milk for intestinal organisms will materially assist in this work. I know of no applicable method to cover all the question as asked. (Dr. S. C. Prescott, Boston, Mass.)

No. (Health officer Los Angeles, Cal.)

Proper pasteurization is the only practical test. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Only where suspected contamination. Then typhoid or diphtheria may be found. With typhoid in milk, very difficult. (Health officer San Francisco, Cal.)

I know of no test that would prove beneficial except a thorough system of milk inspection. (Dr. C. J. Marshall, University of Pennsylvania, Philadelphia, Pa.)

Bacteriological analysis. (Health officer Scranton, Pa.)

#### EXTRACT FROM ANSWERS OF BORDEN'S CONDENSED MILK CO.

The following conclusions are taken from the testimony of Dr. Theobald Smith, of the medical department of Harvard University, the man who first discovered that the bovine bacillus was different from the human bacillus, given in a case involving the propriety of the tuberculin test:

As a result of my special study, I would like to formulate the following conclusions as representing not only my own views, but those of a great body of scientific men on the question of the relation of milk to tuberculosis:

1. Bovine tuberculosis is not transmissible to man in the sense of being more than a relatively rare source of tuberculosis.

2. The bacillus of bovine tuberculosis has not yet been demonstrated to be the cause of pulmonary tuberculosis, true phthisis, or consumption.

3. A cow reacting toward tuberculin, but which shows clinically no signs of disease, and whose udder is unimpaired, is not to be regarded as a source of infection to man.

4. By a clinically sound cow I mean one free from swellings of bones, joints, lymph nodes, or other soft parts; from indurations of portions of the udder and

the giving off of milk physically changed; from repeated diarrhea and discharge from the vagina; from the repeated distension of the rumen with gas; from cough and physical signs of lung disease, these pointing to tuberculosis.

5. Unless tubercle bacilli be present in an article of food, be it milk or flesh, such an article of food can not in any sense be considered a source of tubercular infection.

6. There must be a tubercular lesion of the udder in order that milk may be contaminated with tubercle bacilli in sufficient numbers to be dangerous to man.

7. Even if a clinically sound cow shed tubercle bacilli in her feces, which is unlikely, the enforcement of proper rules governing cleanliness would eliminate infection from such an alleged source.

8. Tubercle bacilli can be discharged in feces only in advanced cases of the disease in which there are open foci in the lungs or in the throat or in the intestinal walls. Such cases would most likely be detected by clinical examination.

9. The elimination from dairies of all clinically diseased cows or cows showing upon careful physical examination by competent and conscientious veterinarians disease of the udder removes all danger of infection of which we can take cognizance under present conditions.

10. A careful periodical inspection of all dairies by competent veterinarians at proper intervals, with removal of cows affected, as stated under paragraph 9, is as ample a safeguard for the protection of the public health as we can look for for some years to come. The line of progress has been defined above.

11. Tuberculosis prevails in countries where dairy products are not used as extensively as in other countries.

12. New York, Boston, and other American cities, as well as British cities, are materially lowering their death rates from tuberculosis without such a drastic and premature ordinance as that under discussion, as the same has been explained to me.

13. There is at present no evidence that the bovine type of bacillus can be transferred and assume the human type in the human body.

14. The discharge of tubercle bacilli into the milk of cows may take place abundantly in udder tuberculosis. In a small proportion of manifestly tuberculous cows without evidence of udder disease it may take place at times in very small numbers.

15. The factor of bovine tuberculosis in the human malady is not of such importance that it should be permitted to imperil the proper execution of measures designed to relieve and cure the strictly human disease, or divert attention from it as the chief evil.

16. The digestive tract is not the exclusive or even predominating portal of entry for pulmonary phthisis. It is highly probable that most cases are due to inhalation or aspiration.

17. In infants the bacilli probably gain entrance through all portals more easily than later in life, and the disease becomes more easily generalized. There are no rational grounds for believing that latency in infancy plays any appreciable rôle in the disease of later decades, but ingestion probably does play a much more important part in infantile tuberculosis, owing to habits and susceptibility of this period of life, than has been granted heretofore.

18. In view of the unsatisfactory conditions which have followed a compulsory application of the tuberculin test, in the destruction of animals, attention has been diverted from tuberculin as a guide, and an effort has been made to eliminate only those animals which discharge tubercle bacilli.

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#### PASTEURIZATION.

QUESTION 1.—*At what temperature should pasteurization be accomplished?*

#### ANSWERS.

Pasteurization should be performed by heating the milk to not less than 140° F. for not less than 20 minutes and rapidly cooling it. For commercial operations it would perhaps be well to require either a slightly higher temperature (145° F.), or a little longer time (30 minutes) in order to be on the safe side. The so-called "flash" process of commercial pasteurization is not regarded as reliable. (Chief Bureau of Animal Industry.)

- Preferably at 150° F. for 20 minutes. (Surgeon General United States Army.)  
 At 60° C. (140° F.). (Surgeon General United States Navy.)  
 At 145° F. for 20 minutes. (Surgeon General Public Health and Marine-Hospital Service.)  
 Between 140° and 158° F.; 140° to 145° F. for 20 minutes approved. (Dr. William H. Park, New York, N. Y.)  
 At 140° F. for 40 minutes, 155° F. for 30 minutes, 167° F. for 20 minutes, or 190° for 1 minute, and immediately cooled to between 40° and 50° F. (Dr. Henry L. Coit, Newark, N. J.)  
 At 140° F. for 40 minutes. (Dr. R. G. Freeman, New York, N. Y.)  
 At 145° F. for 20 minutes. (Dr. M. P. Ravenel, Madison, Wis.)  
 At 145° F. for 20 minutes, or 150° F. for 15 minutes. (Dr. C. E. A. Winslow, New York, N. Y.)  
 At 150° F. (Health officer Ann Arbor, Mich.)  
 We have tried pasteurization in Atlanta, Ga., and have found it worse than bad. For a city of this size we do not think it should be considered. (Health officer, Atlanta, Ga.)  
 Not over 158° F. (Health officer Baltimore, Md.)  
 At 162° to 165° F. (Health officer Birmingham, Ala.)  
 At 60° C. (140° F.). (Health officer Bismarck, N. Dak.)  
 Under ideal conditions, should be retained at a temperature of 155° F. for one-half hour. (Health officer Cleveland, Ohio.)  
 See code, page 46. [Appendix G.] (Health officer Columbus, Ohio.)  
 At 140° to 145° F. for 20 minutes, not above 150° F. (Health officer Detroit, Mich.)  
 At 60° to 75° C. (140° to 167° F.) for 20 minutes. (State board of health, Florida.)  
 At 140° F. for 20 minutes. (Health officer Jacksonville, Fla.)  
 Holding the temperature of milk 20 minutes at a temperature of 150° to 160° F., not a mere flash as some plants do. (Health officer Kansas City, Mo.)  
 Only suspicious milk should be pasteurized. Pasteurization is done by dirty dairies because dirty milk will soon sour. It is best to have a clean dairy and not pasteurize. At 165° to 170° F. (Health officer Lynchburg, Va.)  
 Look up any authority on pasteurization. Our information is from these authorities rather than from experience. (Health officer Montclair, N. J.)  
 At 170° F. for 20 minutes. (Health officer Portland, Oreg.)  
 At 155° F. and kept at this temperature for 20 minutes. (Health officer Providence, R. I.)  
 Opinions differ greatly. (Health officer Richmond, Va.)  
 At 140° F. for 30 minutes. This does not injure your cream line. (Health officer Seattle, Wash.)  
 At 140° F. for 20 minutes. (Health officer Topeka, Kans.)  
 We are using 150° to 155° F. and holding the milk at that temperature for 20 minutes after it reaches it. (Straus Laboratory, Washington, D. C.)  
 Authorities differ. Some say 145° F. and others 212° F. in order to make the milk sterile. (Sharon Dairy, District of Columbia.)  
 Our Mr. Willman is the inventor of the pasteurizing process of heating milk continuously for 30 minutes at between 145° to 150° F. We have mentioned above that the Government is recommending this process, therefore we have nothing else to add. (Dairy Machinery & Construction Co., Derby, Conn.)  
 At 145° F. for 30 minutes. (Creamery Packing Manufacturing Co., Chicago, Ill.)  
 At 212° for 10 minutes or 145° for 1 hour. (Borden's Condensed Milk Co., New York, N. Y.)  
 I understand the temperature prescribed for so-called "perfect" pasteurization of 155° F. for 30 minutes. (Walker-Gordon Laboratory, Washington, D. C.)  
 At 165° to 170°. (V. C. Vaughan, Ann Arbor, Mich.)  
 At 155° to 165° F. (Dr. S. C. Prescott, Boston, Mass.)  
 At 145° for 20 minutes. (Health officer Los Angeles, Cal.)  
 At 140° from 30 minutes to 2 hours, and 30 minutes is considered sufficient. (J. M. Houston, White Cross Milk Co., Washington, D. C.)  
 From 60° to 70° C. (Health officer San Francisco, Cal.)  
 At not above 150° F. (Health officer St. Joseph, Mo.)  
 At 60° C. for 20 minutes. (Health officer Wheeling, W. Va.)  
 At 142° F. for 20 minutes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 Between 140° and 175° F. (Health officer Scranton, Pa.)

QUESTION 2.—*Is pasteurization commercially practicable?*

## ANSWERS.

Pasteurization is commercially practicable, but investigations made by the Bureau of Animal Industry show that it is not always reliable when left entirely to the dealers. Commercial pasteurization in order to be reliable should be under official supervision. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

Yes. (Surgeon General U. S. Navy.)

Yes. (Surgeon General Public Health and Marine-Hospital Service.)

Certainly. (Dr. William H. Park, New York, N. Y.)

Only when under official direction, with apparatus that is approved by the medical authorities and operated by officers who are intelligent, above the grade of the ordinary laborer or employee. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

Yes. (Dr. C. E. A. Winslow, New York, N. Y.)

Doubtful. (Health officer Ann Arbor, Mich.)

Yes. (Health officer Baltimore, Md.)

I do not think so. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Only for the larger dealers. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Yes; but not advisable. (Health officer Lynchburg, Va.)

Look up any authority on pasteurization. Our information is from these authorities rather than from experience. (Health officer Montclair, N. J.)

Could be made so. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Entirely practicable, but likely to be utterly inefficient. (Health officer Richmond, Va.)

No; it is a device for the purpose of permitting men to sell quantities of milk unfit for human consumption. (Health officer Rochester, N. Y.)

Doubtful. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

So considered by men who ought to know. (Straus Laboratory, Washington, D. C.)

No. (Sharon Dairy, Washington, D. C.)

Yes; with considerable modification of the present practice. (Borden's Condensed Milk Co., New York, N. Y.)

We have not had experience with pasteurization except as ordered by physicians in the prescription feeding of infants. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes. (Dr. S. C. Prescott, Boston, Mass.)

Yes. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

I do not think proper pasteurization very practical commercially. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

No. At least no method has been devised that is practicable. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes. (Health officer Scranton, Pa.)

QUESTION 3.—*What effect has pasteurization upon the nutritive and digestive qualities of milk?*

## ANSWERS.

Pasteurization at the temperature above recommended has little or no effect on the nutritive and digestive qualities of milk; certainly no deleterious results have ever been scientifically demonstrated. (Chief Bureau of Animal Industry.)

It has no injurious effect. (Surgeon General U. S. Army.)

It slightly alters the nutritive as well as digestive qualities of milk. (Surgeon General U. S. Navy.)

If properly performed there is no proof that it has any deleterious effect on the nutritive and digestive qualities of milk. (Surgeon General Public Health and Marine-Hospital Service.)

Very slight effect at 140° to 145°. (Dr. William H. Park, New York, N. Y.)

Efficient pasteurization at the temperatures indicated does not destroy the digestive enzymes or nutritive principles in milk. (Dr. Henry L. Coit, Newark, N. J.)

At above temperature (140° F. for 40 minutes) none. (Dr. R. G. Freeman, New York, N. Y.)

It is doubtful if any change is caused. Some individuals do not thrive on pasteurized milk, but same is true of raw milk. (Dr. M. P. Ravenel, Madison, Wis.)

No harmful effect whatever if done below 155°. (Dr. C. E. A. Winslow, New York, N. Y.)

Detrimental. (Health officer Ann Arbor, Mich.)

I think it has no effect. (Health officer Baltimore, Md.)

There is much difference of opinion on this subject, some authorities claiming that it makes milk harder to digest, especially for infants and young children. (Health officer Birmingham, Ala.)

Less nutrition and harder to digest. (Health officer Bismarck, N. Dak.)

Probably none if properly done. (Health officer Cleveland, Ohio.)

Mooted question. (Health officer Columbus, Ohio.)

Practically none. (Health officer Detroit, Mich.)

None if milk is not heated over 140° F. (Health officer Jacksonville, Fla.)

Has not been definitely decided. (Health officer Kansas City, Mo.)

The effect on digestibility is bad. (Health officer Lynchburg, Va.)

Look up any authority on pasteurization. Our information is from these authorities rather than from experience. (Health officer Montclair, N. J.)

So slight that amounts to nothing. (Health officer Providence, R. I.)

In itself, properly conducted, pasteurization probably has no effect on either. Commercial pasteurization, however, may affect both and it also encourages neglect of the care necessary to provide wholesome, safe milk. (Health officer Richmond, Va.)

Probably slightly retards digestion. (Health officer Rochester, N. Y.)

No one knows, so far as my knowledge goes. Opinions differ, although I believe the concensus of opinion is that it is slightly harder for infants to digest. One man says one thing and another another. (Health officer Seattle, Wash.)

The vitality of milk is destroyed. (Health officer Syracuse, N. Y.)

None. (Health officer Topeka, Kans.)

None. (Straus Laboratory, Washington, D. C.)

It destroys the two most valuable nutritive qualities in the milk, namely, albumen and lactic acid. (Sharon Dairy, District of Columbia.)

From my experience with my own children, I never found that raw milk agrees better with them than pasteurized milk. (Dairy Machinery & Construction Co., Derby, Conn.)

If properly pasteurized at 145° F., there would be no difference. (Creamery Package Manufacturing Co., Chicago, Ill.)

Do not think that enough data has been collected to give us any positive data in regard to the nutritive or digestive value of milk after pasteurization compared with before, authorities disagreeing on this point. (Borden's Condensed Milk Co., New York, N. Y.)

I am told by a number of competent physicians that pasteurization destroys the self-digesting ferments or enzymes, and diminishes the nutritive value of milk. (Walker-Gorden Laboratory, Washington, D. C.)

Slightly diminishes it. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

A much debated question. Apparently it is a question of the individual. (Dr. S. C. Prescott, Boston, Mass.)

Very little effect. (Health officer Los Angeles, Cal.)

If carried on at low temperatures, no effect. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Decreases same. (Health officer San Francisco, Cal.)

These are very important questions, and can hardly be answered in the space you allow. (Health officer Wheeling, W. Va.)

No definite answer can be given to this question. Clinical evidence in the form of nutritional diseases, more especially infantile scurvy, suggests it has a detrimental effect upon the nutritive value. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

None. (Health officer Scranton, Pa.)

QUESTION 4.—*What effect has Pasteurization upon the beneficial and prejudicial germs in milk?*

ANSWERS.

Pasteurization at the temperatures above recommended (140° F., 20 minutes, to 145° F., 30 minutes), while destroying most, if not all, of the pathogenic bacteria, will not destroy all of the lactic-acid bacteria; hence milk so pasteurized will sour normally. While certain germs are considered beneficial in butter making and cheese making and in the production of ripened or fermented milks, they can not be regarded as beneficial in sweet milk for ordinary use. The advantage of destroying injurious germs would greatly outweigh any possible loss from the destruction of any germs that might be considered harmless. (Chief Bureau of Animal Industry.)

It destroys all germs which do not multiply by spores. (Surgeon General U. S. Army.)

It destroys all but spore bearers. (Surgeon General U. S. Navy.)

Pasteurization, if performed as stated above (145° F. for 20 minutes), destroys pathogenic bacteria and does not destroy the ferments. (Surgeon General Public Health and Marine-Hospital Service.)

Kills all alike that are not in spore forms. (Dr. William H. Park, New York, N. Y.)

Efficient pasteurization destroys all ordinary pathogenic bacteria and also most of the other contaminating germs. (Dr. Henry L. Coit, Newark, N. J.)

Destroys most of the germs. (Dr. R. G. Freeman, New York, N. Y.)

Doubtful whether there are any germs which are beneficial. Prejudicial germs are killed, except spore formers. (Dr. M. P. Ravenel, Madison, Wis.)

Destroys large proportion of all germs and all pathogenic likely to be present. (Dr. C. E. A. Winslow, New York, N. Y.)

Equal. (Health officer Ann Arbor, Mich.)

Bacterial organisms are destroyed, but not all the beneficial germs. (Health officer Baltimore, Md.)

It has practically the same effect on all germs present in milk, kills them, except certain spore-bearing germs. (Health officer Birmingham, Ala.)

Destroys them. (Health officer Bismarck, N. Dak.)

Retards their growth or destroys them, depending upon the degree of efficiency. (Health officer Cleveland, Ohio.)

Friendly germs are more easily destroyed than prejudicial germs. (Health officer Columbus, Ohio.)

Destroys all but spore bearers. (Health officer Detroit, Mich.)

It kills them. (State Board of Health, Florida.)

Destroys all nonsporing organisms. (Health officer Jacksonville, Fla.)

Retards the development of germs. (Health officer Kansas City, Mo.)

Done correctly; typhoid germs are killed and most others, probably. It is seldom done properly; uniformly. (Health officer Lynchburg, Va.)

Look up any authority on pasteurization. Our information is from these authorities rather than from experience. (Health officer Montclair, N. J.)

If sufficient temperature, prevents growth. (Health officer Portland, Oreg.)

Will kill all tuberculosis, diphtheria, typhoid, and most disease germs. (Health officer Providence, R. I.)

There are no beneficial germs in good fresh milk. Lactic acid bacteria are beneficial in a negative way, as they sour milk and thus show it is old. Lactic acid bacteria are easily killed by pasteurization and thus this valuable sign (souring) may be done away with. Proper pasteurization should kill most prejudicial germs. (Health officer Richmond, Va.)

Retards the growth or kills the first and does not interfere with the other, so as to give the absolute protection claimed. (Health officer Rochester, N. Y.)

It destroys the beneficial germs, as it does largely the prejudicial. But the prejudicial germs come to the front and multiply with such rapidity that after a certain length of time this milk becomes absolutely dangerous. It is probably a wise makeshift, but never to take the place of good, clean, natural milk. (Health officer Seattle, Wash.)

Destroys the beneficial germs. (Health officer Syracuse, N. Y.)

Destruction. (Health officer Topeka, Kans.)

Pasteurization kills most of the germs. The temperature given above (150° F. to 155°, 20 minutes) destroys all disease germs that are found in milk. (Straus Laboratory, Washington, D. C.)

It destroys the beneficial and does not kill the prejudicial. (Sharon Dairy, District of Columbia.)

Pasteurization as a rule kills off a certain form of pathogenic bacteria first. Then it attacks the lactic or so-called beneficial bacteria, and lastly the putrefactive organisms. This is particularly so when such putrefactive organisms are embedded or inclosed in excrement or some form of foreign matter where the heat does not readily penetrate and where to a great extent they are protected. (Borden's Condensed Milk Co., New York, N. Y.)

Pasteurization does not destroy spores, but does destroy practically all of the lactic ferments which are credited by many authorities with holding in check many of the prejudicial germs, including those of decomposition. (Walker-Gordon Laboratory, Washington, D. C.)

Kills all alike. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Real pasteurization affects all in about the same degree. Commercial pasteurization is noninjurious to certain harmful types. (Dr. S. C. Prescott, Boston, Mass.)

Destroys pathogenic germs and majority of others. (Health officer Los Angeles, Cal.)

If the milk is bad to begin with, poor pasteurization may kill the beneficial germs, and as these keep the prejudicial germs from growing the prejudicial germs grow unrestricted, and the milk is worse than raw milk. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Deleterious. (Health officer San Francisco, Cal.)

It destroys the beneficial and some of the prejudicial. (Health officer St. Joseph, Mo.)

These are very important questions and can hardly be answered in the space you allow. (Health officer Wheeling, W. Va.)

We do not admit that milk contains beneficial germs. Pasteurization, if properly carried out, will destroy all so-called pathogenic organisms. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

It destroys typhoid fever bacteria; also destroys the virulence of tubercle bacillus. (Health officer Scranton, Pa.)

QUESTION 5.—*Does pasteurization tend to preserve milk?*

ANSWERS.

Yes. (Chief Bureau of Animal Industry.)

It will for a limited period. (Surgeon General U. S. Army.)

Only to the extent that it renders the milk temporarily sterile. (Surgeon General U. S. Navy.)

Pasteurization is not intended to preserve milk, but to destroy pathogenic bacteria contained in it. (Surgeon General Public Health and Marine-Hospital Service.)

It does. (Dr. William H. Park, New York, N. Y.)

Pasteurization does not preserve milk without efficient and constant refrigeration. (Dr. Henry L. Coit, Newark, N. J.)

Yes; especially if done in the container in which it is kept. (Dr. R. G. Freeman, New York, N. Y.)

Yes; but the milk requires just as careful handling as before pasteurization. (Dr. M. P. Ravenel, Madison, Wis.)

It does. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

To a slight extent. (Health officer Baltimore, Md.)

Yes; for a given length of time. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Yes. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Till reinfected. After that it deteriorates worse than raw milk. (State board of health, Florida.)

Yes; if properly done. (Health officer Jacksonville, Fla.)

To a certain extent. It tends to retard growth of germs if promptly cooled afterwards and so maintained. (Health officer Kansas City, Mo.)

Yes. (Health officer Lynchburg, Va.)

Look up any authority on pasteurization. Our information is from these authorities rather than from experience. (Health officer Montclair, N. J.)

Yes. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Yes. (Health officer Richmond, Va.)

Yes, unfit milk. (Health officer Rochester, N. Y.)

It will stay sweet for a greater length of time than if it had not been pasteurized. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Yes; by destroying germs in the milk the process of souring is retarded. (Straus Laboratory, Washington, D. C.)

Yes. (Sharon Dairy, District of Columbia.)

Certainly, as the lactic acid germs are destroyed. (Creamery Package Manufacturing Co., Chicago, Ill.)

Pasteurization preserves milk for a certain length of time, and if it is properly cared for it will keep a few weeks. The hospitals of the Panama Canal are supplied with perfectly pasteurized milk that runs through one of my machines at the Sheffield Farms, Slawson-Decker Co., of New York City, and this will give evidence enough that such pasteurized milk naturally has to keep, because without this it could not be shipped from New York to Panama and arrive there in perfect condition. (Dairy Machinery & Construction Co., Derby, Conn.)

Only in so far as it renders the bacteria inactive, and pasteurized milk needs to be kept fully as cold, if not colder, than unpasteurized milk, unless pasteurization has been carried to complete sterilization. (Borden's Condensed Milk Co., New York, N. Y.)

Yes, against souring, but not necessarily against what may be much more objectionable organisms. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Temporarily, yes; i. e., it postpones souring, and, to a less degree, putrefaction. (Dr. S. C. Prescott, Boston, Mass.)

Yes, if properly handled afterwards. (Health officer Los Angeles, Cal.)

Yes; properly pasteurized milk will keep at least twice as long. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Very little. (Health officer San Francisco, Cal.)

As far as natural souring is concerned, yes. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Not in our opinion. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes. (Health officer Scranton, Pa.)

**QUESTION 6.—Do harmful germs multiply as rapidly in pasteurized as in raw milk?**

#### ANSWERS.

Yes. Experiments have shown that there is practically no difference in the multiplication of germs in pasteurized milk and in clean raw milk of approximately the same bacterial content and kept under similar conditions. While the rate of multiplication may be more rapid in pasteurized milk than in raw milk with a much higher bacterial content, this is because of the low number of bacteria in the pasteurized milk at the beginning of the test, so that the ratio of multiplication is much greater as compared with the raw milk in which the number of bacteria is already enormous. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

At least as rapidly. (Surgeon General U. S. Navy.)

I am unable to give data on this. (Surgeon General Public Health and Marine-Hospital Service.)

About the same. (Dr. William H. Park, New York, N. Y.)

More rapidly. (Dr. Henry L. Coit, Newark, N. J.)

Probably. (Dr. R. G. Freeman, New York, N. Y.)

Yes; perhaps more so. (Dr. M. P. Ravenel, Madison, Wis.)

Yes. (C. E. A. Winslow, New York, N. Y.)

Under similar conditions. (Health officer Ann Arbor, Mich.)

I do not know; it is said that they do. (Health officer Baltimore, Md.)

It is my opinion that they do in case that the milk should receive a reinfec- tion. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

No. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

More rapidly in pasteurized milk, as raw milk has some germicidal prop- erties. (Health officer Jacksonville, Fla.)

If milk remains at body temperature, multiply more so in raw milk. Milk is a perfect medium for bacterial growth. (Health officer Kansas City, Mo.)

Yes; I believe so. (Health officer Lynchburg, Va.)

Look up any authority on pasteurization. Our information is from these authorities rather than from experience. (Health officer Montclair, N. J.)

Yes; but are delayed for a time by pasteurization. (Health officer Port- land, Oreg.)

If dairies kept clean, no. (Health officer Providence, R. I.)

More rapidly as a rule. (Health officer Richmond, Va.)

More so. (Health officer Rochester, N. Y.)

Much faster, in my opinion, after the milk is 48 hours old. (Health officer Seattle, Wash.)

Theoretically, yes. (Health officer Syracuse, N. Y.)

More so, especially if pasteurization be at all inefficiently done. (Health officer Topeka, Kans.)

Yes; if given a chance to get in after pasteurization. (Straus Laboratory, Washington, D. C.)

Yes; faster. Raw milk has germicidal properties. (Sharon Dairy, District of Columbia.)

Under advantageous conditions certain germs will multiply much more rapidly in pasteurized milk than in raw milk, due to the fact that in raw milk when it has reached a certain acidity certain forms will entirely cease to multiply, and most of the increase is due to harmless bacteria. This statement is made on the average bacterial content as regards variety of species and does not apply to special cases in which the harmful germs multiply much more rapidly than the ordinary lactic. The latter case, however, being rare, can almost be disregarded. (Borden's Condensed Milk Co., New York, N. Y.)

A number of authorities claim more rapidly, owing to the absence of lactic acid forming bacilli which destroy many of the other organisms. (Walker-Gordon Laboratory, Washington, D. C.)

Probably more rapidly. (Dr. S. C. Prescott, Boston, Mass.)

Yes. (Health officer Los Angeles, Cal.)

Yes; more so unless the pasteurization is proper and the milk produced properly at the farm. (J. M. Houston, White Cross Milk Co., Washing- ton, D. C.)

Yes. (Health officer San Francisco, Cal.)

Much more rapidly. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Probably, yes; this depends to some extent upon the degree of heat. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

No. (Health officer Scranton, Pa.)

QUESTION 7.—*Are pasteurizing machines controlled, so far as you know, by a monopoly?*

#### ANSWERS.

No; there are eight or ten pasteurizing machines on the market, and so far as the department knows they are independent. Certainly there is every appearance of strong competition in the sale of the different makes. (Chief Bureau of Animal Industry.)

Not that I am aware. (Surgeon General U. S. Army.)

None that we know of. (Surgeon General U. S. Navy.)

I have no knowledge of any monopoly of pasteurizing machines. (Surgeon General Public Health and Marine-Hospital Service.)

They are not. (Dr. William H. Park, New York, N. Y.)

Not to my knowledge. (Dr. Henry L. Coit, Newark, N. J.)

- Know nothing about this. (Dr. R. G. Freeman, New York, N. Y.)  
 No. (Dr. M. P. Ravenel, Madison, Wis.)  
 Not to my knowledge. (Dr. C. E. A. Winslow, New York, N. Y.)  
 I do not know. (Health officer Baltimore, Md.)  
 I do not know. (Health officer Birmingham, Ala.)  
 Do not know. (Health officer Bismarck, N. Dak.)  
 No. (Health officer Cleveland, Ohio.)  
 Do not know. (Health officer Columbus, Ohio.)  
 No. (Health officer Detroit, Mich.)  
 No. (Health officer Jacksonville, Fla.)  
 Not in Kansas City. (Health officer Kansas City, Mo.)  
 Don't know. (Health officer Lynchburg, Va.)  
 I think not. (Health officer Portland, Oreg.)  
 No; anyone can pasteurize milk in original package, i. e., bottles. (Health officer Providence, R. I.)  
 I have never heard of such a monopoly. (Health officer Richmond, Va.)  
 I don't know. (Health officer Rochester, N. Y.)  
 We think so. (Health officer Seattle, Wash.)  
 Do not know. (Health officer Syracuse, N. Y.)  
 No. (Health officer Topeka, Kans.)  
 Not that I know of. (Straus Laboratory, Washington, D. C.)  
 Indications point that way. (Sharon Dairy, District of Columbia.)  
 There is absolutely no monopoly controlled by the sale or production of pasteurizing machinery. All we know is that the different manufacturers fight each other in the worst way for trade. (Dairy Machinery & Construction Co., Derby, Conn.)  
 No; manufacturers of these machines are all independent of each other and in keen competition. (Creamery Package Manufacturing Co., Chicago, Ill.)  
 So many forms of pasteurizing machines are known that it would be very hard to have any control over them, as on many of the machines patents have expired, and it would be very easy for any manufacturing company to start manufacturing them, or dealer to manufacture his own. (Borden's Condensed Milk Co., New York, N. Y.)  
 Not so far as I know. (Walker-Gordon Laboratory, Washington, D. C.)  
 I do not know what "arrangements" exist between the different manufacturers. (Dr. S. C. Prescott, Boston, Mass.)  
 I do not know. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 Don't know. (Health officer Los Angeles, Cal.)  
 No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)  
 I do not know. (Health officer Wheeling, W. Va.)  
 Unable to answer. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 I don't know. (Health officer Scranton, Pa.)

QUESTION 8.—*Is a municipal pasteurization plant (or plants) in your judgment practicable and desirable?*

ANSWERS.

Yes. Dealers doing a large business and having proper equipment should be allowed to continue pasteurization at their own plants, but under official supervision. There should be a central municipal plant or plants at which the milk of all other dealers should be required to be pasteurized. Such a plan would have the advantage of bringing all milk under official supervision. (Chief Bureau of Animal Industry.)

As to practicability, yes. As to desirability, I do not know. (Surgeon General U. S. Army.)

Yes. (Surgeon General U. S. Navy.)

In my opinion, where thorough official supervision of private pasteurizing plants is not practicable, municipal plants should take their place. (Surgeon General Public Health and Marine-Hospital Service.)

I believe in strict supervision and control, but not operation. (Dr. William H. Park, New York, N. Y.)

Municipal pasteurization is impracticable and undesirable unless every quart of milk brought to a community is efficiently pasteurized at or near the source of production and properly refrigerated. This has not been accomplished thus far. (Dr. Henry L. Coit, Newark, N. J.)

Absolutely not. We want clean raw milk. The pasteurization can be done better in the home. (Dr. R. G. Freeman, New York, N. Y.)

Yes. If not municipal, strict and abundant inspection is necessary. (Dr. M. P. Ravenel, Madison, Wis.)

Yes, unless commercial plants are carefully supervised. (Dr. C. E. A. Winslow, New York, N. Y.)

No. (Health officer Ann Arbor, Mich.)

No. (Health officer Baltimore, Md.)

I have not given this subject enough thought to give a definite answer. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

I am not prepared to say as yet. (Health officer Cleveland, Ohio.)

It is desirable, but its practicability is problematic. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Not half so desirable as clean milk. (State board of health, Florida.)

No. (Health officer Jacksonville, Fla.)

Yes, providing your department has enough health inspectors. (Health officer Kansas City, Mo.)

Might be practicable, but not desirable. (Health officer Lynchburg, Va.)

Yes, for large cities, but not for small communities. Always get a good raw milk if possible. (Health officer Montclair, N. J.)

I so recommended, but the newspapers would not stand for it. I think it practicable. (Health officer Portland, Ore.)

No. (Health officer Providence, R. I.)

It furnishes, perhaps, the only means of securing efficient pasteurization of entire milk supply, if such is deemed necessary. Municipal inspection is next best thing, where all milk must be pasteurized. (Health officer Richmond, Va.)

Some day they may be, but if that day ever comes pasteurization will be unnecessary. (Health officer Rochester, N. Y.)

Yes. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Yes. (Straus Laboratory, Washington, D. C.)

No. (Sharon Dairy, District of Columbia.)

We believe that in the United States it is better to have individual pasteurizing plants; that is, handled by individual concerns. (Dairy Machinery and Construction Co., Derby, Conn.)

No. We do not believe that a proposition of this sort can be successfully and economically handled by municipal government. (Creamery Packing Manufacturing Co., Chicago, Ill.)

No. Neither practicable nor desirable, and absolutely disadvantageous in every way. (Borden's Condensed Milk Co., New York, N. Y.)

I do not believe a municipal pasteurization plant would be either practical or desirable. (Walker-Gordon Laboratory, Washington, D. C.)

I am not sure. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes; if pasteurization is to be made compulsory. (Health officer Los Angeles, Cal.)

No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

It would be desirable where clean milk is unobtainable, but I do not favor pasteurization of clean milk under any conditions. As to whether it would be practical or not, I do not know. (Health officer St. Joseph, Mo.)

They should at least be under the control and regulation of the city. (Health officer Wheeling, W. Va.)

Not unless there is developed some new method more constant in its results than those at present used. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes. (Health officer Scranton, Pa.)

QUESTION 9.—*Should the plant (or plants) be located in the city or on the farm?*

#### ANSWERS.

In order to have the pasteurization properly supervised the plant should be located in the city. (Chief Bureau of Animal Industry.)

It would be difficult to supervise pasteurization at farms. (Surgeon General U. S. Army.)

In the city. (Surgeon General U. S. Navy.)

The location of the plant will depend on the city served, but it should be central. (Surgeon General Public Health and Marine-Hospital Service.)

In the city or near by, so that it can be distributed within a few hours after heating. (Dr. William H. Park, New York, N. Y.)

Between the farm and city. (Dr. Henry L. Coit, Newark, N. J.)

Never on the farm. (Dr. R. G. Freeman, New York, N. Y.)

Better located as near the source of supply as possible. (Dr. M. P. Ravenel, Madison, Wis.)

City. (Dr. C. E. A. Winslow, New York, N. Y.)

They are better located on the farm, but probably will be confined to the city, or a creamery in the country. (Health officer Baltimore, Md.)

On farm. (Health officer Bismarck, N. Dak.)

City. (Health officer Cleveland, Ohio.)

In the city. (Health officer Columbus, Ohio.)

City. (Health officer Detroit, Mich.)

It would be better, but not practical, on the farm. (Health officer Jacksonville, Fla.)

City. (Health officer Kansas City, Mo.)

City. (Health officer Lynchburg, Va.)

Depends on conditions. (Health officer Montclair, N. J.)

In the city. (Health officer Portland, Oreg.)

City. (Health officer Providence, R. I.)

A central plant in each neighborhood is the ideal thing if pasteurization must be done. (Health officer Richmond, Va.)

City; if to be practicable. (Health officer Seattle, Wash.)

In the city. (Health officer Syracuse, N. Y.)

In city. (Health officer Topeka, Kans.)

To save plants, in town. (Straus Laboratory, Washington, D. C.)

Neither. (Sharon Dairy, District of Columbia.)

That would depend entirely upon the local conditions, as to the time milk was received and time shipped. (Borden's Condensed Milk Co., New York, N. Y.)

While it would be more desirable to pasteurize milk as soon as possible after it is drawn from the cow, so much of the milk of commerce is produced on small farms where this work would not be properly performed, that it would seem more practical to have it done by the city dealers. (Walker-Gordon Laboratory, Washington, D. C.)

On the farm. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Will have to be central. (Health officer Los Angeles, Cal.)

The plants should be located in the country by the railroads where the work is done near the source of supply, and not in the city after the milk is 12 to 24 hours old. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Depends on environment. (Health officer San Francisco, Cal.)

It would be better if they were located on the farm, provided a competent official could be in charge of the work. (Health officer St. Joseph, Mo.)

Either place. Under proper regulations. (Health officer Wheeling, W. Va.)

If established, they should be as near the consumer as possible. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

City. (Health officer Scranton, Pa.)

QUESTION 10.—*Is it possible by scientific observation to ascertain definitely whether milk has been properly pasteurized or not?*

#### ANSWERS.

The bacterial count is a good index of the efficiency of the pasteurization. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

Yes. (Surgeon General U. S. Navy.)

No; except by a bacterial examination of the milk before and after pasteurization, which will show the consequent decrease in the number of bacteria. (Surgeon General Public Health and Marine-Hospital Service.)

Probably only by observation of the process, or bacterial counts before and after heating and bottling. (Dr. William H. Park, New York, N. Y.)

Not without expensive equipment of a laboratory and an expert investigator. The time necessary would defeat the object of the investigation, as the milk would have been already used. (Dr. Henry L. Coit, Newark, N. J.)

It is easy to ascertain whether it is as sterile as it should be after pasteurization. (Dr. R. G. Freeman, New York, N. Y.)

No. (Dr. M. P. Ravenel, Madison, Wis.)

Yes. (Dr. C. E. A. Winslow, New York, N. Y.)

I think so. (Health officer Baltimore, Md.)

Yes. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

Yes. (Health officer Cleveland, Ohio.)

Not unless heated to 180° and determined by Storch's method. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes; test for enzymes. (Health officer Jacksonville, Fla.)

Yes, if the relation of the component parts of milk stand as normal before pasteurization. (Health officer, Kansas City, Mo.)

Only with great difficulty, if at all. Impracticable. Bacteria count would be lowered by pasteurization. Storch's test shows when heated to 176° F. (Health officer Lynchburg, Va.)

Only by microscopical or bacterial examination. (Health officer Montclair, N. J.)

Time would tell, but this would not be practical. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

No absolute means so far as I know. If it is known that a given sample has been pasteurized and if the sample contains very few bacteria, it may be assumed that the pasteurization has been efficient. The best test is to compare bacterial counts before and after pasteurization. This would, of course, be impossible of application to a single sample. (Health officer Richmond, Va.)

I do not know. Several schemes have been proven failures. Dr. Evans of Chicago can give you data on this point if anybody can. He is the commissioner of health. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

I know of no way except the bacterial count. (Straus Laboratory, Washington, D. C.)

Not to my knowledge. (Sharon Dairy, District of Columbia.)

Yes. (Borden's Condensed Milk Co., New York, N. Y.)

It is possible, but the results could not be known in time to be of practical value as to any given shipment of milk. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes. (Dr. S. C. Prescott, Boston, Mass.)

Yes. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Not absolutely. (Health officer San Francisco, Cal.)

It is possible, but not very practical on a large scale. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Opinions differ as to this point. We know of no reliable method. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

QUESTION 11.—*Would pasteurization, if generally insisted upon, dispense with the necessity of the tuberculin test?*

#### ANSWERS.

While pasteurization is an efficient means of guarding against infection of milk, it should not be regarded as a substitute for other measures to eliminate disease. The tuberculin test has an important function in eradicating tuberculosis of animals for the economic benefit of the live-stock industry and for the conservation of the supply of milk. Tuberculosis reduces the yield of milk, and the unrestricted spread of this disease would in time seriously curtail production. It is important, therefore, in the interest of a plentiful supply of milk,

that the tuberculin test should be used judiciously to eradicate tuberculosis. (Chief Bureau of Animal Industry.)

No; because the eradication of bovine tuberculosis is a necessary sanitary measure. (Surgeon General U. S. Army.)

It would. (Surgeon General U. S. Navy.)

If properly performed pasteurization would remove the danger to consumers of milk, but would not prevent the spread of tuberculosis among herds. (Surgeon General Public Health and Marine-Hospital Service.)

It would, so far as human disease is concerned. (Dr. William H. Park, New York, N. Y.)

No; tuberculosis is the most insidious germ carried by milk. (Dr. Henry L. Coft, Newark, N. J.)

It would be a poor substitute. (Dr. R. G. Freeman, New York, N. Y.)

No; pasteurization should be always only a temporary measure. It can never take the place of clean, healthy milk entirely. (Dr. M. P. Ravenel, Madison, Wis.)

Yes. (Dr. C. E. A. Winslow, New York, N. Y.)

I think it is desirable to continue the tuberculin test. (Health officer Baltimore, Md.)

I do not think so. In order to prevent any danger from infection from bovine tuberculosis the tuberculin test should be applied to all dairy herds, even if pasteurization is compulsory. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

To a great degree. (Health officer Cleveland, Ohio.)

Pasteurization properly performed is a substitute. (Health officer Columbus, Ohio.)

Not altogether. (Health officer Detroit, Mich.)

No; diseased cattle should still be removed from the herds, and they can be detected only by the test. (This for economic reasons.) (State board of health, Florida.)

No. (Health officer Jacksonville, Fla.)

Question in which authorities differ. (Health officer Kansas City, Mo.)

Tuberculin test much superior for cows. Of course, tuberculous persons handling milk might distribute germs in milk from a pure herd. (Health officer Lynchburg, Va.)

It would kill the germs of tuberculosis, but would not remove the toxins. Milk from a diseased cow should not be used. (Health officer Montclair, N. J.)

If properly done so far as the milk is concerned; but you would have diseased meat on the market. (Health officer Portland, Oreg.)

No. (Health officer Providence, R. I.)

Admitting (which I do not) that general pasteurization is desirable and always efficiently done, it would. (Health officer Richmond, Va.)

No. (Health officer Rochester, N. Y.)

This is a big question; but would not be sufficient in my judgment. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Yes; as far only as infection by milk is concerned; but enforcement of tuberculin test would greatly reduce losses in hogs as well as danger to man. (Health officer Topeka, Kans.)

With the necessity, yes; but it would still be highly desirable. We believe in clean healthy milk pasteurized. (Straus Laboratory, Washington, D. C.)

Pasteurization would open the way for a dirty milk supply. (Sharon Dairy, District of Columbia.)

A reply to this question, we think, would depend entirely upon the final conclusions of scientific authorities as to the efficiency of the tuberculin test. It is our understanding at the present time there is a very wide difference of opinion on this point. So long as there is any question as to the efficiency of the tuberculin test, in our judgment all milk should be pasteurized. (Creamery Package Manufacturing Co., Chicago, Ill.)

In my own judgment the tuberculin test should be applied gradually to the various herds. Pasteurization will have to be used anyway, because scarlet fever, typhoid fever, etc., are much more important from a milk standpoint than tuberculosis. Every farmer should pasteurize all the milk that he feeds to his stock so that he does not infect the young animals with tuberculosis. Under the present conditions it is absolutely impossible to have all the herds

tested, because there are not veterinarians enough to do the testing in 25 years. (Dairy Machinery & Construction Co., Derby, Conn.)

Not recognizing the necessity of the tuberculin test, should say that ordinary care coupled with rigorous physical inspection by competent veterinarians would obviate any necessity of the test far better than any pasteurization. (Borden's Condensed Milk Co., New York, N. Y.)

If pasteurization could be perfectly accomplished, probably, yes; but the injurious effects on the milk would make this seem a questionable method of reaching the desired end. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

No. (Dr. S. C. Prescott, Boston, Mass.)

Yes; but only so far as milk is concerned. (Health officer Los Angeles, Cal.)

Yes; but the dealers should buy upon the scoring system, and the test might be a feature of the score, but optional now. The milk must be good before pasteurization. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

It would require more than any general insistence within my knowledge at the present time. (Health officer St. Joseph, Mo.)

Clean, raw milk from healthy cattle is more to be desired than any pasteurized milk. I hope, therefore, that pasteurization will not be generally insisted upon. (Health officer Wheeling, W. Va.)

No. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I think so. (Health officer Scranton, Pa.)

QUESTION 12.—*Would compulsory pasteurization obviate in any way the necessity for a prescribed bacterial content?*

#### ANSWERS

No; because the bacterial count would afford an indication of the efficiency of the pasteurization and how the milk has been handled and kept after pasteurization. The bacterial count is an important aid in bringing about sanitary conditions on dairy farms and should not be abandoned even though compulsory pasteurization were adopted. The bacterial test should be applied to milk before pasteurization, and milk should not be pasteurized if it is very bad, but be rejected entirely. (Chief Bureau of Animal Industry.)

No; because pasteurization does not make dirty milk clean and does not destroy the toxins which may develop in old milk. (Surgeon General U. S. Army.)

It would not. (Surgeon General U. S. Navy.)

In my opinion a prescribed bacterial count is an indispensable part of any regulations requiring compulsory pasteurization. Pasteurized milk is the only class of milk in which a definite bacterial standard can be set and enforced independent of the inspection service. It is an absolute index of the efficiency of the pasteurization and of the conditions under which the milk is kept after pasteurization. (Surgeon General Public Health and Marine-Hospital Service.)

It would lessen the need a little, but it would still be highly desirable, as a milk chemically altered by excessive bacterial growth will not be rendered wholesome for infants for drinking purposes by heating, even though it is much less dangerous. (Dr. William H. Park, New York, N. Y.)

No; the standards should be, first, certified milk; second, inspected milk; and milk pasturized at a low temperature. The first through a medical-milk commission, and the last two through a board of health. (Dr. Henry L. Coit, Newark, N. J.)

It would make it more necessary. Commercial pasteurized milk is usually recontaminated before it is disposed of. (Dr. R. G. Freeman, New York, N. Y.)

If proper inspection can be maintained, bacterial content may be disregarded. Bacterial content is one way of deciding on proper pasteurization, however. (Dr. M. P. Ravenel, Madison, Wis.)

Not at all; the milk must be kept as clean as possible before pasteurizing, and then pasteurized for complete safety, and then properly handled afterwards. (Dr. C. E. A. Winslow, New York, N. Y.)

No. (Health officer Ann Arbor, Mich.)

No; because sanitary conditions at the milk producers are more important, both with and without pasteurization. (Health officer Baltimore, Md.)

I do not think so. Strict methods in the production of milk should be employed and bacterial counts made to determine if the milk is produced and

handled in a sanitary manner. (Samples should be collected at the plant before pasteurization to determine this.) If the milk is not handled in an acceptable manner, which includes quick and efficient cooling and the maintaining of a low temperature, even though the pasteurization may be thorough and no bacteria found on examination taken from the discharge of the machine, it does not destroy the spore which will subsequently develop. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

No; as no check upon the efficiency of the pasteurization could be made without bacterial checks. (Health officer Cleveland, Ohio.)

No. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes; unless it should be resorted to as a method of checking the pasteurization. (State board of health, Florida.)

No. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

Pasteurization would destroy about 90 per cent of germs. (Health officer Lynchburg, Va.)

No. (Health officer Montclair, N. J.)

Yes; except for scientific purposes. (Health officer Portland, Oreg.)

No. (Health officer Providence, R. I.)

It would necessitate an entirely different bacterial standard. The necessity for bacterial standard would, however, in my opinion be all the greater. (Health officer Richmond, Va.)

No. (Health officer Rochester, N. Y.)

No. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Think the bacterial count would still be necessary to make sure of proper pasteurization. (Straus Laboratory, Washington, D. C.)

No. (Sharon Dairy, District of Columbia.)

It would be far more necessary for a low bacterial count in pasteurized milk than in raw milk, and the presence beyond a prescribed bacterial count in pasteurized milk would be the best evidence of imperfect pasteurization. (Borden's Condensed Milk Co., New York, N. Y.)

Compulsory pasteurization would, in my judgment, greatly increase the necessity for careful supervision of the bacterial content, so as to insure against the more dangerous organisms that might survive the pasteurization. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

It would not; but would make it possible to establish it at a lower level—say, 50,000 per cubic centimeter. (Dr. S. C. Prescott, Boston, Mass.)

No. (Health officer Los Angeles, Cal.)

Bacterial count should go with the pasteurization. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Not to much extent. (Health officer San Francisco, Cal.)

No; unless there is a distinction between pasteurized dirt and raw dirt. If the dirt is to be present anyway, it would probably be better to have it pasteurized. (Health officer St. Joseph, Mo.)

By no means; pasteurized milk may contain bacteria by the millions. (Health officer Wheeling, W. Va.)

No; we are of the opinion that the determination of a bacterial standard for pasteurized milk is extremely important, as well as a standard for the same milk before pasteurization. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

No. (Health officer Scranton, Pa.)

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#### BACTERIAL COUNT.

QUESTION 1.—*Is the bacterial count reliable and an indication of unsatisfactory conditions?*

#### ANSWERS.

The bacterial count is believed to be reliable. When the bacterial count of milk from a certain herd is habitually high, this is a reliable indication that the milk is being produced under insanitary conditions or handled in an insani-

tary way. A discussion of the bacteriological count will be found beginning on page 43 of Circular 153 of the Bureau of Animal Industry. (Chief Bureau of Animal Industry.)

The bacterial count is, generally speaking, a fair index of cleanliness in milk as in water. (Surgeon General U. S. Army.)

Yes; within certain limits. (Surgeon General U. S. Navy.)

The bacterial count is a reliable index of the care taken in the production and handling of milk. (Surgeon General Public Health and Marine-Hospital Service.)

Yes; a high count indicates either dirty, warmth, or long keeping. Perhaps one of these, or all, may be factors in any case. (Dr. William H. Park, New York, N. Y.)

Numerical findings of bacteria in milk are the only reliable index of cleanliness in the collections of milk. They were first proposed by the Medical Milk Commission of Essex County, N. J., in 1890, and carried out under its supervision with Dr. Pruden and Dr. R. G. Freeman, of New York. (Dr. Henry L. Coit, Newark, N. J.)

Yes; in general. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

It is. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

We think so. (Health officer Atlanta, Ga.)

I believe it is when milk from the same station from different producers are reported. (Health officer Baltimore, Md.)

While not reliable at all times, it does in most cases reveal whether conditions are satisfactory or otherwise. The three factors which contribute largely to high bacterial counts are: (1) Contamination of milk at times of being drawn, resulting from unclean and improper methods; (2) temperature; (3) age. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Not necessarily (answer only to latter part of question). (Health officer Burlington, Vt.)

In a general way it is indicative of degree of contamination, the method of cooling and storage, and the age of a given sample. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Not necessarily. (Health officer Detroit, Mich.)

It is the most reliable method at our disposal. (State board of health, Florida.)

Yes. (Health officer Jacksonville, Fla.)

Yes; it permits health department to go to source of trouble, which in many instances is at the farm, and compel cleanliness. (Health officer Kansas City, Mo.)

An excellent indication of the general sanitary conditions. Count should be high, say 500,000 c. c., or can not be enforced. (Health officer Lynchburg, Va.)

Yes; a high count is indicative of unsatisfactory conditions, either at the dairy or during handling and transportation. (Health officer Montclair, N. J.)

Yes; either in milking, handling, surroundings, as well as diseased cows. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

It never indicates actual number of bacteria present, but applied under standard conditions it gives thoroughly reliable comparative figures. It always indicates that something is wrong; either (1) dirty production, (2) failure to cool promptly and efficiently and to keep cold, or (3) keeping too long. (Health officer Richmond, Va.)

Within certain limitations; for instance, when icing from stable to retailer is enforced. Yes. (Health officer Rochester, N. Y.)

Yes. (Health officer Seattle, Wash.)

Only comparatively. (Health officer Syracuse, N. Y.)

Not necessarily so. (Health officer Topeka, Kans.)

Bacterial counts taken consecutively are an indication of the cleanliness and careful handling when low; of the opposite when high. But it is unfair to draw conclusions from one count, as accidents may happen. (Straus Laboratory, Washington, D. C.)

No. (Sharon Dairy, District of Columbia.)

The bacterial count is absolutely reliable if taken in accordance with prescribed precautions and with due exercise of care. The mere count in itself, however, does not show or denote the presence of deleterious organisms, but

simply gives the number of bacteria per cubic centimeter as an entirety. Yet, however, in experienced hands the growth of these colonies denotes to a great extent the species to which they belong, and in this way conditions can be checked up. (Borden's Condensed Milk Co., New York, N. Y.)

It is only reliable in that it shows whether or not care has been exercised in the handling of milk. As usually made, it does not give any indication of contagious disease. (Walker-Gordon Laboratory, Washington, D. C.)

I have used it constantly for six years and believe in it thoroughly. It is, or may be, if properly done, reliable and a direct means of estimating conditions. (Dr. S. C. Prescott, Boston, Mass.)

Yes; if age and temperature of milk is known. Does not denote point of contamination. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Yes; if standard be taken to 500,000. (Health officer San Francisco, Cal.)

Yes. (Health officer St. Joseph, Mo.)

Reliable enough. We have discovered unsatisfactory conditions by making inspections upon strength of high counts. (Health officer Wheeling, W. Va.)

We believe it reliable in the hands of the proper person and that it is an indication of unsatisfactory conditions. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I think bacterial count alone is reliable if low and if preservatives are ruled out. If it is high, I think of itself it should not condemn milk, but should lead to inspection of dairy and methods of handling. (Health officer Scranton, Pa.)

QUESTION 2.—*Do bacteriologists working independently arrive at approximately the same results in examining samples of a given milking?*

#### ANSWERS.

Bacteriologists working independently, but using uniform and standard methods, obtain fairly uniform results. (Chief Bureau of Animal Industry.)

Approximately; yes. (Surgeon General United States Army.)

Yes; under the same conditions. (Surgeon General United States Navy.)

Yes. (Surgeon General Public Health and Marine-Hospital Service.)

Yes. A variation of 10 or 20 per cent may be made, but this is no objection, as the differences between bad and good milk are so great. (Dr. William H. Park, New York, N. Y.)

They do. Methods are now standardized by the American Association of Medical Milk Commissions. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes; if their methods are standardized and the samples properly taken. (Dr. M. P. Ravenel, Madison, Wis.)

Within the limits of variation; yes. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes (Health officer Ann Arbor, Mich.)

Within reasonable limits. (Health officer Atlanta, Ga.)

I have no information. (Health officer Baltimore, Md.)

While there is considerable variation in the number of bacteria taken from the same sample, hence at least three samples should be examined in order to get a general average of the number of bacteria in a given sample. By following this rule bacteriologists working independently would obtain approximately the same results. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Yes. (Health officer Burlington, Vt.)

Have no personal observation on that point. (Health officer Cleveland, Ohio.)

Yes; providing the bacteriologists use the same methods. (Health officer Columbus, Ohio.)

Approximately. (Health officer Detroit, Mich.)

The range of variation is considerable, but the range of conditions is also considerable. The first two or three draws of milk contain a very much higher bacterial count than the later milking. (State board of health, Florida.)

Yes. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Experienced biologists do, provided they test the same sample under same conditions. (Health officer Lynchburg, Va.)

Yes, if the counts are made at the same temperatures, room, or incubator. The media and the temperature should always be stated in a bacteriological report. (Health officer Montclair, N. J.)

If honest, they do. (Health officer Portland, Oreg.)

Yes; if they employ standard methods of analysis and counts. (Health officer Providence, R. I.)

Yes; by use of standard methods. (Health officer Richmond, Va.)

Yes. (Health officer Rochester, N. Y.)

No. Those working for the State or city more nearly the same. Those working for a dairyman generally find lower counts than we. (Health officer Seattle, Wash.)

Probably not. (Health officer Syracuse, N. Y.)

No. (Health officer Topeka, Kans.)

Fairly so. At least, working on the same bottle, they will agree that the milk is good because of a low count, though the counts do not tally exactly. (Straus Laboratory, Washington, D. C.)

I am not prepared to answer. (Sharon Dairy, District of Columbia.)

The results of bacteriologists working with given methods are approximately the same. (Borden's Condensed Milk Co., New York, N. Y.)

In a general way; yes. It is unfortunate that a standard method of making bacteriological counts has not been established. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

If they use standard methods; yes. If each has his own method, results are likely to vary quite widely. (Dr. S. C. Prescott, Boston, Mass.)

Yes; when technique is identical. (Health officer Los Angeles, Cal.)

They should. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Yes. (Health officer San Francisco, Cal.)

I do not know from experience, but know of no reason why they should not, if proper precautions are used. (Health officer St. Joseph, Mo.)

I have no personal knowledge of this. (Health officer Wheeling, W. Va.)

Generally, yes; always provided the milk is carefully prepared and exactly the same methods pursued. Milk from the same milking, part of which is placed into a clean can and another into a dirty can, will naturally give different bacterial counts at the end of a few hours. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I have never checked this up with another man. (Health officer Scranton, Pa.)

QUESTION 3.—*Is it feasible to indicate the maximum number of bacteria allowable?*

#### ANSWERS.

Yes; provided the number is not made unreasonably low. (Chief Bureau of Animal Industry.)

Approximately; yes. (Surgeon General U. S. Army.)

It is, under given fixed conditions. (Surgeon General U. S. Navy.)

For pasteurized milk a maximum bacterial standard is indispensable, and probably more important than inspection. For other classes of milk a bacterial standard is only supplementary to other requirements, such as competent veterinary inspection and medical inspection of employees. The bacterial count is an index of the efficiency of the methods used for the production of a safe milk and is a check upon the efficiency of the inspection service. (Surgeon General Public Health and Marine-Hospital Service.)

It is as to an average, but not for an individual excess. Almost every one of the certified farms has at some time had a high count. (Dr. William H. Park, New York, N. Y.)

Perfectly so. The American Association of Medical Milk Commissions, at my suggestion, fixed the standard at 10,000 per cubic centimeter. (Dr. Henry L. Coit, Newark, N. J.)

Yes; but not always advisable. (Dr. R. G. Freeman, New York, N. Y.)

Yes. Discretion should be allowed to the bacteriologist, however. (Dr. M. P. Ravenel, Madison, Wis.)

Certainly. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

We think so. (Health officer Atlanta, Ga.)

No; I should use such information for our guidance of our inspectors only. (Health officer Baltimore, Md.)

Yes. (Health officer Birmingham, Ala.)

- Yes. (Health officer Bismarck, N. Dak.)  
 Perhaps of value, even if not enforceable. (Health officer Burlington, Vt.)  
 Not in my judgment. (Health officer Cleveland, Ohio.)  
 Yes. (Health officer Columbus, Ohio.)  
 Depending on legal backing. (Health officer Detroit, Mich.)  
 Yes. (State board of health, Florida.)  
 Yes. (Health officer Jacksonville, Fla.)  
 Yes. (Health officer Kansas City, Mo.)  
 I believe so. (Health officer Lynchburg, Va.)  
 Yes. (Health officer Montclair, N. J.)  
 I think a standard should be established and maintained. (Health officer Portland, Oreg.)  
 Yes. (Health officer Providence, R. I.)  
 Yes. (See rules, pages 6 and 7, marked "B.") [Appendix G.] (Health officer Richmond, Va.)  
 Not unless the law is really enforced; cleanliness and icing compulsory. (Health officer Rochester, N. Y.)  
 No. Because a low count may contain both pathological and harmless bacteria. In other words, a low count does not necessarily mean that the milk is not dangerous. (Health officer Seattle, Wash.)  
 No. (Health officer Topeka, Kans.)  
 Yes; when an average of counts are taken, but it would not be fair to prosecute for one count that went above the maximum fixed. (Straus Laboratory, Washington, D. C.)  
 No. (Sharon Dairy, District of Columbia.)  
 Yes. (Borden's Condensed Milk Co., New York, N. Y.)  
 It is certainly so in certified milk, and I believe could be practically applied to the milk of commerce. (Walker-Gordon Laboratory, Washington, D. C.)  
 Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 Yes. (Dr. S. C. Prescott, Boston, Mass.)  
 Yes. (Health officer Los Angeles, Cal.)  
 Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)  
 Yes. (Health officer San Francisco, Cal.)  
 I think it is. (Health officer St. Joseph, Mo.)  
 We have found it feasible. (Health officer Wheeling, W. Va.)  
 The difficulty rests in the fact that it is extremely difficult to know where to place the responsibility for high counts, inasmuch as a large percentage of the milk coming into our cities goes through the hands of the producer, the creamery, the transportation companies, and finally the dealer. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 I think it is feasible to put a limit as to the number of bacteria allowable, but before disbaring a dealer enough examination should be made to show that he is practically always over the count. (Health officer Scranton, Pa.)

QUESTION 4.—*What number, in your judgment, should be specified in this connection?*

#### ANSWERS.

In the recommendations of the conference appointed by the Commissioners of the District of Columbia in 1907 100,000 bacteria per cubic centimeter was given as a standard for inspected milk. This might be found too low a standard for raw milk under present conditions, but the maximum standard should not in any event be set higher than 500,000. (Chief Bureau of Animal Industry.)

I regard the classification of milk in Circular No. 114, August 14, 1910, Bureau of Animal Industry, as a fair scientific standard. [NOTE.—Ten thousand for "certified" milk and 100,000 for "inspected" milk.] (Surgeon General U. S. Army.)

One hundred thousand. (Surgeon General U. S. Navy.)

For certified milk, 10,000; for inspected milk, 100,000; for pasteurized milk a standard of 10,000 to 20,000 would appear to be reasonable. (Surgeon General Public Health and Marine-Hospital Service.)

This depends on the size of the town or city, for the longer the haul the poorer the bacterial quality of the milk. Certified milk should average under 10,000. Pasteurized under 50,000. In cities in winter the common milk under 100,000 and in summer under 500,000. (Dr. William H. Park, New York, N. Y.)

It is perfectly feasible to keep milk below 5,000 with the present knowledge of dairy hygiene, but 10,000 per cubic centimeter is a reasonable limit throughout the year. (Dr. Henry L. Coit, Newark, N. J.)

That must be a matter for each community to settle, depending on the cleanliness of the dairies. (Dr. R. G. Freeman, New York, N. Y.)

For a small city 100,000; perhaps 250,000 for Washington. (Dr. C. E. A. Winslow, New York, N. Y.)

Seventy-five thousand to 100,000 per cubic centimeter. (Health officer Ann Arbor, Mich.)

Not less than 100,000 per cubic centimeter. (Health officer Atlanta, Ga.)

Not yet determined. (Health officer Baltimore, Md.)

Five hundred thousand per cubic centimeter seems reasonable for general market milk. While for "certified" milk the standard should range from 10,000 to 15,000 per cubic centimeter. (Health officer Birmingham, Ala.)

One hundred thousand. (Health officer Burlington, Vt.)

Dependent entirely upon local conditions. (Health officer Cleveland, Ohio.)

Under new conditions, 500,000 count is all that is practical; with education of the dairyman and continual enforcement of dairy rules 200,000 or 100,000 should be attained. (Health officer Columbus, Ohio.)

By using cleanly methods in the handling of milk and by rapidly cooling it afterwards, it is practicable to produce and vend milk containing not more than 10,000 per cubic centimeter. Five to ten times this number is certainly not too exacting. (State board of health, Florida.)

When milk is produced locally, 1,500,000; when milk is shipped, 3,000,000. (Health officer Jacksonville, Fla.)

From 100,000 to 500,000 per cubic centimeter. (Health officer Kansas City, Mo.)

Five hundred thousand per cubic centimeter. (Health officer Lynchburg, Va.)

For small communities, 100,000. Large cities should have a higher limit, depending upon conditions, unless they require pasteurization. (Health officer Montclair, N. J.)

Average, 100,000 per cubic centimeter. (Health officer Portland, Oreg.)

One hundred thousand bacteria per cubic centimeter, media; 1 per cent agar, 1.5 per cent acid, 1 per cent peptone; 9 cubic centimeters used. One cubic centimeter milk incubated 24 hours at 37½° C. in 9½ cubic centimeters petre dish, clay cover. (Health officer Providence, R. I.)

Depends on local conditions; 95 per cent of all milk on Richmond market is produced within 11 miles of Richmond. Our results for 1909 are shown in appendix —. A city getting milk from a distance could not maintain as good a standard as ours. (Health officer Richmond, Va.)

I would not specify any number, but would use 100,000 to hold up the milk producer. (Health officer Rochester, N. Y.)

Certified, 15,000; market milk, 100,000. We have no special trouble in producing milk as good as this. But it is only done by very rigid inspection. (Health officer Seattle, Wash.)

If specified, the location and conditions would determine. I could insist on and enforce 25,000 in this city. Many of my producers sell 10,000 germ milk at no additional cost, and in midsummer too, not certified, but just plain "milk." (Health officer Topeka, Kans.)

No standard can be set. (Sharon Dairy, District of Columbia.)

In summer, 150,000; in winter, 75,000. (Borden's Condensed Milk Co., New York, N. Y.)

Ten thousand per cubic centimeter seems to be the generally accepted maximum for certified milk. Possibly 100,000 would be as low as could be required in milk of commerce. (Walker-Gordon Laboratory, Washington, D. C.)

Ten thousand per cubic centimeter. (This is intended to refer to "certified" milk.) (Dr. V. C. Vaughan, Ann Arbor, Mich.)

A sliding scale. At outset make the number within comparatively easy reach. I should say 300,000; then reduce as conditions improve. (Dr. S. C. Prescott, Boston, Mass.)

Depends on grade of milk. Certified, 10,000; inspected, 100,000; market milk, 500,000. (Health officer Los Angeles, Cal.)

One hundred thousand. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Five hundred thousand. (Health officer San Francisco, Cal.)

Three hundred thousand. (Health officer St. Joseph, Mo.)

The number would depend largely upon local conditions. Wheeling, with its milk supply very close to the city, should specify a much lower number than New York or Washington. (Health officer Wheeling, W. Va.)

We believe, however, it should be the aim of every municipality to so safeguard its milk supply as to reach the standard of 100,000 bacteria to the cubic centimeter. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I think a community should set this figure for itself by determining the average count under ordinary conditions. This average count should be set as a standard, with the idea of reducing it later as conditions can be gradually improved. (Health officer Scranton, Pa.)

**QUESTION 5.**—*Is it possible for the producer or dealer to verify or disprove the bacterial count reported?*

ANSWERS.

If the producer or dealer is given a duplicate sample of the milk and has it examined by a competent bacteriologist by a standard method, this would be a check on the bacterial count officially reported. (Chief Bureau of Animal Industry.)

Not usually. (Surgeon General U. S. Army.)

Not absolutely. (Surgeon General U. S. Navy.)

The producer or dealer can take samples at the same time that the authorities do, and in this way the latter's results can be checked. Unless this is done, the bacterial count can not be verified, as the examination must be made under like conditions, and requires at least 48 hours for a count to be known. (Surgeon General Public Health and Marine-Hospital Service.)

Only by taking duplicate samples and making tests. (Dr. William H. Park, New York, N. Y.)

Not if an officer of a medical milk commission collects the milk from a delivery wagon and the count is made by a good observer under its direction. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes; approximately, but not practical. (Dr. M. P. Ravenel, Madison, Wis.)

Not unless the same sample were examined. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes; i. e., two samples taken at same time. But not after report is made. (Health officer Ann Arbor, Mich.)

With ordinary cleanliness and prompt cooling the bacterial count may be ignored. (Health officer Atlanta, Ga.)

No. (Health officer Baltimore, Md.)

It would be necessary for him to have a laboratory properly equipped and a bacteriologist employed to make the necessary tests. This would be necessary and feasible in the case of a large dealer. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

Responsibility for high bacterial content can not always be placed. Municipality can not show per cent of increase between wholesaler and retailer and between taking sample and time of examination. (Health officer Burlington, Vt.)

Not unless he takes a sample at the same time and uses the same methods in arriving at results. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Doubtful. (Health officer Detroit, Mich.)

Only by bacterial methods; that is, by the service of a trained bacteriologist. By resorting to these means he can. (State board of health, Florida.)

Can be verified, but not disproved. (Health officer, Jacksonville, Fla.)

Yes; owing to a tendency of certain germs to glutinate. He could verify or disprove count. (Health officer, Kansas City, Mo.)

He can give sample to another bacteriologist. (Health officer Lynchburg, Va.)

Only by having duplicate samples plated by his own bacteriologist. (Health officer, Montclair, N. J.)

Yes. (Health officer, Portland, Oreg.)

Yes; as he has the original package and results need not vary greatly if milk kept cool, as should be if delivery is proper. (Health officer, Providence, R. I.)

Only by having duplicate samples (made by dividing a single sample after

thorough mixing) examined independently and immediately by two or more competent bacteriologists using standard methods. (Health officer Richmond, Va.)

Not in practice. (Health officer Rochester, N. Y.)

Under our law he gets a sealed sample the same as we and our slides are always at the disposal of competent conscientious bacteriologists. (Health officer Seattle, Wash.)

No. (Health officer, Topeka, Kans.)

If he had counts made elsewhere the same day, yes; otherwise, no. (Straus Laboratory, Washington, D. C.)

No. (Sharon Dairy, District of Columbia.)

Duplicates of samples taken for bacterial count should be given the producer or dealer, and dealers should be in a position to verify counts. The larger producers could be put in a position to do so, but in the case of the small producer it would be exceedingly hard to impress upon him the need of sterility as to his apparatus, even though he be furnished with necessary utensils and media. (Borden's Condensed Milk Co., New York, N. Y.)

Practically no. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Not absolutely, unless duplicate samples are taken and treated in uniform way with official samples. Dealer or producer may have his own bacteriologist. (Dr. S. C. Prescott, Boston, Mass.)

Yes; if he takes simultaneously samples and uses same technique. (Health officer Los Angeles, Cal.)

It depends on whether the dealer has his laboratory or not; the producer can not verify the count, nor the dealer, unless he sees it. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

It would be possible for him to have a test made from a sample taken under the same conditions as those of the inspector, if he were instructed as to what those conditions should be. (Health officer St. Joseph, Mo.)

Yes; we inform each dairyman as we collect the sample, so he may have a count made if he desires. (Health officer Wheeling, W. Va.)

No; unless his counts are made from the same can or the same jar, and of the same date, and by the same methods. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I do not see how it is practical unless the producer maintains his own laboratory. (Health officer Scranton, Pa.)

#### QUESTION 6.—*What does a high bacterial count indicate?*

#### ANSWERS.

A high bacterial content indicates unclean conditions on the farm, or lack of care and cleanliness in handling the milk in transit, or both. (Chief Bureau of Animal Industry.)

Old milk or dirty milk, or milk that has not been properly cooled and kept at a low temperature. (Surgeon General U. S. Army.)

Milk improperly kept. (Surgeon General U. S. Navy.)

A high bacterial count indicates dirty dairy methods, lack of proper cooling of milk, or that it is too old. (Surgeon General Public Health and Marine-Hospital Service.)

At the farm, dirt or old milk contamination. In the city usually that the milk has been warm for many hours before using, and often original dirt or old milk in the can or on the strainers, etc. (Dr. William H. Park, New York, N. Y.)

Filthy dairy surroundings, careless collections and handling, or a diseased udder. (Dr. Henry L. Coit, Newark, N. J.)

Dirty cows or dirty employees or utensils or methods, or neglect to cool efficiently or promptly or to deliver properly. (Dr. R. G. Freeman, New York, N. Y.)

Dirty cows, stables, or handling; lack of refrigeration often. (Dr. M. P. Ravenel, Madison, Wis.)

Dirty, age, high temperature, one or all. (Dr. C. E. A. Winslow, New York, N. Y.)

Dirt of some kind, or uncleanliness in containers. (Health officer Ann Arbor, Mich.)

Careless contamination or a high temperature, or stale milk. (Health officer Atlanta, Ga.)

Uncleanliness and improper temperature. (Health officer Baltimore, Md.)

One or all of the following things: Bad methods, improper cooling, too much delay in the delivery of the milk. (Health officer Birmingham, Ala.)

Insanitary methods of collecting and improper cooling. (Health officer Bismarck, N. Dak.)

That the milk at some stage was seeded either heavily or lightly, and that conditions of temperature at some time or other were favorable for growth. (Health officer Burlington, Vt.)

Degree of contamination, degree of efficiency attained in cooling and the age. Kind are more significant than the number of bacteria. (Health officer Cleveland, Ohio.)

Old milk, warm milk, dirty milk. (Health officer Columbus, Ohio.)

Contamination. (Health officer Detroit, Mich.)

Dirt in milk always gives a high bacterial content. Milk containing only a few bacteria at first, but kept at warm temperature the bacteria increase in numbers, and soon the bacterial content is high, even though the milk was produced under cleanly conditions. (State board of health, Florida.)

Careless methods of handling milk. (Health officer Jacksonville, Fla.)

Source of contamination, after milk leaves cow's udder. (Health officer Kansas City, Mo.)

Either that the milk is old or insanitary. (Health officer Lynchburg, Va.)

Either diseased condition, filth, or carelessness at time of milking, or inefficiently low temperature of storage. (Health officer Montclair, N. J.)

Usually improper handling of milk from milker to consumer. (Health officer Portland, Oreg.)

That milk has not been properly handled. (Health officer Providence, R. I.)

One (or more, or all) of conditions given under 1 on this page (i. e., dirty production, failure to cool promptly and efficiently, and to keep cool, or keeping milk too long. (Health officer Richmond, Va.)

Dirt and warm milk. (Health officer Rochester, N. Y.)

Indicates diseases udder or teats, old milk, or contaminated milk. (Health officer Seattle, Wash.)

Unclean methods of production or handling or both. Long time intervening between production and plating. Not low temperature kept between production and plating. (Health officer Topeka, Kans.)

Usually either dirty methods of milking and handling, or diseased cows, or old milk. (Straus Laboratory, Washington, D. C.)

It indicates that the milk was not immediately cooled after being drawn from the cow, or the temperature was allowed to raise higher than it should some time between the milking and the delivery of the milk. (Sharon Dairy, District of Columbia.)

A high bacterial count as a rule indicates either, first, that the milk has been kept at too high temperature, or, second, that it has been kept too long. (Borden's Condensed Milk Co., New York, N. Y.)

A continued high bacterial content indicates want of care in either the cleanliness or the cooling of the milk. (Walker-Gordon Laboratory, Washington, D. C.)

Little. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Either dirt, age, or high temperature. Expert can generally decide which. (Dr. S. C. Prescott, Boston, Mass.)

Improper methods of handling milk. (Health officer Los Angeles, Cal.)

Unclean conditions and contamination somewhere along the line. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Uncleanly conditions, contamination, heat, old milk. (Health officer San Francisco, Cal.)

Either old milk, dirty milk, or milk kept at too high temperature. (Health officer St. Joseph, Mo.)

Usually dirt, old milk, carelessness in handling. (Health officer Wheeling W. Va.)

Carelessness in production or in subsequent handling. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Dirty dairies, old milk, or milk kept at a high temperature. (Health officer Scranton, Pa.)

QUESTION 7.—*Is the harmfulness of a high bacterial count scientifically established beyond question?*

## ANSWERS.

As a high bacterial count indicates insanitary conditions, such a count is evidence that the milk is dangerous. Several authorities on feeding infants assert that milk with a high bacterial content is injurious regardless of the character of the bacteria. (Chief Bureau Animal Industry.)

The undesirability of old milk or dirty milk is self-evident. It is also scientifically established. (Surgeon General U. S. Army.)

No. (Surgeon General U. S. Navy.)

Yes. (Surgeon General Public Health and Marine-Hospital Service.)

For infants, beyond all reasonable doubt. For adults, not harmful as a rule, e. g., buttermilk. (Dr. William H. Park, New York, N. Y.)

It is. (Dr. Henry L. Coit, Newark, N. J.)

I believe so. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

High count is not necessarily harmful, but it indicates conditions which are harmful. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

We have no doubt of it. (Health officer Atlanta, Ga.)

Depends upon the character of the bacteria. (Health officer Baltimore, Md.)

The harmfulness of a high bacterial count in milk may not be scientifically established; at the same time the possibility of a sample of milk having a high bacterial count, showing the presence of disease germs, would be greater than in a sample having a very low bacterial count. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

The presence of large number of practically harmless types can do no good and is responsible for many complaints among children and adults due to particular susceptibility. "Yes." (Health officer Burlington, Vt.)

I would not attempt to say. (Health officer Cleveland, Ohio.)

No; this depends, however, upon the kind of bacteria. (Health officer Columbus, Ohio.)

No. (Health officer Detroit, Mich.)

Yes. (State board of health, Florida.)

Yes. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

I should say not. It is simply an indication of conditions, and is highly useful from this standpoint. (Health officer Lynchburg, Va.)

When the count is in the millions its harmfulness is well established. With certain types of bacteria the count may be much lower, and yet the milk will be harmful. (Health officer Montclair, N. J.)

I think so. (Health officer Portland, Oreg.)

It is a greater fraud to sell milk which can not be used at all, due to decomposition from excessive numbers of bacteria, than if adulterated with water. (Health officer Providence, R. I.)

Milk of very high bacterial content may be harmless, as buttermilk, for example; but high counts in milk sold as sweet milk always show something wrong and should be condemned. In few matters of public health do we consider that any given conditions must always do harm, but we know (1) that milk improperly produced and handled does produce disease, and (2) that high bacterial content always shows that milk has in some way been improperly produced or handled. (Health officer Richmond, Va.)

Not a high count alone; but a high count is generally indicative of dirt and lack of ice. (Health officer Rochester, N. Y.)

Yes; at least so far as its use among babies is concerned. It is in my judgment undoubtedly harmful when given to adults. (Health officer Seattle, Wash.)

No; the bacteria may be nearly, if not quite, all beneficial organisms, though producing souring of the milk. (Health officer Topeka, Kans.)

No. (Sharon Dairy, District of Columbia.)

The harmfulness of high bacterial count depends entirely upon the character of bacteria. With ordinary lactic bacteria, milk takes on a high acidity, giving

what is called a self-soured milk, which is not very palatable and which in the advanced stages gives separation of both fat and proteid matter. This milk necessarily, however, is not harmful, as many cheeses are made according to this self-soured method, and, as a rule, advanced acidity shows bacteria principally of the lactic specie. A highly bacterial count with a low acidity, however, as a rule, would denote more of the putrefactive and pathogenic specie. (Borden's Condensed Milk Co., New York, N. Y.)

Not so far as I know. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I think so, in general, although in case of special "fermented" milk high count means nothing bad, of course. (Dr. S. C. Prescott, Boston, Mass.)

Infant mortality reduced by keeping count down. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

The possible harmfulness is, undoubtedly. (Health officer St. Joseph, Mo.)

I think so. (Health officer Wheeling, W. Va.)

We are not prepared to answer this affirmatively. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I do not think a high count is dangerous per se, as most of the ordinary milk bacteria are, of course, harmless. As stated, a persistent high count would signify dirty milk, which would unquestionably be unwholesome in the long run. (Health officer Scranton, Pa.)

QUESTION 8.—*Is it practicable with due regard to the rights of the producer or dealer to insist upon a prescribed bacterial count?*

#### ANSWERS.

Yes; if the maximum limit is not unreasonably low. (Chief Bureau of Animal Industry.)

It is practicable to require either clean milk or proper pasteurization. (Surgeon General U. S. Army.)

No. (Surgeon General U. S. Navy.)

Yes. (Surgeon General Public Health and Marine-Hospital Service.)

Yes; for each kind of milk. Low for milk to be consumed raw by children. Higher for milk to be used for pasteurization or cooking. Low for pasteurized milk. (Dr. William H. Park, New York, N. Y.)

Yes. It does not require expensive equipment to obtain clean milk. In Kentucky five dairies with whitewashed barns and ordinary domestic cleanliness are approved and certified by a medical milk commission with counts never above 4,000. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

Certainly. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. (Health officer Ann Arbor, Mich.)

As the bacterial count means clean milk, properly cooled and kept so, we can not see that this imposes upon the dealer or producer. (Health officer Atlanta, Ga.)

I have my doubts. (Health officer Baltimore, Md.)

Yes. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Count can be kept down with ease, if simple rules are regarded. Practicability doubtful. (Health officer Burlington, Vt.)

No. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (State board of health, Florida.)

Yes. (Health officer Jacksonville, Fla.)

Yes; our ordinance specifies 300,000 per cubic centimeter. (Health officer Kansas City, Mo.)

Yes. Clean fresh milk will have a low count, and such milk is highly desirable for infants and invalids. (Health officer Lynchburg, Va.)

Yes. Due care, ice, and short time before delivery will accomplish the object. (Health officer Montclair, N. J.)

Yes. It encourages cleanliness. (Health officer Portland, Oreg.)

Yes. We do so. (Health officer Providence, R. I.)

Yes. (Health officer Richmond, Va.)

I think it is. What right has the dealer to talk about rights as against the lives of children? (Health officer Rochester, N. Y.)

It is not right to the legitimate and honest dealer unless we do insist upon a bacterial count, because it gives a dishonest, filthy dealer a chance to sell dangerous milk and to unjustly compete with a man striving to produce good, pure, wholesome milk. (Health officer Seattle, Wash.)

No. (Health officer Topeka, Kans.)

In cities where there is certified milk it is done. (Straus Laboratory, Washington, D. C.)

No. (Sharon Dairy, District of Columbia.)

Yes; providing that the enforcement of such standard be exercised with due care and moderation and allowance made for certain contingencies, as in the case of delays in transit or accident, which may cause a rising temperature and thereby increased bacterial count, which count, however, would be simply a local rise due to the conditions at that particular time and would probably not extend beyond that particular shipment and could not be taken as affecting in any way the standard which had up to that time been adhered to. (Borden's Condensed Milk Co., New York, N. Y.)

Yes; but to be fair to the producer and dealer the limit should be a very high one until the public is willing to pay the added cost entailed in producing and handling a high-grade milk. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I believe it is practicable to enforce withdrawal of any milk from public sale which may be regarded as dangerous to public. (Dr. S. C. Prescott, Boston, Mass.)

Yes. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Yes. (Health officer San Francisco, Cal.)

Yes; if not too low. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

With proper regulations governing production, transportation, and delivery, yes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I think so, if a reasonable average figure is taken and opportunity is given to a dealer to improve his conditions instead of barring him arbitrarily on a yes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

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#### MAINTENANCE OF LOW TEMPERATURES.

QUESTION 1.—*At what maximum temperature should milk be kept to give the best results for commercial purposes?*

#### ANSWERS.

While the temperature limit should be practicable, it should not be fixed primarily with a view to giving the best results for commercial uses, the real object being to insure the delivery of milk to the consumer in a wholesome condition. To accomplish the latter object, it is believed that milk should be promptly cooled to 50° F. or less, and should be kept below that temperature until delivery. This would require the use of ice in summer, but is not believed to be commercially impracticable, except possibly during the summer in warm climates where the producer is unable to provide ice. This requirement has been made by the city of Atlanta, Ga., and if it is practicable there it would certainly be practicable for the city of Washington. (Chief Bureau of Animal Industry.)

It is generally agreed that a temperature not above 50° F. is desirable. (Surgeon General U. S. Army.)

Fifty degrees Fahrenheit. (Surgeon General U. S. Navy.)

Under 50° F. (Surgeon General Public Health and Marine-Hospital Service.)

Forty-five degrees Fahrenheit is desirable, but 50° F. is much easier to have and will answer fairly well. (Dr. William H. Park, New York, N. Y.)

Between 40° and 50° F. from an hour after milking until its use. Never above 50°. (Dr. Henry L. Coit, Newark, N. J.)

As near 33° F. as possible. Not above 50° F. (Dr. R. G. Freeman, New York, N. Y.)

- Fifty degrees Fahrenheit. (Dr. M. P. Ravenel, Madison, Wis.)  
 Fifty degrees Fahrenheit. (Dr. C. E. A. Winslow, New York, N. Y.)  
 Forty degrees Fahrenheit or lower. (Health officer Ann Arbor, Mich.)  
 Below 50° F. (Health officer Atlanta, Ga.)  
 About 50° F. (Health officer Baltimore, Md.)  
 From 40° to 50° F. (Health officer Birmingham, Ala.)  
 Ordinary cold-storage temperature. (Health officer Bismarck, N. Dak.)  
 Fifty degrees Fahrenheit. (Health officer Burlington, Vt.)  
 Thirty-four to forty-five degrees Fahrenheit. (Health officer Cleveland, Ohio.)  
 Fifty degrees. (Health officer Columbus, Ohio.)  
 Below 50° F. (Health officer Detroit, Mich.)  
 Fifty degrees Fahrenheit. (State board of health, Florida.)  
 Fifty degrees Fahrenheit. (Health officer Jacksonville, Fla.)  
 Fifty degrees. (Health officer Kansas City, Mo.)  
 Forty to fifty degrees Fahrenheit is desirable. In Lynchburg, where the milk is quickly delivered, 60° F. is allowed, but most dairymen of their own volition store below 50° F. (Health officer Lynchburg, Va.)  
 Should not be over 50° F. This is a limit that is easily attained. (Health officer Montclair, N. J.)  
 Not above 60° F. (Health officer Portland, Oreg.)  
 Below 50° F. (Health officer Providence, R. I.)  
 At or below 50° F., if milk is kept any length of time or comes from great distance. Where producers are near at hand and the milk reaches the consumer promptly, good milk may be had without insisting on so low a temperature. If farmers have no practical way of getting ice on farm, 50° can not be insisted upon. (Health officer Richmond, Va.)  
 Under 50° F. (Health officer Rochester, N. Y.)  
 Not higher than 50°. (Health officer Seattle, Wash.)  
 Not above 50° F. (Health officer Syracuse, N. Y.)  
 I believe in general that 50° is sufficient. (Health officer Topeka, Kans.)  
 Fifty degrees Fahrenheit as a maximum. Certified milk is kept at 40° and 45°. A high temperature gives high bacterial count. (Straus Laboratory, Washington, D. C.)  
 Authorities differ. Anywhere between 48° F. and 58° F. will give good results. (Sharon Dairy, District of Columbia.)  
 Fifty degrees Fahrenheit. (Borden's Condensed Milk Co., New York, N. Y.)  
 We bottle all milk at the farm and keep it packed in ice until delivered to the consumer, and so lack experience on these two points. (Walker-Gordon Laboratory, Washington, D. C.)  
 Forty-five to fifty degrees Fahrenheit. (Dr. S. C. Prescott, Boston, Mass.)  
 Fifty degrees Fahrenheit. (Health officer Los Angeles, Cal.)  
 Fifty degrees. (J. M. Houston, White Cross Milk Co., Washington, D. C.)  
 About 50° F. (Health officer San Francisco, Cal.)  
 As low as possible. Not above 60° F. at most. (Health officer St. Joseph, Mo.)  
 Fifty degrees Fahrenheit. (Health officer Wheeling, W. Va.)  
 Forty to fifty degrees Fahrenheit. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 Sixty degrees. (Health officer Scranton, Pa.)

QUESTION 2.—*Is it commercially practicable to maintain a maximum temperature of 50° F. from time of milking to city delivery to consumer?*

#### ANSWERS.

While the temperature limit should be practicable, it should not be fixed primarily with a view to giving the best results for commercial uses, the real object being to insure the delivery of milk to the consumer in a wholesome condition. To accomplish the latter object it is believed that milk should be promptly cooled to 50° F. or less, and should be kept below that temperature until delivery. This would require the use of ice in summer, but is not believed to be commercially impracticable except possibly during the summer in warm climates where the producer is unable to provide ice. This requirement has been made by the city of Atlanta, Ga., and if it is practicable there it would certainly be practicable for the city of Washington. (Chief Bureau of Animal Industry.)

This depends upon the facilities granted by the railroads, amount of capital put into business, etc. (Surgeon General U. S. Army.)

Yes; it is. (Surgeon General U. S. Navy.)

Yes. (Surgeon General Public Health and Marine-Hospital Service.)

It is, with the possible exception of cans situated at the outside in the wagons. If these are to be kept cold they must be covered with some nonconductor of heat. The actual cost of this would not be great. (Dr. William H. Park, New York, N. Y.)

It is. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

Yes. (Health officer Ann Arbor, Mich.)

Dairymen in Atlanta have found it so without increasing the price. (Health officer Atlanta, Ga.)

We have not yet been able to solve it. (Health officer Baltimore, Md.)

The answer to this question would depend largely on the local prices of ice. Cost of ice might be prohibitive in some localities, while in others this temperature could be maintained without its being a burden on the milk producer or dealer. (Health officer Birmingham, Ala.)

Not very practicable, but desirable. (Health officer Bismarck, N. Dak.)

Yes. (Health officer Burlington, Vt.)

Absolutely not. (Health officer Cleveland, Ohio.)

No; see answer No. 3 under "Health department" heading, viz, the requirement is desirable certainly; 50° is too low for market milk under ordinary conditions, as experienced in Columbus. We have enforced a 65° rule for two years; 98 per cent of retail milk kept at 65°; 60 per cent of wholesale milk kept at 65°. Great improvement during last summer. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes. (State board of health, Florida.)

Yes. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

I should say impracticable until the dairymen are fully convinced of its desirability. When the dairyman has been taught the use of cold and cleanliness, he will strive to maintain both. (Health officer Lynchburg, Va.)

Yes. (Health officer Montclair, N. J.)

No. (Health officer Portland, Oreg.)

Yes. (Inspector of milk, Providence, R. I.)

When farmers can always make ice (or buy it to advantage), this can be done. (Health officer Richmond, Va.)

Yes. (Health officer Rochester, N. Y.)

I do not believe that it is; although it is from city to consumer. If trains were regular in their schedule, delivering milk to the city on time each day, it would be more practicable. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

It costs more, but can be and is done in other cities. (Straus Laboratory, Washington, D. C.)

Not under present conditions. (John Thomas, Ednor, Md., president Milk Producers' Association.)

No; unless ice is used at all times. The average temperature of water in this locality is about 56° F., and without refrigerator cars it is impossible to maintain that temperature. (Sharon Dairy, District of Columbia.)

Yes. (Borden's Condensed Milk Co., New York, N. Y.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes; by abundant icing. I think it should be generally understood that with precautions suggested by these questions, price of milk must rise. (Dr. S. C. Prescott, Boston, Mass.)

Only in a few instances in this section. (Health officer Los Angeles, Cal.)

We bottle all milk at the farm and keep it packed in ice until delivered to the consumer, and so lack experience on these two points. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Not at the present price of milk. (Health officer San Francisco, Cal.)

It is possible, if ice is properly used. (Health officer St. Joseph, Mo.)

Yes; during the past year some of our dairymen have demonstrated it. (Health officer Wheeling, W. Va.)

Yes; provided the producer, the railroad companies, and the dealers can be forced by law to adopt proper methods. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes; by prohibiting the sale of dip milk; enforce the sale of bottle milk. (Health officer Scranton, Pa.)

QUESTION 3.—*Should hours be prescribed for the city delivery so as to prevent increase of temperature while deposited on doorsteps, etc.?*

## ANSWERS.

It is undoubtedly desirable that milk should not be left on the doorstep in warm weather long enough to allow a material rise in the temperature, but the department is not prepared to recommend that certain hours be prescribed for delivery in order to accomplish this. (Chief Bureau of Animal Industry.)

I do not know whether such regulations would be capable of enforcement. (Surgeon General U. S. Army.)

They should. (Surgeon General U. S. Navy.)

The practice of early morning delivery of all milk is commendable. (Surgeon General Public Health and Marine-Hospital Service.)

This should be done during the warm months, so that at least they would not stand more than 30 minutes exposed to a temperature above 55° F. (Dr. William H. Park, New York, N. Y.)

This is impracticable, because milk is required by most people at the same time of day. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. M. P. Ravenel, Madison, Wis.)

It would be well if this could be done. (Dr. C. E. A. Winslow, New York, N. Y.)

Probably. (Health officer Ann Arbor, Mich.)

We think this can best be controlled by printed slips of instructions supplied by the board of health and delivered at intervals by dairymen to their customers. (Health officer Atlanta, Ga.)

I think it would be better to have prescribed it for city delivery, but at present I have no evidence to show much change produced in the milk after it is left at the consumer's residence. (Health officer Baltimore, Md.)

Yes. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

Dealer should not be responsible for milk after delivery, and prescribed hours will nearly always work to advantage of one dealer and to detriment of the next one. (Health officer Burlington, Vt.)

Very doubtful if sentiment would permit the enforcement of such an ordinance. (Health officer Cleveland, Ohio.)

No; subject to modification depending upon character of communities and locations. (Health officer Columbus, Ohio.)

Yes; if possible. (Health officer Detroit, Mich.)

It might not be possible to regulate hours of delivery, but milk could be placed so it is sheltered from the sun. (Health officer Jacksonville, Fla.)

Yes; preferably morning hours, 4 to 8 a. m. In some cities regulations prescribe 12 m. to 8 a. m. (Health officer Kansas City, Mo.)

No. (Health officer Lynchburg, Va.)

No; that would be undue interference with private business. If the milk is at a low temperature when delivered, the householder is responsible for subsequent conditions. She also has the option of taking milk from a dealer that comes at a more convenient hour. (Health officer Montclair, N. J.)

Yes. (Health officer Portland, Oreg.)

Not necessary. (Health officer Providence, R. I.)

Not if delivery wagon is provided (as all should be in summer) with means of keeping milk cold while on delivery route. It is best, however, never to leave milk on doorstep, but to hand it directly to cook. (Health officer Richmond, Va.)

The whole question of early morning delivery is wrong. Milk should not be delivered to the consumer prior to 6 a. m. (Health officer Rochester, N. Y.)

This would be desirable, but impracticable in this city at least. (Health officer Seattle, Wash.)

Hardly practicable. (Health officer Syracuse, N. Y.)

I would say not practicable or desirable. (Health officer Topeka, Kans.)

Think it would be a good thing if it could be done. (Straus Laboratory, Washington, D. C.)

Yes; if possible. (John Thomas, Ednor, Md., president Milk Producers' Association.)

No. (Sharon Dairy, District of Columbia.)

This would be most impracticable, as the natural demands are for fresh milk for breakfast. Provision must be made for the people who take early breakfast as well as for those who can take late breakfast. (Borden's Condensed Milk Co., New York, N. Y.)

Dissatisfaction of consumers and increased cost of delivery would seem to make this impractical. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

If this is practicable, it would have an excellent effect. It must be borne in mind, however, that time is necessary for milk delivery, and that dealer must utilize as few wagons and men as possible in order to make fair profit. (Dr. S. C. Prescott, Boston, Mass.)

No. (Health officer Los Angeles, Cal.)

Yes; milk should be delivered after 7 a. m. so it can be taken in the house and not exposed to contamination on door steps, standing exposed to the rays of the sun in the summer and frozen in the winter. The dealer has to put up with poor help, stolen milk, and other complaints that would not occur. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Not in this city. (Health officer San Francisco, Cal.)

I think a more practical plan would be to prescribe certain hours, later than which no milk shall be deposited in such places, but must be delivered to the ice chest or refrigerator of the consumer. (Health officer St. Joseph, Mo.)

Many things should come before this; the consumer if interested could regulate this matter. Our certified milk distributor is not allowed to leave milk on door steps. He must place it in an ice chest or in the hands of an adult member of family. (Health officer Wheeling, W. Va.)

Unquestionably. We consider this a very important step. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes. In summer not later than 8 o'clock a. m. (Health officer Scranton, Pa.)

QUESTION 4.—*Could requirements reasonably be made compelling consumers to exercise caution in handling milk?*

## ANSWERS.

Educational work is believed to be the best method of inducing consumers to exercise caution in handling milk. The Department of Agriculture has recently issued a publication (Farmers' Bulletin 413) on The Care of Milk and its Use in the Home, which is well adapted to this purpose and which is being widely circulated. (Chief Bureau of Animal Industry.)

I do not know whether such regulations would be capable of enforcement. (Surgeon General U. S. Army.)

No. (Surgeon General U. S. Navy.)

Consumers can be advised as to the care of milk. (Surgeon General Public Health and Marine-Hospital Service.)

It seems to me that advice only is practicable in case of private families. In hotels, etc., rules should be made. (Dr. William H. Park, New York, N. Y.)

No; but an educational plan is advisable whereby they could assist the dealer in protecting his milk. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

It seems impossible to carry out any such regulation. (Dr. M. P. Ravenel, Madison, Wis.)

Questionable in private families. (Health officer Ann Arbor, Mich.)

We have investigated this and think it a better plan to send printed slips of instructions by the dairymen as a means of education. (Health officer Atlanta, Ga.)

Such requirements are practically difficult to enforce. We can only advise. (Health officer Baltimore, Md.)

It should be done, but this matter is open to question. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck N. Dak.)

No. Should be instructed by health department circulars and then made to take their own chances. (Health officer Burlington, Vt.)

Could never be enforced. (Health officer Cleveland, Ohio.)

No; providing this does not apply to boarding houses, hotels, hospitals, etc. (Health officer Columbus, Ohio.)

Educational. (Health officer Detroit, Mich.)

Yes. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

No; only printed advice given, which patrons slowly learn to follow. (Health officer Lynchburg, Va.)

Education is all, I think, that could be accomplished along this line. (Health officer Montclair, N. J.)

Yes. (Health officer Portland, Oreg.)

Yes; make deliveries of milk be made in original packages only. (Health officer Providence, R. I.)

Such requirements can be reasonably made, but they can not always be enforced. We have such regulations, but not everybody lives up to them. (Health officer Richmond, Va.)

I know of none. (Health officer Rochester, N. Y.)

I do not think so. Of course, you can compel the bottle to be washed, but then you have no assurance that even diseased germs have been removed. I believe that education in the home to be our greatest safeguard in this respect. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

No; education alone can accomplish results. (Health officer Topeka, Kans.)

If possible. (John Thomas, Ednor, Md., president Milk Producers' Association.)

No; and should not be attempted. (Sharon Dairy, District of Columbia.)

Requirements could not be made, or, rather, could not be enforced regarding any action which consumers would have to take. Consumers, however, should be cautioned in regard to the necessary care which they should take and advised as to the results of the disregard of such caution. They, however, should be compelled to thoroughly clean and scald any and all utensils which contained milk and which containers are to be returned to the dealer. (Borden's Condensed Milk Co., New York, N. Y.)

Yes; but education of the consumer to the need of carrying out these regulations would seem the only possible method of enforcing them. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I fail to see how consumer can be "compelled" to exercise caution with his own property if he chooses not to do so. (Dr. S. C. Prescott, Boston, Mass.)

No. (Health officer Los Angeles, Cal.)

Serve after 7 a. m. Here is where much of the trouble starts. Educate the public by literature and the public press. Surround the dealer with rigid rules and regulations. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Would be impossible to enforce. (Health officer San Francisco, Cal.)

Requirements might aid a great deal, but it is a question whether or not such requirements could be legally enforced. (Health officer St. Joseph, Mo.)

I doubt if the consumer could be compelled. We try to persuade and educate him by the distribution of pamphlets on "care of milk in the home." (Health officer Wheeling, W. Va.)

We doubt if legal requirements could be made; but the dealers could be required to deliver the milk at such hours as to make it possible for the consumer to receive the milk into his house immediately upon its delivery. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes. (Health officer Scranton, Pa.)

QUESTION 5.—*If so, specify what requirements?*

ANSWERS.

Educational work is believed to be the best method of inducing consumers to exercise caution in handling milk. The Department of Agriculture has recently issued a publication (Farmers' Bulletin 413) on The Care of Milk and its Use in the Home, which is well adapted to this purpose and which is being widely circulated. (Chief Bureau of Animal Industry.)

Measures to be exercised in the handling of milk are set forth in Hygienic Laboratory Bulletin No. 56. (Surgeon General Public Health and Marine-Hospital Service.)

Clean utensils, protection from flies, etc., cooling. (Dr. William H. Park, New York, N. Y.)

Immediate transfer from delivery wagon to proper refrigeration in the home, with precautions against droppings in open vessels. (Dr. Henry L. Coit, Newark, N. J.)

Ordinary health board regulations. Its enforcement would, of course, be difficult. (Dr. R. G. Freeman, New York, N. Y.)

When a dealer of known reliability serves milk to persons who complain of the milk going bad constantly, it is good evidence of careless handling. It might be possible to stop the sale of milk to such parties by all milkmen. It would be hard to carry out. (Dr. M. P. Ravenel, Madison, Wis.)

(a) Milk should be promptly removed after delivery and kept cool or pasteurized. (b) Milk receptacle to be kept clean after emptying. (Health officer Baltimore, Md.)

The same as in case of other dealers in milk. (Health officer Columbus, Ohio.)

Keep milk cool; put in refrigerator as early as possible after delivery; rinse and wash bottles thoroughly before returning to dealer. (Health officer Jacksonville, Fla.)

As adopted by United States Bureau of Animal Industry. (Health officer Kansas City, Mo.)

That would be difficult, owing to the different degrees of intelligence. (Health officer Portland, Oreg.)

No milk to be turned on street, in stores, and all milk to be below 50° F. (Health officer Providence, R. I.)

See last reference. (Health officer Richmond, Va.)

Our milk is all distributed in bottles. We send hundreds of thousands of instructions to housekeepers each year asking them to place their milk in the bottle on ice at once and to use same from bottle and then to thoroughly clean bottle before delivery. (Health officer Seattle, Wash.)

Keep cool and properly guarded from exposure. (Health officer Syracuse, N. Y.)

None. (Sharon Dairy, District of Columbia.)

Keeping the milk at a reasonably low temperature, say 55° F., and free from contamination. (Walker-Gordon Laboratory, Washington, D. C.)

Prompt care of the milk. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I suggest that consumers be given instructions as to care of milk in the home, effect of temperature, etc., putting all information on a basis of securing their own welfare and that of family, rather than as a command from a public health official. (Dr. S. C. Prescott, Boston, Mass.)

It is impossible to compel the consumer to exercise caution in the handling of milk. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

In the first place, to sterilize the receptacle if not delivered ready bottled, then to place it at once in a cold place not above 50° F. and keep it so in a tightly covered receptacle until ready to use. Sterilize all bottles as soon as empty. Return no bottles where contagious disease exists until premises have been fumigated by health authorities. (Health officer St. Joseph, Mo.)

Cold and cleanliness. Keep separate from anything giving out an odor. (Health officer Wheeling, W. Va.)

We doubt if legal requirements could be made, but the dealers could be required to deliver the milk at such hours as to make it possible for the consumer to receive the milk into his house immediately upon its delivery. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Prompt care after delivery by vendor, placing the vessel or bottle in refrigerator; avoid exposure to flies; keep milk out of reach of children. (Health officer Scranton, Pa.)

QUESTION 6.—*To what extent is the failure to preserve a maximum temperature of 50° F. deleterious to milk?*

#### ANSWERS.

Failure to keep milk at a temperature below 50° F. provides favorable conditions for rapid multiplication of bacteria and is therefore deleterious. (Chief Bureau of Animal Industry.)

Milk is a good culture medium for various pathogenic organisms which rapidly increase in high temperatures, making such milk dangerous, especially for infants. (Surgeon General U. S. Army.)

Allows bacteria to multiply. (Surgeon General U. S. Navy.)

The failure to maintain a temperature under 50° F. favors a great increase in the bacteria in the milk, and milk containing a large number of bacteria has been shown by clinicians to be harmful to children using the same. Moreover, if the milk should contain a small number of typhoid bacilli or other organisms, a great increase in these organisms would likewise take place if the milk were not kept below 50° F. (Surgeon General Public Health and Marine-Hospital Service.)

This is the greatest reason for the deterioration of city milk. Increase of bacteria at common temperatures: In one test at 50° the bacteria increased from 30,000 to 89,000; in one test at 55° the bacteria increased from 30,000 to 187,000; in one test at 60° the bacteria increased from 30,000 to 900,000. Above 60° the typhoid bacilli grow rapidly. (Dr. Wm. H. Park, New York.)

A well-known authority on milk says that a quart of milk at 60° in a refrigerator will grow 19,000,000 germs in 24 hours. (Dr. Henry L. Coit, Newark, N. J.)

Causes a growth of bacteria. (Dr. R. G. Freeman, New York, N. Y.)

Rapid increase in bacterial content. If these germs are not disease producing, the harm done is problematical within certain limits. (Dr. M. P. Ravenel, Madison, Wis.)

Extreme. (Health officer Ann Arbor, Mich.)

A temperature above 50° favors the production of bacterial poisons, which result in diarrheal diseases of variable duration. (Health officer Atlanta, Ga.)

By increasing the rapidity of the multiplication of germs. (Health officer Baltimore, Md.)

At temperature higher than this the bacterial development is very rapid, which would necessarily soon cause the milk to "sour." (Health officer Birmingham, Ala.)

Increases the bacterial count and shortens the period of fitness for use. (Health officer Bismarck, N. Dak.)

Bacterial count will increase, causing loss of keeping qualities and decrease in wholesomeness, especially for infant feeding. (Health officer Burlington, Vt.)

Depends entirely upon the degree of temperature and length of time exposed to high temperature. (Health officer Cleveland, Ohio.)

Deterioration and bacterial count increase with rising temperature. (Health officer Columbus, Ohio.)

Rise in bacterial count with increased toxin production. (Health officer Detroit, Mich.)

To the extent that it permits multiplication of bacteria. (State board of health, Florida.)

The more nearly milk approximates the temperature of 100° F. the more rapid the growth of bacteria, especially pathogenic bacteria. (Health officer Jacksonville, Fla.)

It increases bacterial count of milk and, as such, is dangerous to babies who live upon artificial food, if unable to nurse from mother's breast. (Health officer Kansas City, Mo.)

Low temperature retains first purity longer. Fresh milk is always best, and cold tends to keep it longer nearer the fresh condition. (Health officer Lynchburg, Va.)

Increases bacterial count. Makes milk sour quickly. (Health officer Montclair, N. J.)

Causes rapid growth of bacteria. (Health officer Portland, Oreg.)

The quicker milk is cooled to 50° F. and the colder it is kept, the longer it will keep sweet and the fewer bacteria it will contain if sold fresh. (Health officer Providence, R. I.)

It makes milk sour quicker, increases total bacterial count rapidly, and, if specific disease germs (typhoid bacilli) are present, these will multiply far more rapidly in warm milk than in cold. (Health officer Richmond, Va.)

The usual and customary increase in bacterial life depending, of course, largely upon temperature and primary contamination, the higher the temperature the more rapid the increase. (Health officer Seattle, Wash.)

Causes increase in growth of bacteria. (Health officer Syracuse, N. Y.)

Increases number of bacteria; lactic acid producing, if milk be fresh, assuming that (tuberculosis) typhoid, diphtheria, etc., germs be not present. (Health officer Topeka, Kans.)

The temperature above 50° are those at which germs multiply very rapidly; the low temperature does not kill them, but does retard multiplication. When a high temperature is reached, as 140° and above, the heat does destroy them. (Straus Laboratory, Washington, D. C.)

None. (Sharon Dairy, District of Columbia.)

Principally in an increase of bacterial count, thus causing souring up to a certain point, which souring in the case of some lactic bacilli may reach a point high enough to retard all growth of pathogenic and putrefactive bacteria, yet in the case of other forms of lactic bacilli, which do not reach a high point of acidity, may cause them to grow to a maximum point so far as the acidity is concerned, at which maximum point they themselves cease to multiply, but both the pathogenic and putrefactive bacilli do multiply. (Borden's Condensed Milk Co., New York, N. Y.)

The growth of bacteria in milk would seem to be in direct proportion to the increase of temperature, up to at least 100° F. (Walker-Gordon Laboratory, Washington, D. C.)

It permits the bacteria to multiply. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Souring is increasingly rapid with increase of temperature, and if milk is dirty, undesirable types flourish. It should also be remembered that in old milk, held at low temperatures, putrefactive organisms increase at expense of acid formers. (Dr. S. C. Prescott, Boston, Mass.)

To the extent that it increases the bacterial count and hastens souring. (Health officer Los Angeles, Cal.)

Milk being the best medium extant for the growth of germs, and they grow best above 50°; in fact few grow at that temperature. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Had one epidemic of ptomaine poisoning during hot spell; 50 cases, no death. (Health officer San Francisco, Cal.)

The higher the temperature, up to a certain point, the more rapidly all forms of bacteria increase. Hence, milk will keep sweet and contain less deleterious bacteria at 50° than at 60° to 90°, during any stated period of time. However, if milk is free from deleterious bacteria, souring would not affect its wholesomeness. (Health officer St. Joseph, Mo.)

Bacteria multiply more rapidly as the temperature of the milk increases. (Health officer Wheeling, W. Va.)

To the extent that it admits of the multiplication of the bacterial flora, which we believe to be detrimental. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Souring. (Health officer Scranton, Pa.)

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#### GENERAL.

QUESTION 1.—*To what extent in your judgment is milk a factor in diphtheria, typhoid fever, scarlet fever, and tuberculosis infection.*

#### ANSWERS.

Some very striking information and charts showing the extent to which milk is a factor in the spread of typhoid fever, scarlet fever, and diphtheria are presented by Dr. John W. Trask in Bulletin 56 of the Hygienic Laboratory, Public Health and Marine-Hospital Service, Treasury Department, beginning at page 25. With regard to tuberculosis, Dr. William H. Park of the research laboratory of the New York City health department examined over 400 cases of tuberculosis in persons of various ages. Among children under 5 years of age, he found that 26 per cent of the cases examined were due to a bovine source as indicated by the bacilli. In children between 5 and 16 years of age, 17 per cent of the cases were due to a bovine source. Above 16 years of age he found very few cases indicating a bovine source. The percentage of all cases indicating a bovine source, irrespective of age, was 7.22. (Chief Bureau of Animal Industry.)

Infected milk is an agency of considerable importance in transmitting typhoid fever and the tuberculosis of childhood, and is also undoubtedly at times an

agency in the spread of scarlet fever and diphtheria. (Surgeon General U. S. Army.)

There seems to be sufficient evidence of the fact that all these diseases may be transmitted through milk—extent unknown. Surgeon General U. S. Navy.)

To a very great extent. The influence of milk in the transmission of typhoid fever, diphtheria, scarlet fever, and tuberculosis is plainly set forth in Hygienic Laboratory Bulletins Nos. 35, 44, 52, and 65. (Surgeon General Public Health and Marine-Hospital Service.)

In order of importance, I place these diseases in the following order: Typhoid fever, tuberculosis (in children), scarlet fever, diphtheria. (Dr. William H. Park, New York, N. Y.)

The Marine-Hospital Service has published statistics on these points. It is my judgment that milk is a larger factor in producing these diseases than is at present known. (Dr. Henry L. Coit, Newark, N. J.)

Causes many epidemics of typhoid, scarlet fever, and diphtheria. Tuberculosis: About one-third of the cases under 15 years of age examined are of bovine, probably of milk, origin. (Dr. R. G. Freeman, New York, N. Y.)

Conditions vary. There is no doubt that many epidemics have been caused through milk. Tuberculosis is frequently caused in children. In New York 300 children die each year from milk infection. (Dr. M. P. Ravenel, Madison, Wis.)

Can not be stated quantitatively, but it is an important factor in all four diseases. (Dr. C. E. A. Winslow, New York, N. Y.)

Very potent factor in typhoid and scarlet fever particularly. (Health officer Ann Arbor, Mich.)

In Atlanta we have occasional outbreaks in some neighborhoods which can be traced to some dairy. (Health officer Atlanta, Ga.)

It is considerably difficult to estimate, but in typhoid fever it is a considerable factor. (Health officer Baltimore, Md.)

Milk is regarded as an excellent culture medium for any of these disease germs, but we have no statistics at hand to indicate the amount of infection carried in this manner. No person suffering with any one of these diseases should be allowed to have any connection with the production and the handling of milk. (Health officer Birmingham, Ala.)

It is a very important means of disseminating them. (Health officer Bismarck, N. Dak.)

It may be and sometimes is a dangerous medium for the transmission of infectious disease. (Health officer Columbus, Ohio.)

The proportion of these diseases transmitted by milk is considerable, the percentage depending upon a host of factors, as inspection, amount of milk pasteurized in any given community. (Health officer Cleveland, Ohio.)

In direct ratio to the prevalence of these diseases among those who handle it. (Health officer Detroit, Mich.)

Only when diphtheria, scarlet fever, or typhoid fever prevails on the premises where the milk is produced, does it occasionally become a factor in the spread of these diseases, but wherever the milk of tuberculous herds is used there is danger of tuberculosis. (State board of health, Florida.)

I do not believe milk epidemics play a very important part, but it deserves close watching. (Health officer Jacksonville, Fla.)

A producer of epidemics if brought in contact with infected persons. (Health officer Kansas City, Mo.)

An important factor and should be closely watched. (Health officer Lynchburg, Va.)

Many epidemics of the first three diseases have been traced to milk. Experiments show that about 10 per cent of all tuberculosis deaths under 5 years of age are of bovine origin. (Health officer Montclair, N. J.)

Certainly carriers. (Health officer Portland, Oreg.)

To a considerable extent. (Health officer Providence, R. I.)

In the past three and one-half years we have had efficient control over milk, and also thorough medical inspection of every case of these diseases. During that time we have had seven cases of diphtheria due to milk, and no other diseases above mentioned at all. The tuberculosis question is still "sub judice." (Health officer Richmond, Va.)

Considerable. (Health officer Rochester, N. Y.)

It is a factor in each disease; unimportant, in my opinion, in diphtheria and scarlet fever; very important in typhoid fever and tuberculosis. (Health officer Seattle, Wash.)

Without a doubt a great factor. (Health officer Syracuse, N. Y.)

Not much; excepting occasionally in typhoid. Very great in case of tuberculosis. (Health officer Topeka, Kans.)

It has been shown in many instances to have been the cause of epidemics of above-mentioned diseases. (Straus Laboratory, Washington, D. C.)

Not a scientist; but believe this cause of disease is overestimated. (John Thomas, Ednor, Md., president Milk Producers' Association.)

Very remote; unless some one is filthy enough to put slops from a sick room into milk bottles and refill them with milk without properly washing. (Sharon Dairy, District of Columbia.)

In the case of the better class of dealers in milk, and with the educational work done on the part of these dealers to bring the producer up to the point of recognizing what his duty is, and also impressing on him the necessity of the exercise of the utmost care and cleanliness in caring for milk, it has almost been eliminated entirely as a factor in infectious diseases, and where physicians comply strictly with the rules of the board of health and report all suspicious cases, it is absolutely eliminated, and larger dealers and all responsible dealers do not furnish for consumption any milk which has been handled in any way by any person having any disease which has been reported by the physician in charge as being "suspicious." (Borden's Condensed Milk Co., New York, N. Y.)

Any reply to these not based on statistics covering a long period would be of little value. (Walker-Gordon Laboratory, Washington, D. C.)

Can not say definitely. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Variable; the known facts, however, prove that it is a considerable factor, a very important one. (Dr. S. C. Prescott, Boston, Mass.)

Considerable extent. (Health officer Los Angeles, Cal.)

I believe that milk is a decided factor in the diseases mentioned, especially amongst children and grown people; also, in the case of typhoid fever; many epidemics of typhoid and scarlet fever have been traced to the milk supply. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Have not as yet traced any infection to milk. (Health officer San Francisco, Cal.)

Where bottles are not properly sterilized, and where they are allowed to be refilled on the wagons, milk becomes a very important factor in the spread of disease, and raw milk from cows not tuberculin tested is undoubtedly dangerous. (Health officer St. Joseph, Mo.)

To a very considerable extent. Tuberculosis directly, the other diseases indirectly. (Health officer Wheeling, W. Va.)

Investigations in your own city offer the best evidence as to typhoid fever, and Dr. Park's figures the best evidence as to tuberculous infection, and it is well known that many epidemics of scarlet fever and diphtheria have been traced to milk. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Slight extent, considering quarantine. (Health officer Scranton, Pa.)

QUESTION 2.—*To what extent, in your judgment, will this infection be diminished by the enforcement of the tuberculin test?*

#### ANSWERS.

The tuberculin test, followed by the removal of the reacting cows, would eliminate only the infection of tuberculosis, and would not prevent other kinds of infection. (Chief Bureau of Animal Industry.)

It would greatly diminish the occurrence of tuberculosis of the bovine type in children. (Surgeon General U. S. Army.)

The test will diminish tuberculosis, but can have no influence whatever on other diseases. (Surgeon General U. S. Navy.)

The tuberculin test, if properly practiced, will practically eliminate the dangers of milk-borne infection of tuberculosis. It will have no effect in diminishing the danger of the other diseases mentioned. (Surgeon General Public Health and Marine-Hospital Service.)

Rigidly enforced for cows before entering herd, and twice a year in herd, with removal of all reacting and partially reacting cows, it would eliminate or almost eliminate with bovine bacilli, which causes 10 per cent of total tuberculosis in New York City infants. (Dr. William H. Park, New York, N. Y.)

Only to the extent that tuberculosis is now disseminated by market milk; about 25 per cent of tuberculosis occurring in children. (Dr. Henry L. Coit, Newark, N. J.)

It should eliminate a third of the cases under 15 years of age. (Dr. R. G. Freeman, New York, N. Y.)

Proper enforcement will entirely prevent tuberculosis infection. (Dr. M. P. Ravenel, Madison, Wis.)

Tuberculosis infection from milk can be largely controlled by tuberculin testing. (Dr. C. E. A. Winslow, New York, N. Y.)

None. (Health officer Ann Arbor, Mich.)

Our investigations up to the present time indicate that the amount of tuberculosis spread by milk is very slight. (Health officer Atlanta, Ga.)

To whatever extent tuberculosis is due to the milk. The enforcement of the tuberculin test, as I understand it to be carried out, would lessen the amount of the disease. (Health officer Baltimore, Md.)

To the extent of the possibility of infection of bovine tuberculosis. (Health officer Birmingham, Ala.)

To a great extent with reference to tuberculosis. (Health officer Bismarck, N. Dak.)

To the degree of preventing tuberculosis. (Health officer Columbus, Ohio.)

The general enforcement of the tuberculin test is out of the question for any large city under present conditions. (Health officer Cleveland, Ohio.)

Tuberculosis will be lowered. (Health officer Detroit, Mich.)

Only to the extent that tuberculosis herds are the means of spreading the infection, and that varies a good deal. In Florida there is relatively little tuberculosis among dairy cattle as compared with the herds North. (State board of health, Florida.)

It should reduce intestinal tuberculosis. (Health officer Jacksonville, Fla.)

Bovine tuberculosis is, in our judgment, communicable, and a test would have a tendency to diminish. (Health officer Kansas City, Mo.)

Tuberculin test could not affect diphtheria, typhoid and scarlet fever. (Health officer Lynchburg, Va.)

The tuberculosis danger entirely. The others not at all. (Health officer Montclair, N. J.)

Relieve the tuberculosis condition. (Health officer Portland, Oreg.)

Much. (Health officer Providence, R. I.)

This would, of course, affect only tuberculosis, and would, it is believed, have decided influence on tuberculosis in infants and children, provided, of course, that the tuberculin reacting animals—all of them—were removed from the herds. (Health officer Richmond, Va.)

Very considerably. (Health officer Rochester, N. Y.)

So far as bovine tuberculosis is concerned, it would cease; infection from the milkers might continue. Of course, I am going on the supposition that the diseased cattle are destroyed. (Health officer Seattle, Wash.)

Only affecting tuberculosis. (Health officer Syracuse, N. Y.)

I believe that most of human pulmonary tuberculosis is gained from the use of milk from tuberculous herds of cows. This would be very greatly diminished by the enforcement of tuberculin test in a rational, systematic, scientific way. (Health officer Topeka, Kans.)

The tuberculin test may impress upon the farmer the need of care in handling milk, but it will not remove the possibility of infection from those diseases. (Straus Laboratory, Washington, D. C.)

Very little, if a vigorous physical test is maintained. (John Thomas, Ednor, Md., president Milk Producers' Association.)

None. (Sharon Dairy, District of Columbia.)

Not a particle. (Borden's Condensed Milk Co., New York, N. Y.)

Any reply to these not based on statistics covering a long period would be of little value. (Walker-Gordon Laboratory, Washington, D. C.)

Can not say. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I should expect some diminution in tuberculosis of the intestines in young children. (Dr. S. C. Prescott, Boston, Mass.)

It will finally eliminate all the tuberculosis infection. (Health officer Los Angeles, Cal.)

The tuberculin test will diminish tuberculosis if the test is carried out year after year, or periodically. New animals should be tested before going into the herd. The calves should be vaccinated. Many certified milk herds shrink 10 per cent to 15 per cent reaction every six months. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

With tuberculosis to a considerable extent. (Health officer San Francisco, Cal.)

The enforcement of the tuberculin test under proper conditions will undoubtedly greatly reduce danger of infection from tuberculosis. (Health officer St. Joseph, Mo.)

The tuberculin test if enforced will undoubtedly decrease intestinal tuberculosis among children. (Health officer Wheeling, W. Va.)

On the basis of Dr. Park's figures, which we incline to believe are low, about 20 per cent of the tuberculous infections of early life would be eliminated. (Dr. Samuel M. Hamill, Philadelphia, Pa.)

Very slight. (Health officer Scranton, Pa.)

QUESTION 3.—*To what extent, in your judgment, would this infection be decreased by compulsory pasteurization?*

## ANSWERS.

Efficient compulsory pasteurization would greatly reduce the danger of all kinds of infection. It would practically destroy such infections up to the time of pasteurization, and the danger of contamination afterwards is very slight. (Chief Bureau of Animal Industry.)

It would prevent the transfer of these infections from the farm to the city. (Surgeon General U. S. Army.)

Pasteurization under the influence of a temperature of 60° C. for 20 minutes will destroy all germs except spore bearers. (Surgeon General U. S. Navy.)

Compulsory pasteurization, if properly practiced, will kill the infections of tuberculosis, typhoid fever, scarlet fever, diphtheria, and other infections sometimes contained in milk. (Surgeon General Public Health and Marine-Hospital Service.)

This would eliminate all danger of bovine infection. (Dr. William H. Park, New York, N. Y.)

It would be entirely obviated by efficient pasteurization, but no statistics are available to prove this point. (Dr. Henry L. Coit, Newark, N. J.)

That would depend on the sterility of the milk after pasteurization. (Dr. R. G. Freeman, New York, N. Y.)

Proper enforcement would entirely prevent all infection. (Dr. M. P. Ravenel, Madison, Wis.)

Infection from all four diseases could, of course, be prevented by pasteurization, absolutely, if milk were kept clean after treatment. (Dr. C. E. A. Winslow, New York, N. Y.)

Considerably. (Health officer Ann Arbor, Mich.)

Good milk does not need pasteurization. For a city of this size we have found pasteurization harmful rather than beneficial. (Health officer Atlanta, Ga.)

As far as the communication of bovine tuberculosis is concerned proper pasteurization will eliminate it. It does not prevent subsequent infection with human tuberculosis. (Health officer Baltimore, Md.)

All of these disease germs should be destroyed by thorough pasteurization. If this be true the infection from any of these disease germs should be prevented. (Health officer Birmingham, Ala.)

It would have some. (Health officer Bismarck, N. Dak.)

All milk-borne disease can be prevented by efficient pasteurization. (Health officer Cleveland, Ohio.)

That depends upon enforced regulation. (Health officer Columbus, Ohio.)

If the infection gets in before pasteurization, it is destroyed; if after, it is not. (Health officer Detroit, Mich.)

To the same extent that it would by the tuberculin test, less the liability of those working with tuberculous cattle to become infected. (State board of health, Florida.)

To a great extent, if the pasteurization is ideal. (Health officer Jacksonville, Fla.)

Sterilization of milk would have a tendency to diminish, if proper steps are taken. (Health officer Kansas City, Mo.)

Would cut out most of the foregoing, but other dangers equally as great might result. (Health officer Lynchburg, Va.)

Would be practically eliminated for all these diseases if pasteurization were properly done, as the men at the plant would be the only ones who could possibly infect the milk. (Health officer Montclair, N. J.)

Prevent transmission of diseases. (Health officer Portland, Oreg.)

Much. (Health officer Providence, R. I.)

To the fullest extent if properly done. But while it would lessen these infections we have no right to look at the question simply from that standpoint. Pasteurization may do great harm in other directions. (Health officer Richmond, Va.)

I don't know what is meant by pasteurization. As practiced here it is only used to preserve dirty milk. (Health officer Rochester, N. Y.)

If it were possible to properly pasteurize all milk all danger of infection from tuberculosis would cease so far as the bovine form is concerned. (Health officer Seattle, Wash.)

If properly used it ought to be successful. (Health officer Syracuse, N. Y.)

Greatly, if pasteurization properly conducted. (Health officer Topeka, Kans.)

By proper pasteurization it could be practically eliminated if put at once in sealed sterile containers. (Straus Laboratory, Washington, D. C.)

None, but to the contrary would be increased. (Sharon Dairy, District of Columbia.)

This is purely problematical and depends entirely on how thorough the pasteurizing is done. As pasteurization would have to be most thorough in order to affect it in any way, this would again bring up the question as to the relative values between a good, clean, raw milk and a milk which had been heated, particularly when this was kept up as a steady diet covering a period of time. (Borden's Condensed Milk Co., New York, N. Y.)

Any reply to these not based on statistics covering a long period would be of little value. (Walker-Gordon Laboratory, Washington, D. C.)

Can not say. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

If real pasteurization, somewhat; if commercial pasteurization, hardly at all. (Dr. S. C. Prescott, Boston, Mass.)

Would be eliminated. (Health officer Los Angeles, Cal.)

Properly pasteurized milk would decrease the infection, and it is more practical at present than tuberculin-tested milk unless the testing is kept up periodically. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

With tuberculosis to a considerable extent. (Health officer San Francisco, Cal.)

This would depend upon the methods required. If the pasteurizing be done by individual dairies or depots and not under the direct supervision of the authorities, very uncertain results would be obtained. (Health officer St. Joseph, Mo.)

Very slightly. (Health officer Wheeling, W. Va.)

The notoriously uncertain results of commercial pasteurization render an answer to this question impossible. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Very slight. (Health officer Scranton, Pa.)

**QUESTION 4.**—*To what extent is this infection influenced by the prescribed conditions of cleanliness on a farm and in the handling and the distribution of milk?*

ANSWERS.

While cleanliness will greatly reduce the danger of infection with such diseases, it will not entirely remove such danger, as the germs of disease might be conveyed by clean persons, especially by persons termed "bacillus carriers" or "walking cases" of disease. (Chief Bureau of Animal Industry.)

If the prescribed conditions are accurately enforced, the spread of tuberculosis in cattle is somewhat, and the transfer of the human infections to the milk is much, diminished. (Surgeon General U. S. Army.)

The prescribed conditions of cleanliness, while minimizing the infection, would not entirely prevent it. (Surgeon General U. S. Navy.)

Cleanliness in production and handling of milk will reduce the danger of infectious diseases, but the milk must be handled by healthy persons and come from noninfected cows. (Surgeon General Public Health and Marine-Hospital Service.)

Considerably lessened. (Dr. William H. Park, New York, N. Y.)

Infection is entirely obviated, providing the tuberculin test is reliable. Other infectious diseases are impossible through milk with proper medical supervision of the dairy hygiene, as seen in the production of certified milk by a medical commission. (Dr. Henry L. Coit, Newark, N. J.)

To a very great extent. (Dr. R. G. Freeman, New York, N. Y.)

Can not give estimate, but it is an important factor. (Dr. M. P. Ravenel, Madison, Wis.)

Infection is reduced by these precautions, but can not be prevented except by pasteurization. (Dr. C. E. A. Winslow, New York, N. Y.)

Theoretically could be entirely controlled. (Health officer Ann Arbor, Mich.)

Cleanliness in handling milk and proper cooling of same appears to be a safeguard against infection. (Health officer Atlanta, Ga.)

Depends upon whether tuberculosis is present on farm. (Health officer Baltimore, Md.)

Largely eliminated. (Health officer Birmingham, Ala.)

To a great extent. (Health officer Bismarck, N. Dak.)

To a great degree; perhaps 50 per cent of milk-borne epidemics can be prevented by efficient sanitary inspection. (Health officer Cleveland, Ohio.)

Very great deal. (Health officer Columbus, Ohio.)

It is barred if the prescribed conditions are enforced. (Health officer Detroit, Mich.)

The determining factor in the case of tuberculosis is its presence in the herd—not the method of management. It comes from the feces, which dry and are blown about by the wind. (State board of health, Florida.)

To the greatest possible extent. It is a matter of education; and, secondly, of careful supervision and prosecution. (Health officer Jacksonville, Fla.)

Absolute cleanliness must be observed. (Health officer Kansas City, Mo.)

An enormous extent. (Health officer Lynchburg, Va.)

Greatly diminished. (Health officer Montclair, N. J.)

The key to the situation rests with the handling. (Health officer Portland, Oreg.)

It is very expensive to always see that rules are being carried out. (Health officer Providence, R. I.)

It is almost completely done away with if inspections are thorough. Even tuberculosis is decidedly affected, as manure (a common component of dirty milk) is the main vehicle by which the bacilli get into milk. (Health officer Richmond, Va.)

Not very much. (Health officer Rochester, N. Y.)

We believe that milk contaminated by the urine or fecal matter of the cow is extremely dangerous. The milker himself may infect milk, therefore the conditions of the farm and the handling of milk are of vast importance. (Health officer Seattle, Wash.)

It should thoroughly control. (Health officer Syracuse, N. Y.)

Very greatly, if sanitary requirements properly enforced by competent inspection. (Health officer Topeka, Kans.)

Very largely, but extremely difficult of enforcement and the danger reappears with any slip up. (Straus Laboratory, Washington, D. C.)

Largely. It is to cleanliness that we must look for better conditions to obtain in the milk supply. (Sharon Dairy, District of Columbia.)

As it would be impossible for infection to creep in if all the prescribed conditions for cleanliness, handling, and distribution were rigidly adhered to, it would seem as if infection was influenced entirely by these points. (Borden's Condensed Milk Co., New York, N. Y.)

Comparatively little, except indirectly through education. (Walker-Gordon Laboratory, Washington, D. C.)

Largely. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I feel sure that it is greatly influenced in this way. (Dr. S. C. Prescott, Boston, Mass.)

All eliminated except tuberculosis. (Health officer Los Angeles, Cal.)

It is influenced almost entirely by conditions of cleanliness and in the handling and the distribution. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Cleanliness would eliminate all but tuberculosis. (Health officer San Francisco, Cal.)

In my judgment, the contagious disease infection would be very much reduced. (Health officer St. Joseph, Mo.)

Very large extent. (Health officer Wheeling, W. Va.)

Assuming that you refer to tuberculosis, we would say that there would be no reduction except in so far as it might eliminate tuberculous individuals from the handling of the milk. To some extent also by protecting the milk

from contamination by fecal matter. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

There you have the sequel—it is all in the first care of milk and cleanliness. (Health officer Scranton, Pa.)

QUESTION 5.—*What effect, in your judgment, will insistence upon the tuberculin test, pasteurization, the bacterial count, the maintenance of a temperature not exceeding 50° F., and requirements as to stabling and cleanliness in the production of milk, have upon the retail price of milk?*

## ANSWERS.

The question is primarily one of human health and life, and necessary precautions should not be omitted simply because they would increase the price of milk. It is believed, however, that such requirements would not greatly increase the cost. In the city of Washington milk which practically conforms to these requirements is already being sold at only 1 cent a quart over the price of other milk, and the dealers appear to be making a commercial success of this business. (Chief Bureau of Animal Industry.)

A good article is usually somewhat more expensive than a poor one. (Surgeon General U. S. Army.)

It is bound to increase the retail price. (Surgeon General U. S. Navy.)

Insistence on the requirements mentioned will increase the cost of production and delivery of milk, but the reduction of morbidity will in the end be an economic saving to the community. (Surgeon General Public Health and Marine-Hospital Service.)

The tuberculin test would cause the loss of about 15 per cent of the cattle. The other changes would add one-half to 1 cent to each quart for ordinary city milk. (Dr. William H. Park, New York, N. Y.)

An increase of 25 per cent. (Dr. Henry L. Coit, Newark, N. J.)

It might raise the price 1 or 2 cents. (Dr. R. G. Freeman, New York, N. Y.)

Might cause temporary increase in cost, but would not be great. (Dr. M. P. Ravenel, Madison, Wis.)

It probably will increase it; it ought to increase it. Present prices are too low for safety and thus for economy. (Dr. C. E. A. Winslow, New York, N. Y.)

The enforcement of the tuberculin test would not increase the price of land, the price of foodstuffs, the price of stable accommodations, the price of labor, the cost of transportation, or the cost of distribution. It would increase for a while a single item, to wit, the cost of cattle. For purposes of illustration assume that a farmer has a herd of 100 cattle, worth \$75 each, making the total value of his cattle \$7,500. Interest on this capital at 5 per cent per annum is equivalent to \$375. Assume now that the tuberculin test is applied. Twenty per cent of herd react and are killed, and 20 new cows are introduced, tuberculin tested, costing \$100 apiece, or 33 $\frac{1}{3}$  per cent more than the value of the original herd before testing. If we disregard the increased value of the herd that has stood the test that arises out of the fact that it has done so, the value of the herd will then be as follows: Eighty cattle, at \$75 each, equivalent to \$6,000; 20 cattle, at \$100, equivalent to \$2,000; total value of herd, \$8,000. The interest on this capital at 5 per cent per annum is equivalent to \$400. Between the interest in the capital invested on the untested herd and the interest on the capital invested in the tested herd the difference amounts, therefore, to but \$25 per annum. This amount is distributed over the entire output of a herd of 100 cows for 12 months. It represents the increased cost to the producer of producing milk from tuberculin-tested cattle. This amount would probably be materially reduced, if not altogether eliminated, by the increased period of usefulness of the tuberculosis-free cattle as compared with those infected with the disease otherwise in the herd.

Viewing the matter in the light most favorable to the producer, the increased cost of producing milk from tuberculin-tested cows should not amount to more than a small fraction of a cent per gallon. Taking the herd of 100 cows, untested, with \$75 per cow, the gross value of the herd would be \$7,500. Kill 20 per cent of these cows on account of tuberculosis, without remuneration of any kind to the farmer, and appraise the remaining 80 animals as still worth as much as the entire herd, \$7,500. Replace the 20 animals that have been destroyed by 20 tuberculin-tested cows, costing \$100 per cow, or \$2,000. The value of the 100 tuberculin-tested cows would then be \$9,500. Five per cent on this investment would amount to \$475 per annum, or just \$100 per annum more

than the interest charged on the untested herd. If, then, we presume that the average production for each animal in the entire herd is but  $1\frac{1}{2}$  gallons per day, the production of the herd for the entire year will be 36,500, and the increased cost per gallon, representing the interest charges on the increased cost of the herd, would amount to one-fifth of 1 cent. Of course if a larger percentage of the herd reacted, the net increase in the cost of production would be increased, but it does not appear likely that there will be any material increase. In view of the experience with respect to the testing of cattle in the District, however, it would appear that the figure taken for condemnation, 20 per cent, was extremely liberal. (Health officer District of Columbia.)

It must increase. (Health officer Ann Arbor, Mich.)

Positive cleanliness, cooling below  $50^{\circ}$ , and maintaining this temperature has been adopted by several dairymen in Atlanta of their own accord without increasing the price. (Health officer Atlanta, Ga.)

This is hard to answer, but I believe that the present price of 9 and 10 cents should not be affected by such requirements. (Health officer Baltimore, Md.)

It will increase the cost of production; being greater it is natural that the price should also increase. Milk produced under these restrictions is worth more, and the consumer should be willing to pay for same. (Health officer Birmingham, Ala.)

It will increase the price considerably. (Health officer Bismarck, N. Dak.)

Probably none, but would tend to centralize the business in the hands of larger dealers. (Health officer Cleveland, Ohio.)

Must go up. (Health officer Columbus, Ohio.)

One or two cents per quart retail. (Health officer Detroit, Mich.)

It will increase it, and milk so produced is worth an increase in price. (Health officer Jacksonville, Fla.)

None whatever, notwithstanding reports to contrary by dealers. (Health officer Kansas City, Mo.)

A first-class milk should be sold at 10 cents per quart in most places, only unusual conditions will put it much less. (Health officer Lynchburg, Va.)

Increase of a cent or two per quart. In any trade a good article brings more than a poor one. (Health officer Montclair, N. J.)

None, or practically none. (Health officer Portland, Oreg.)

At first make little higher, but cost would be less as supply would be increased, as much milk is not salable. (Health officer Providence, R. I.)

These will, and should, have a decided effect. One expects to pay more for wholesome, clean milk than for dirty, dangerous milk. (Health officer Richmond, Va.)

Except pasteurization. It has had none here; it ought to have none anywhere. (Health officer Rochester, N. Y.)

If the law were enforced to the letter, and if milk condenseries and creameries had to observe substantially the same law, milk would not increase in price. (Health officer Seattle, Wash.)

Will bring a fair price to producers. (Health officer Syracuse, N. Y.)

Little, if any. (Health officer Topeka, Kans.)

Raise the price. At present pasteurization of all milk except that of a given high standard seems the only method of putting a safe milk within reach of ordinary people. (Straus Laboratory, Washington, D. C.)

Probably 50 per cent raise. (John Thomas, Ednor, Md., president Milk Producers' Association.)

They will all tend to increase the price. Tuberculin test, compulsory pasteurization, and the bacterial count should not be attempted. Stabling and cleanliness should be rigidly enforced. (Sharon Dairy, District of Columbia.)

It would necessarily increase the retail price of milk, and probably would affect it to a considerable degree. (Borden's Condensed Milk Co., New York, N. Y.)

It would justify a material increase in the retail price of milk. (Walker-Gordon Laboratory, Washington, D. C.)

Increase it. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Increase it, probably 3 to 5 cents per quart if all are required. (Dr. S. C. Prescott, Boston, Mass.)

Will temporarily, at least, increase the price. (Health officer Los Angeles, Cal.)

I believe that the retail price would not have to be changed, unless the requirements were too rigid. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Certified milk, as above, is 100 per cent dearer. (Health officer San Francisco, Cal.)

Where milk is being sold at a reasonable price it would undoubtedly raise the price of milk from 10 to 20 per cent. (Health officer St. Joseph, Mo.)

It may increase the price. At present the producer does not get enough profit; the city dealer in most cities does. (Health officer Wheeling, W. Va.)

To increase its price to 9 or 10 cents, unless there should be municipal control of the production. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Fifty per cent advance above present prices. (Health officer Scranton, Pa.)

QUESTION 6.—*Will the insistence upon these requirements result in a temporary or permanent milk famine?*

## ANSWERS.

These requirements, if gradually introduced, will not result in a milk famine. If suddenly and injudiciously enforced, however, they would probably cause a temporary shortage in the milk supply. (Chief Bureau of Animal Industry.)

I do not know. (Surgeon General U. S. Army.)

No means for determining this question. (Surgeon General U. S. Navy.)

In my opinion, it will not. (Surgeon General Public Health and Marine-Hospital Service.)

It would be impossible to carry out the tuberculin test properly on all farms in a less period than one year. The insistence on ice would require a winter to intervene. (Dr. William H. Park, New York, N. Y.)

No; they are judiciously applied. (Dr. Henry L. Coit, Newark, N. J.)

All reforms of this sort should be introduced gradually, in which case there would be no milk famine. (Dr. R. G. Freeman, New York, N. Y.)

No. Time should be allowed for farmers to adjust themselves to new conditions. (Dr. M. P. Ravenel, Madison, Wis.)

It has not elsewhere. (Dr. C. E. A. Winslow, New York, N. Y.)

If the test be applied within a day or a week, and were so applied, a milk famine would undoubtedly result. If the application of the tests in the first instance were spread over a reasonable length of time, no famine would result. Under ordinary conditions, the routine applications of the test would not diminish the milk supply. (Health officer District of Columbia.)

No. (Health officer Ann Arbor, Mich.)

In Atlanta we can not see how this will affect the supply, as we are now insisting upon these requirements. (Health officer Atlanta, Ga.)

Probably would. (Health officer Baltimore, Md.)

No. Not permanently; however, it might have this influence temporarily. (Health officer Birmingham, Ala.)

Permanent. (Health officer Bismarck, N. Dak.)

Not if carried out within a reasonable period, say two years. (Health officer Cleveland Ohio.)

Neither, if brought about gradually. (Health officer Columbus, Ohio.)

Not necessarily. (Health officer Detroit, Mich.)

If they result in milk famine at all, it will be of the most transitory character. (State board of health, Florida.)

Not if enforced slowly and with judgment. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

Should be gradually introduced. (Health officer Lynchburg, Va.)

Temporary, if enforced at once. (Health officer Montclair, N. J.)

In our experience, none. But the middleman tried to increase the price to consumer. (Health officer Portland, Oreg.)

No. (Health officer Providence, R. I.)

Not if wisely carried out. The work should be progressive; not everything perfect at once. (Health officer Richmond, Va.)

No; the threat has been made to make a milk famine every time we have enforced a new rule, but none has occurred. (Health officer Rochester, N. Y.)

Neither one; if the people are all treated alike. This, of course, would include the opportunity of selling liquid manure to the condensers. (Health officer Seattle, Wash.)

No. Will increase the use of milk and so increase the demand. (Health officer Syracuse, N. Y.)

Yes; if immediate. But all changes or reforms in this respect should be accompanied with common sense and judgment. (Health officer Topeka, Kans.)

Could not be done instantaneously without causing a famine. Chicago method seems most feasible. (Straus Laboratory, Washington, D. C.)

It would have that tendency. (John Thomas, Ednor, Md., president Milk Producers Association.)

Partially so. To what extent is problematical. (Sharon Dairy, District of Columbia.)

We think that the insistence upon all these requirements would result in more than a temporary milk famine, and, while of course it would not be probably permanent, it would extend over a considerable period of time; this famine of course being entirely dependent upon what price the consumer was willing to pay. (Borden's Condensed Milk Co., New York, N. Y.)

Yes; but for what length of time it is impossible to estimate. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

It would doubtless mean reduced production. (Dr. S. C. Prescott, Boston, Mass.)

If any famine, it will be slight and only temporary. (Health officer Los Angeles, Cal.)

Insistence upon the testing of the cows may, too low a bacterial count may, but temperature and pasteurization will not cause a temporary milk famine. None will cause a permanent milk famine. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Consumer could not afford milk. (Health officer San Francisco, Cal.)

If famine resulted at all, it would only be a question of a short time until the supply would adjust itself to meet the demand. (Health officer St. Joseph, Mo.)

I think not. (Health officer Wheeling, W. Va.)

No; unless the producers and dealers combine to create it. The chance of such a famine would be lessened by requiring the same standards for milk used for making butter. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

It might. (Health officer Scranton, Pa.)

QUESTION 7.—*To what extent would such insistence lead to the use of prepared milks and other substitutes for raw or pasteurized milk?*

#### ANSWERS.

If the requirements were gradually introduced, they would probably make no difference in this respect. Sudden enforcement, however, might make it necessary for a limited time to use prepared milks. (Chief Bureau of Animal Industry.)

I do not know. (Surgeon General U. S. Army.)

The price will determine this. (Surgeon General U. S. Navy.)

I am unable to say. (Surgeon General Public Health and Marine-Hospital Service.)

There would be no reason to insist on tuberculin tests if milk were to be pasteurized. If done gradually, and if the increased cost were paid, there should be little substitution. (Dr. William H. Park, New York, N. Y.)

To no extent; substitutes for raw milk have never been found satisfactory. (Dr. Henry L. Coit, Newark, N. J.)

Probably not at all. (Dr. R. G. Freeman, New York, N. Y.)

Can not answer. (Dr. M. P. Ravenel, Madison, Wis.)

Very slight. (Health officer Ann Arbor, Mich.)

We have not seen any such results; on the other hand, bad milk certainly leads to this. (Health officer Atlanta, Ga.)

I do not know. (Health officer Baltimore, Md.)

Do not know. (Health officer Birmingham, Ala.)

It would not tend to it. (Health officer Bismarck, N. Dak.)

Impossible to say. (Health officer Cleveland, Ohio.)

Not very great, if any. (Health officer Columbus, Ohio.)

None. (Health officer Detroit, Mich.)

I believe when the public are assured of clean milk, the demand for milk will increase greatly. (Health officer Jacksonville, Fla.)

None. (Health officer Kansas City, Mo.)

Judicious inspection in Lynchburg has resulted in an extremely enlarged demand for milk. Almost three times as great. (Health officer Lynchburg, Va.)

A proposition of supply and demand with reference to price. (Health officer Portland, Oreg.)

To no great extent, if public are not frightened by sensational articles. (Health officer Providence, R. I.)

Impossible to say; but even if this should result, still the sale of fresh milk will increase when the people know it is safe. Many will give up these substitutes, thus offsetting the other. (Health officer Richmond, Va.)

I do not know. Do not believe to any extent. The milkman is afraid he would not get his trade again. (Health officer Rochester, N. Y.)

Many families in this city during the last two years are using cow's milk because they believe that it is now wholesome. At that time they were using canned milk in not a few cases. (Health officer Seattle, Wash.)

Not at all. (Health officer Syracuse, N. Y.)

Only so far as the price would be a consideration. The people much prefer the fresh article when they can get it. (Health officer Topeka, Kans.)

Can't tell. Certainly it ought to be coupled with a campaign of education against use of such prepared foods for infants. (Straus Laboratory, Washington, D. C.)

It would have a tendency to increase the sale. (Sharon Dairy, District of Columbia.)

To a considerable degree. It is very hard to state as to just exactly what extent. (Borden's Condensed Milk Co., New York, N. Y.)

I do not know. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Greatly. (Dr. S. C. Prescott, Boston, Mass.)

Large quantities of sweetened and unsweetened condensed milks would be used. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

It would undoubtedly cause at least a temporarily increased demand for such products. (Health officer St. Joseph, Mo.)

I do not know. (Health officer Wheeling, W. Va.)

Probably increase it temporarily. Establish the same requirements for milk used in the manufacture of these products. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Increase the manufacture and sale to about 50 per cent. (Health officer Scranton, Pa.)

QUESTION 8.—*Are these prepared milks as nutritious as raw or properly pasteurized milk?*

## ANSWERS.

This depends upon the character and method of preparation. Some prepared milks are not as nutritious as raw or properly pasteurized milk. (Chief Bureau of Animal Industry.)

They are not as desirable for the feeding of infants. (Surgeon General U. S. Army.)

No. (Surgeon General U. S. Navy.)

This question involves consideration of each individual preparation. (Surgeon General Public Health and Marine-Hospital Service.)

Not prepared to answer. Believe they are poor permanent substitutes. (Dr. William H. Park, New York, N. Y.)

Rating raw milk at 100, would place condensed milk at 20, and powdered milk at 10. (Dr. Henry L. Coit, Newark, N. J.)

Probably they are. (Dr. R. G. Freeman, New York, N. Y.)

Some are; many not; many almost worthless. (Dr. M. P. Ravenel, Madison, Wis.)

Substitutes are much more dangerous for infants than pasteurized milk. (Dr. C. E. A. Winslow, New York, N. Y.)

No. (Health officer Ann Arbor, Mich.)

We prefer the raw milk or fresh milk. (Health officer Atlanta, Ga.)

I think not. (Health officer Baltimore, Md.)

I would not consider them so. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

No. (Health officer Cleveland, Ohio.)

No. (Health officer Columbus, Ohio.)

No. (Health officer Detroit, Mich.)

I am convinced that they are not. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

Not as good as raw; I had rather drink them than pasteurized. (Health officer Lynchburg, Va.)

I think so, but not as palatable. (Health officer Portland, Oreg.)

They are not. (Health officer Providence, R. I.)

Probably, if the milk was originally right. (Health officer Richmond, Va.)

They are usually so. I do not know what properly pasteurized milk means in a commercial sense. (Health officer Rochester, N. Y.)

The most of them are not; they are harder to digest, are made out of inferior milk, impure in many instances, contain sugar in unnatural quantities and are not satisfactory as food for children, neither is the taste appetizing or agreeable. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

I don't know. I would be inclined to think not. (Health officer Topeka, Kans.)

No. (Straus Laboratory, Washington, D. C.)

I do not think so. There is more nutrition in raw milk than any of the above substitutes. (Sharon Dairy, District of Columbia.)

"Prepared milk" of a recognized standard brand, manufactured and cared for under conditions existing in the high-grade factories is practically a concentrated "properly pasteurized milk," and has all the nutritive qualities of such milk. (Borden's Condensed Milk Co., New York, N. Y.)

According to the best authorities, no. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Much variation. They are likely to be deficient in fats. (Dr. S. C. Prescott, Boston, Mass.)

No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

I think not. (Health officer St. Joseph Mo.)

I have had little experience with prepared milks. (Health officer Wheeling, W. Va.)

No. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

I don't think so. (Health officer Scranton, Pa.)

QUESTION 9.—How do prepared milks (including evaporated, condensed, and powdered) compare in price by volume with raw or pasteurized milk?

#### ANSWERS.

Investigations made by the Boston Board of Health show that if condensed milk is diluted with only enough water to make milk of the Massachusetts standard, the cost exceeds the price of ordinary milk, and in some instances equals the price of inspected milk and in others exceeds the price of some brands of certified milk. The conclusion is drawn that condensed milk can not be employed economically where whole milk is procurable. (Chief Bureau of Animal Industry.)

An answer to this question would require much space and labor; but it can be easily found out with regard to any special preparation. (Surgeon General U. S. Army.)

Prepared milks are cheaper. (Surgeon General U. S. Navy.)

Not prepared to answer. (Dr. William H. Park, New York, N. Y.)

No knowledge. (Dr. Henry L. Coit, Newark, N. J.)

Not necessarily more expensive. (Dr. R. G. Freeman, New York, N. Y.)

We are not prepared to say. (Health officer Atlanta, Ga.)

I do not know. (Health officer Baltimore, Md.)

Higher than the raw or pasteurized products (good brands). (Health officer Birmingham, Ala.)

Higher. (Health officer Bismarck, N. Dak.)

Higher. (Health officer Cleveland, Ohio.)

Not favorably. (Health officer Columbus, Ohio.)

Slightly higher. (Health officer Detroit, Mich.)

They are very much cheaper and worth less. (Health officer Jacksonville, Fla.)

Higher. (Health officer Kansas City, Mo.)

Raw milk in Lynchburg is used almost exclusively. Retail price, 10 cents per quart. (Health officer Lynchburg, Va.)

That is a commercial question. (Health officer Portland, Oreg.)

- More expensive. (Health officer Providence, R. I.)  
 Much higher than raw milk at 10 cents a quart, the Richmond price.  
 (Health officer Richmond, Va.)  
 I do not know. (Health officer Rochester, N. Y.)  
 I can not answer this question intelligently, since we have many prices on  
 canned milk. (Health officer Seattle, Wash.)  
 Unknown. (Health officer Syracuse, N. Y.)  
 About the same, maybe a little cheaper; say, a cent a quart. (Health  
 officer Topeka, Kans.)  
 Generally higher, I think. (Sharon Dairy, District of Columbia.)  
 This depends entirely on the price; but on an average, when they are  
 increased to equal volumes and containing the same amount of ratio of solids,  
 their cost is approximately the same, and in some cases lower. (Borden's  
 Condensed Milk Co., New York, N. Y.)  
 More costly. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 About the same as ordinary (not inspected) new milk or commercially pas-  
 teurized milk. (Dr. S. C. Prescott, Boston, Mass.)  
 Higher in price, but their advertising would lead you to believe otherwise.  
 (J. M. Houston, White Cross Milk Co., Washington, D. C.)  
 Greater in price. (Health officer Wheeling, W. Va.)  
 Unable to answer. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 Cheaper by 30 per cent. (Health officer Scranton, Pa.)

QUESTION 10.—*Have you seen any evidence or indication of a milk trust or com-  
 bine to control raw-milk production or milk supply of the District of Co-  
 lumbia or elsewhere?*

## ANSWERS.

- The department has no information as to such a trust or combine. The local  
 milk dealers have an organization, but this is not regarded as a trust or com-  
 bine in the usual sense of those terms. (Chief Bureau of Animal Industry.)  
 No. (Surgeon General U. S. Army.)  
 No. (Surgeon General U. S. Navy.)  
 No. (Surgeon General Public Health and Marine-Hospital Service.)  
 Not prepared to answer. (Dr. William H. Park, New York, N. Y.)  
 I have not. (Dr. Henry L. Coit, Newark, N. J.)  
 A milk exchange in New York fixes the price paid to the producer. (Dr. R. G.  
 Freeman, New York, N. Y.)  
 Some indication of such a combination in Boston. (Dr. C. E. A. Winslow,  
 New York, N. Y.)  
 Such combines have been attempted. (Health officer Ann Arbor, Mich.)  
 We have heard remarks to this effect, but it did not seem to materialize.  
 (Health officer Atlanta, Ga.)  
 I have not seen it in Baltimore. (Health officer Baltimore, Md.)  
 No. (Health officer Birmingham, Ala.)  
 No. (Health officer Bismarck, N. Dak.)  
 Yes. (Health officer Cleveland, Ohio.)  
 Not in Columbus, Ohio. (Health officer Columbus, Ohio.)  
 No. (Health officer Jacksonville, Fla.)  
 We have no evidence at this point, though this answer does not apply to  
 other localities. Milk here retails at 8 cents per quart. (Health officer Kansas  
 City, Mo.)  
 Don't know anything about it. (Health officer Lynchburg, Va.)  
 An attempt in this city, but frowned down. (Health officer Portland, Oreg.)  
 Not in Providence, R. I. (Health officer Providence, R. I.)  
 I can answer only for Richmond. Two large concerns handle about 60 per  
 cent of all milk on this market. I would not regard this at present as a trust.  
 They have merely built up good business. (Health officer Richmond, Va.)  
 No; but I have heard that the pasteurizers are controlled. (Health officer  
 Rochester, N. Y.)  
 We sent one gentleman to jail for two months for conspiring with others to  
 raise the price of milk some two years since. We believe that the milk trust  
 collapsed at that time. (Health officer Seattle, Wash.)  
 No. (Health officer Syracuse, N. Y.)  
 No. (Straus Laboratory, Washington, D. C.)  
 I have no such evidence. (John Thomas, Ednor, Md., president Milk Pro-  
 ducers' Association.)

I have seen an indication of a combine. (Sharon Dairy, District of Columbia.)

No. This would be an impossibility by reason of the economic conditions surrounding the production of milk, as each man producing milk is a unit in himself, and therefore must be reckoned with, and there is no way in which a combination could be effected to control either the production or supply. (Borden's Condensed Milk Co., New York, N. Y.)

No. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

In Boston. (Dr. S. C. Prescott, Boston, Mass.)

One firm in Los Angeles does over 50 per cent of the business. (Health officer Los Angeles, Cal.)

No; the remarks of some people in the public press in regard to that are ridiculous. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Attempt has been made in San Francisco; not successful. (Health officer San Francisco, Cal.)

No. (Health officer St. Joseph, Mo.)

No. (Health officer Wheeling, W. Va.)

No. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Not at present. (Health officer Scranton, Pa.)

QUESTION 11.—*Have you seen indications of a trust to control the production or distribution of prepared, condensed, concentrated, or other forms of milk other than raw milk in the District of Columbia or elsewhere?*

## ANSWERS.

One concern is believed to control a large part of the output of condensed milk, but the department is unable to give particulars. However, other brands of condensed milk are also found on the market. (Chief Bureau of Animal Industry.)

No. (Surgeon General U. S. Army.)

No. (Surgeon General U. S. Navy.)

No. (Surgeon General Public Health and Marine-Hospital Service.)

Not prepared to answer. (Dr. William H. Park, New York, N. Y.)

There are several corporations organized for the production and sale of other forms of milk than raw milk. (Dr. Henry L. Coit, Newark, N. J.)

No. (Dr. R. G. Freeman, New York, N. Y.)

No. (Health officer Ann Arbor, Mich.)

Do not know of any. (Health officer Atlanta, Ga.)

I have not noticed any. (Health officer Baltimore, Md.)

No. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

Yes. (Health officer Cleveland, Ohio.)

Not in Columbus, Ohio. (Health officer Columbus, Ohio.)

No. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

Do not know. (Health officer Lynchburg, Va.)

No. There may be such combinations. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

No. (Health officer Richmond, Va.)

No. (Health officer Rochester, N. Y.)

No. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

I have no such evidence. (John Thomas, Ednor, Md., president Milk Producers Association.)

No. (Sharon Dairy, District of Columbia.)

No. This is equally true as relating to concentrated milk as in relation to fluid milk. (Borden's Condensed Milk Co., New York, N. Y.)

No. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

No. (Dr. S. C. Prescott, Boston, Mass.)

No. I have been connected with concentrated milk companies for some years, and very close to other large companies in New York and elsewhere, and such a thing is impossible. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

- No. (Health officer St. Joseph, Mo.)  
 No. (Health officer Wheeling, W. Va.)  
 No. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 No. (Health officer Scranton, Pa.)

QUESTION 12.—*Is it practicable, in your judgment, to maintain a temperature not exceeding 50° F. on delivery wagons?*

## ANSWERS.

Yes; with the possible exception of a few extremely warm summer days. (Chief Bureau of Animal Industry.)

I have not investigated this question. (Surgeon General U. S. Army.)

Certainly. (Surgeon General U. S. Navy.)

Yes. (Surgeon General Public Health and Marine-Hospital Service.)

Yes, if the outside cans are protected from exposure to the air by boards or canvas and a little ice is kept on the cans. (Dr. William H. Park, New York, N. Y.)

It is, with the use of cracked ice. (Dr. Henry L. Coit, Newark, N. J.)

Yes; only a matter of icing. (Dr. R. G. Freeman, New York, N. Y.)

Possible, but not practicable. (Dr. M. P. Ravenel, Madison, Wis.)

Yes. (Health officer Ann Arbor, Mich.)

Several of our dairymen in Atlanta have been doing this of their own accord during the summer. (Health officer Atlanta, Ga.)

Yes, if started out at that temperature. (Health officer Baltimore, Md.)

From a commercial standpoint it is not entirely feasible for ordinary market milk at this time. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

No. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes. (State board of health, Florida.)

Yes; and most desirable. (Health officer Jacksonville, Fla.)

Yes. Wagons, if properly iced, can maintain temperature until delivered to consumer, but there the liability of deliverer ceases and consumer assumes responsibility. (Health officer Kansas City, Mo.)

Yes, if introduced very slowly. It is done by most of the wagons in Lynchburg. (Health officer Lynchburg, Va.)

Yes. We require it in Montclair, and we fined one dealer for violation of the law. (Health officer Montclair, N. J.)

No. May be done, but in extreme hot weather very difficult. (Health officer Portland, Oreg.)

Yes, if ice is used. (Health officer Providence, R. I.)

Absolutely, if the milk is at or below this temperature when it is put on the wagon. (Health officer Richmond, Va.)

It is here. (Health officer Rochester, N. Y.)

Yes, in this city, of cool summers. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Yes; but the ice bill will run up. (Straus Laboratory, Washington, D. C.)

Not without ice. It might be possible to do five months in the year. (Sharon Dairy, District of Columbia.)

Yes. (Borden's Condensed Milk Co., New York, N. Y.)

Not without ice in warm weather. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

It is possible. (Dr. S. C. Prescott, Boston, Mass.)

Yes, by using plenty of cracked ice around the cases of bottles. (Health officer Los Angeles, Cal.)

Yes. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

Where ice is used, yes. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Yes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Yes; if bottle milk is sold only. (Health officer Scranton, Pa.)

QUESTION 13.—*What is condensed milk?*

ANSWERS.

Condensed milk (evaporated milk) is milk from which a considerable portion of water has been evaporated, and contains not less than 28 per cent milk solids, of which not less than 27.5 per cent is milk fat. Sweetened condensed milk is milk from which a considerable portion of water has been evaporated and to which sugar (sucrose) has been added, and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat. (Chief Bureau of Animal Industry.)

Milk from which a part of the water has been removed by heating in a vacuum, with or without the addition of sugar. (Surgeon General U. S. Army.)

Condensed milk is milk to which was added one-eighth of its weight of cane sugar, was reduced to one-third of its volume by evaporation in vacuo, cooled, and put in hermetically sealed cans. (Surgeon General U. S. Navy.)

In the United States, Borden's Eagle brand of condensed milk may be taken as a type which is said to be prepared by heating fresh cow's milk to 100° C. to destroy the bacteria and then evaporating the remaining milk in vacuo at a low temperature to a little less than one-fourth of its original volume. The finished product is usually preserved in tin cans after having added about 6 ounces of cane sugar per pint.

A sample of such milk, analyzed by Dr. E. E. Smith for Holt, showed the following composition:

	Per cent.
Fat.....	6.94
Proteins.....	8.43
Sugar (cane, 40.44; milk, 10.25).....	50.69
Salts.....	1.39
Water.....	31.30

According to Bagenski, Schweizermilch Condenserte, contains:

	Per cent.
Butter.....	12.0-13.6
Proteins.....	24.2-28.1
Sugar:	
Milk.....	14.0-18.0
Cane.....	24.0-30.0
Salts.....	2.1-2.6
Water.....	18.0-24.4

Whereas, according to Bagenski, normal cow's milk contains:

	Per cent.
Butter.....	3.11
Proteins.....	3.65
Sugar (milk).....	4.54
Salts.....	1.08
Water.....	87.60

(Surgeon General Public Health and Marine-Hospital Service.)

Milk reduced in bulk by boiling at a high temperature and afterwards reduced to a proper consistency in a vacuum. (Dr. Henry L. Coit, Newark, N. J.)

Milk evaporated in vacuum pans. (Dr. R. G. Freeman, New York, N. Y.)

Milk preserved by addition of sugar and evaporation. (Dr. C. E. A. Winslow, New York, N. Y.)

Depends on term. (Health officer Ann Arbor, Mich.)

Whole milk evaporated at low temperature. (Health officer Baltimore, Md.)

Milk from which a portion of water has been removed by evaporation. (Health officer Birmingham, Ala.)

Evaporated milk. (Health officer Bismarck, N. Dak.)

Whole or skimmed milk from which a portion of the water has been removed by evaporation. (Health officer Cleveland, Ohio.)

Not germane. See Lusk on nutrition. (Health officer Columbus, Ohio.)

Milk from which a considerable portion of the water has been evaporated and to which sugar has been added. (Health officer Detroit, Mich.)

Milk in which portion of watery contents has been evaporated. (Health officer Kansas City, Mo.)

Milk from which a large portion of water has been evaporated. It should have not less than 10 per cent fat, and be free from preservatives. Some brands have sugar added. (Health officer Lynchburg, Va.)

Watery element evaporated. (Health officer Portland, Oreg.)

Used to be evaporated, skimmed milk to which 40 per cent cane sugar had been added. (Health officer Providence, R. I.)

Milk from which a large part of its water has been removed. Many brands have cane sugar added. Much condensed milk is made from skim milk. (Health officer Richmond, Va.)

Milk which has been subject to artificial heat and by our ordinance shall contain not less than 25 per cent of milk solids, and 28 per cent of these solids shall be butter fat free from all preservatives, coloring matter, or foreign substances. This is the definition of condensed milk that we operate under. (Health officer Seattle, Wash.)

Evaporation in a vacuum, with enormous quantity of sugar added. (Health officer Syracuse, N. Y.)

Milk which has been reduced in bulk and consistency by the removal of considerable portion of its water by evaporation and should satisfy some standard of fat and nonfat solid content. (Health officer Topeka, Kans.)

Raw milk with the water evaporated, and otherwise prepared. (Sharon Dairy, District of Columbia.)

Condensed milk is milk which has had part of its water removed, and to which cane sugar has been added. (Borden's Condensed Milk Co., New York, N. Y.)

Condensed milk, with or without the addition of sugar. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Whole or partially skimmed milk condensed in vacuo with addition of about 40 per cent of cane sugar. The sugar prevents decompositions, as germs are not necessarily destroyed. (Dr. S. C. Prescott, Boston, Mass.)

See city ordinance, section 13. [Appendix G.] (Health officer Los Angeles, Cal.)

Condensed milk is milk from which most of the water is evaporated under a vacuum. It may have sugar added to it in different quantities or not. If not, it is generally called evaporated milk. It is heated to very high temperatures above boiling point. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Evaporated and sterilized. (Health officer San Francisco, Cal.)

What it is, and what it should be, are in some cases, very different. What it is in every instance is hard to answer. I think what it should be is simply milk from which most of the water has been evaporated at a temperature below 150° F. (Health officer St. Joseph, Mo.)

Condensed milk is skim milk or milk enriched by the addition of cream and condensed to about one-third of its original bulk. It is sometimes prepared without added sugar, most often with the addition of cane sugar, to act as a preservative. When diluted in the manner necessary for the feeding of infants, it is woefully deficient in fats (this applies to all varieties). It is more expensive than the market milks. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Is milk from which a considerable portion of water has been evaporated. (Health officer Scranton, Pa.)

#### QUESTION 14.—*Is it as nutritious as raw milk?*

#### ANSWERS.

It is almost impossible to make a comparison between the nutritive value of condensed milk and ordinary milk, as the composition of the condensed milk varies, especially when sugar is added. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

No. (Surgeon General U. S. Navy.)

Condensed milk in the United States is usually low in fat content, and excessively rich in sugar. If properly diluted, the best grades of condensed milk ought to contain the same nutriment as the original milk from which it was made, plus or minus whatever is added or removed when finally put up in packages. This, however, does not imply the same food value as the original milk. (Surgeon General Public Health and Marine-Hospital Service.)

- It is not. Useful dilutions of it contain a much reduced percentage of fat and nutritive substance. (Dr. Henry L. Coit, Newark, N. J.)
- Yes. (Dr. R. G. Freeman, New York, N. Y.)
- Not if used as directed on cans. (Dr. C. E. A. Winslow, New York, N. Y.)
- No. (Health officer Ann Arbor, Mich.)
- I do not know. (Health officer Baltimore, Md.)
- It is probably as nutritious, but I do not think that it would be as palatable. (Health officer Birmingham, Ala.)
- No. (Health officer Bismarck, N. Dak.)
- Have no observation on this point. (Health officer Cleveland, Ohio.)
- Not germane. See Lusk on Nutrition. (Health officer Columbus, Ohio.)
- No. (Health officer Detroit, Mich.)
- No. (Health officer Jacksonville, Fla.)
- No. (Health officer Kansas City, Mo.)
- Don't think so. (Health officer Lynchburg, Va.)
- Yes. (Health officer Portland, Oreg.)
- No. (Health officer Providence, R. I.)
- It is as nutritious as the special raw milk from which it is made. (Health officer Richmond, Va.)
- No. (Health officer Seattle, Wash.)
- No. (Health officer Syracuse, N. Y.)
- I do not know. I would be inclined to think not. (Health officer Topeka, Kans.)
- No. (Straus Laboratory, Washington, D. C.)
- Used in the manner in which it is, it undoubtedly is as nutritious, or at least so nearly so as to be on a most debatable ground. (Borden's Condensed Milk Co., New York, N. Y.)
- No. (Walker-Gordon Laboratory, Washington, D. C.)
- No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)
- It is not as well balanced a ration as raw milk. (Dr. S. C. Prescott, Boston, Mass.)
- Probably so. (Health officer Los Angeles, Cal.)
- No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)
- No. (Health officer San Francisco, Cal.)
- If prepared as above, it should be—i. e., water evaporated at temperature below 150° F. (Health officer St. Joseph, Mo.)
- No; for reasons given. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)
- Yes. (Health officer Scranton, Pa.)

QUESTION 15.—*Is it as susceptible to deterioration as raw milk?*

ANSWERS.

- No; condensed milk will keep much longer than raw or pasteurized milk, even after being opened. (Chief Bureau of Animal Industry.)
- Not until again diluted. (Surgeon General U. S. Army.)
- No. (Surgeon General U. S. Navy.)
- Condensed milk either deteriorates or at times contains toxic substances, for children have been made very ill from using certain cans of a given brand. Such brands as contain a high percentage of sugar ought to keep much better than raw milk on account of the well-known preserving properties of sugar. (Surgeon General Public Health and Marine-Hospital Service.)
- It is not, because of its sugar and its complete sterilization. (Dr. Henry L. Coit, Newark, N. J.)
- Not if, as usual, a considerable amount of cane sugar is added. (Dr. R. G. Freeman, New York, N. Y.)
- Not until diluted. (Dr. C. E. A. Winslow, New York, N. Y.)
- No. (Health officer Ann Arbor, Mich.)
- I do not know. (Health officer Baltimore, Md.)
- No; as it is usually preserved with sugar. (Health officer Birmingham, Ala.)
- Yes; after breaking the seal. (Health officer Bismarck, N. Dak.)
- No. (Health officer Cleveland, Ohio.)
- No. (Health officer Columbus, Ohio.)
- Yes; if exposed. If sealed should keep indefinitely. (Health officer Detroit, Mich.)

- No. (Health officer Jacksonville, Fla.)  
 Yes; if exposed. (Health officer Kansas City, Mo.)  
 No. (Health officer Lynchburg, Va.)  
 No. (Health officer Portland, Oreg.)  
 No; because if evaporated to proper density bacteria can't grow, as food can not be absorbed by them. (Health officer Providence, R. I.)  
 Not at all subject to deterioration if properly made and sealed. After opening it keeps much longer than fresh milk, until it is diluted. (Health officer Richmond, Va.)  
 No; not usually. (Health officer Seattle, Wash.)  
 Probably not. (Health officer Syracuse, N. Y.)  
 Yes; but not as rapidly. (Health officer Topeka, Kans.)  
 More so, unless kept in hermetically sealed cans. (Sharon Dairy, District of Columbia.)  
 The sugar acting as a preservative, it is susceptible to practically no deterioration whatever. (Borden's Condensed Milk Co., New York, N. Y.)  
 No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 After dilution; yes. (Dr. S. C. Prescott, Boston, Mass.)  
 No; if sterilized and hermetically sealed. (Health officer Los Angeles, Cal.)  
 Yes; the evaporated without sugar will spoil upon exposure to the air as soon as good raw milk. The sugar-condensed milk will not. When kept tightly sealed they both keep indefinitely. (J. M. Houston, White Cross Milk Co., Washington, D. C.)  
 No. (Health officer San Francisco, Cal.)  
 It is not as susceptible to lactic acid fermentation, but other changes upon exposure to the atmosphere would probably take place similar to those undergone by pasteurized milk. (Health officer St. Joseph, Mo.)  
 Unless properly cared for; yes. It is also liable to undergo decomposition in the cans. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)  
 No. (Health officer Scranton, Pa.)

QUESTION 16.—*Is it as susceptible to deterioration as pasteurized milk?*

ANSWERS.

- No; condensed milk will keep much longer than raw or pasteurized milk, even after being opened. (Chief Bureau of Animal Industry.)  
 Not unless diluted. (Surgeon General U. S. Army.)  
 No. (Surgeon General U. S. Navy.)  
 No; for the same reason. (Dr. Henry L. Coit, Newark, N. J.)  
 No. (Dr. R. G. Freeman, New York, N. Y.)  
 Not until diluted. (Dr. C. E. A. Winslow, New York, N. Y.)  
 No. (Health officer Ann Arbor, Mich.)  
 Do not think so. (Health officer Birmingham, Ala.)  
 Yes. (Health officer Bismarck, N. Dak.)  
 Yes. (Health officer Cleveland, Ohio.)  
 No. (Health officer Columbus, Ohio.)  
 Yes; if exposed. If unsealed, ought to keep indefinitely. (Health officer Detroit, Mich.)  
 No. (Health officer Jacksonville, Fla.)  
 Yes; if exposed. (Health officer Kansas City, Mo.)  
 No. (Health officer Lynchburg, Va.)  
 No. (Health officer Portland, Oreg.)  
 Yes; if diluted as direction on the cans require to make milk. (Health officer Providence, R. I.)  
 By no means. (Not at all subject to deterioration if properly made and sealed. After opening, it keeps much longer than fresh milk—until it is diluted. (Health officer Richmond, Va.)  
 No. (Health officer Seattle, Wash.)  
 Probably not. (Health officer Syracuse, N. Y.)  
 Yes; but not as rapidly. (Health officer Topeka, Kans.)  
 I am not prepared to say. (Sharon Dairy, District of Columbia.)  
 Not nearly. (Borden's Condensed Milk Co., New York, N. Y.)  
 No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 Not quite, I should say, because of the inhibiting effect of sugar. (Dr. S. C. Prescott, Boston, Mass.)

Yes; for the reasons mentioned above. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

Probably not when in a thick or semisolid form. (Health officer St. Joseph, Mo.)

Unless properly cared for; yes. It is also liable to undergo decomposition in the cans. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

No. (Health officer Scranton, Pa.)

QUESTION 17.—*What are the advantages of concentrated milk?*

ANSWERS.

Concentrated milk has less bulk and can be transported more easily and cheaply, and perhaps has also some advantage in keeping qualities. (Chief Bureau of Animal Industry.)

Diminished weight and bulk, and better keeping qualities. (Surgeon General U. S. Army.)

Convenience and its price(?). (Surgeon General U. S. Navy.)

There are none. (Dr. Henry L. Coit, Newark, N. J.)

Diminished bulk, and keeping qualities. (Dr. R. G. Freeman, New York, N. Y.)

Ease and safety of handling and preserving. (Health officer Ann Arbor, Mich.)

For shipping purposes the bulk is very much reduced. (Health officer Birmingham, Ala.)

Very convenient to carry and to use. (Health officer Bismarck, N. Dak.)

A big saving can be made in transportation expenses. (Health officer Cleveland, Ohio.)

Easy of transportation and does not deteriorate so easily. (Health officer Columbus, Ohio.)

Lessening of bulk. (Health officer Detroit, Mich.)

Cheapness and safety when clean milk is not available. (Health officer Jacksonville, Fla.)

Convenience only. (Health officer Kansas City, Mo.)

When market milk is under suspicion, concentrated or condensed milk is used as substitute. Not equal to good raw milk. (Health officer Lynchburg, Va.)

Transportation. (Health officer Portland, Oreg.)

Keeps in hot climates. (Health officer Providence, R. I.)

(1) Useful where good fresh milk can not be had; (2) useful for coffee when cream can not be had; (3) occasionally a baby will thrive better on it than on fresh milk. (Health officer Richmond, Va.)

Small bulk; long-keeping quality; can be had where fresh milk is not possible. Of course, I recognize condensed milk as a very valuable article of food, but I am comparing the advantages with raw milk. (Health officer Seattle, Wash.)

Makes a good winter product when price of raw milk is higher. Keeps longer. (Health officer Topeka, Kans.)

For shipments into distant lands where it is not possible to get raw milk and for use on steamers at sea. (Sharon Dairy, District of Columbia.)

The advantages of concentrated milk are its keeping qualities and the fact that it can be stored in much less space, and permits of any degree of dilution desired. (Borden's Condensed Milk Co., New York, N. Y.)

Long transportation. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Portability, long-keeping quality at low temperature and without dilution. (Dr. S. C. Prescott, Boston, Mass.)

Keeping qualities and small bulk. (Health officer Los Angeles, Cal.)

Concentrated milk is kept at 140° for 3 hours. This will kill almost, if not all, disease germs that exist, because of the air blast passing through the milk. It is claimed to be slightly more digestible than raw and twice as digestible as condensed milk; economy of space; keep for some days; can be used as cream; no waste; can be shipped long distances; cost of handling less. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Only in certain cases of infant feeding and where one can not get fresh milk. (Health officer San Francisco, Cal.)

Convenience in transportation and storing, and its permanent character before opening the package for use. (Health officer St. Joseph, Mo.)

Useful in traveling. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Its keeping qualities. (Health officer Scranton, Pa.)

QUESTION 18.—*Is modified milk as nutritious as raw milk?*

## ANSWERS.

Modified milk is prepared according to medical prescriptions for special use. While it usually contains less nutriment than ordinary cows' milk, it is supposed to be more easily digested and assimilated by the individuals for whom it is intended. (Chief Bureau of Animal Industry.)

It depends upon the formula of modification. (Surgeon General U. S. Army.)

Depends on the individual and the nature of the modification. (Surgeon General U. S. Navy.)

Modified milk is intended for babies, and its value in a particular case must be decided by the physician who prescribes it. The fact that it may not contain the food value of unmodified milk does not mean that it is less nutritious for the infant who uses it. (Surgeon General Public Health and Marine-Hospital Service.)

Yes, and more, because it is milk adjusted to the individual needs of the patient. (Dr. Henry L. Coit, Newark, N. J.)

Not if diluted. (Dr. R. G. Freeman, New York, N. Y.)

For babies, yes; for adults, no. (Dr. C. E. A. Winslow, New York, N. Y.)

Proportionately, yes; all depending on interpretation of "modified milk." (Health officer Ann Arbor, Mich.)

If conditions demand it. (Health officer Baltimore, Md.)

Modified milk is prepared by the Walker-Gordon Laboratory Co. on prescriptions from physicians to supply the necessary diet for individual infants or small children. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

Depends entirely upon the character and degree of modification. (Health officer Cleveland, Ohio.)

Nutriment values differ, but modification is for a definite purpose. (Health officer Columbus, Ohio.)

Depending on circumstances. (Health officer Detroit, Mich.)

Yes, when modified to suit age and conditions. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

Modified milk may be raw milk; ought to be. (Health officer Lynchburg, Va.)

What do you consider modified milk? We modify milk for infant feeding. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

It is not intended to be, volume for volume, as modification always involves addition of some water. (Health officer Richmond, Va.)

Not when conditions are normal all around. It may be more nutritious under certain conditions of ill health. (Health officer Seattle, Wash.)

If properly modified. (Health officer Syracuse, N. Y.)

Yes, if containing all the proteids. (Health officer Topeka, Kans.)

Yes, and more so, for it is an attempt to reproduce mothers' milk as closely as possible, and is changed to suit the varying ages and strength of babies. (Straus Laboratory, Washington, D. C.)

Much depends on what it is modified with. (Sharon Dairy, District of Columbia.)

There are so many formulas for the modification of milk, each modifier insisting that his particular modification is the most nutritious and most easily assimilated, that it is very hard to give any opinion except on a particular modification. (Borden's Condensed Milk Co., New York, N. Y.)

"Modified milk" is a term originally used by the Walker-Gordon Laboratories to describe milks that have been mechanically changed in their chemical constituents to fill physicians' prescriptions and to increase or decrease these constituents in an exact method so that physicians may be enabled to order a milk that can be digested for any individual case for which it may be prescribed. It may contain more or less of the nutrients found in raw milk. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Depends on amount of modification and on consumer. (Dr. S. C. Prescott, Boston, Mass.)

Yes; modified milk for infant feeding, if prescribed intelligently by the physician, should be perfectly digested by the infant. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer San Francisco, Cal.)

This depends upon how it is modified. (Health officer St. Joseph, Mo.)

If by this is meant, is separated and recombined milk as nutritious as un-separated milk, we would answer in so far as our observation goes, yes. We have no evidence from any others to the contrary. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Depends upon circumstances, modification, condition of infant. (Health officer Scranton, Pa.)

QUESTION 19.—*Is it as digestible as raw milk?*

ANSWERS.

Modified milk is prepared according to medical prescriptions for special use. While it usually contains less nutriment than ordinary cows' milk, it is supposed to be more easily digested and assimilated by the individuals for whom it is intended. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

Depends on the individual and the nature of the modification. (Surgeon General U. S. Navy.)

Modified milk may be either raw or pasteurized, and it is given to infants because for them it is more suited to their needs than whole milk. (Surgeon General Public Health and Marine-Hospital Service.)

Modified milk is raw milk, unless it is heated after modification. (Dr. Henry L. Coit, Newark, N. J.)

Usually more digestible. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes. All depending on interpretation of "modified milk." (Health officer Ann Arbor, Mich.)

It is served raw, pasteurized or sterilized according to the instruction of the physician. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

Depends entirely upon the character and degree of modification. (Health officer Cleveland, Ohio.)

That depends upon the powers of digestion as between an infant and an adult. (Health officer Columbus, Ohio.)

Depending on circumstances. (Health officer Detroit, Mich.)

Yes; or more so. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

Modified milk may be raw milk; ought to be. (Health officer Lynchburg, Va.)

What do you consider modified milk? We modify milk for infant feeding. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Far more so, if modified to suit each case. The object of modification is to make a digestible mixture for infants. (Health officer Richmond, Va.)

Not in my opinion. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Yes; and more so, for it is adapted to the digestion of the baby, depending on its age, strength, and general condition. (Straus Laboratory, Washington, D. C.)

Questionable. (Sharon Dairy, District of Columbia.)

There are so many formulas for the modification of milk, each modifier insisting that his particular modification is the most nutritious and more easily assimilated, that it is very hard to give any opinion except on a particular modification. (Borden's Condensed Milk Co., New York, N. Y.)

When properly adapted to the individual need it is, of course, far more digestible. (Walker-Gordon Laboratory, Washington, D. C.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Depends on amount of modification and on consumer. (Dr. S. C. Prescott, Boston, Mass.)

Modified milk may be, and generally is, raw milk. Very little milk, as modified by the laboratories, is pasteurized, except the Straus Laboratory's supply. Their milk is just the ordinary market milk, and is pasteurized as a safeguard. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Only in some cases of infant feeding and gastro-intestinal conditions. (Health officer San Francisco, Cal.)

Yes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Depends upon circumstances; modification; condition of infant. (Health officer Scranton, Pa.)

QUESTION 20.—*Is it as susceptible to deterioration as raw milk?*

## ANSWERS.

There is probably no difference if both are prepared and handled under similar sanitary conditions. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

Probably more. (Surgeon General U. S. Navy.)

Milk is not modified in order to render it less susceptible to deterioration, but to better meet the needs of infants for whom it is intended. (Surgeon General Public Health and Marine-Hospital Service.)

Yes; for the same reason. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes; all depending on interpretation of "modified milk." (Health officer Ann Arbor, Mich.)

Depends upon conditions. (Health officer Baltimore, Md.)

No. (Health officer Bismarck, N. Dak.)

No. (Health officer Cleveland, Ohio.)

Why not? (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Modified milk may be raw milk; ought to be. (Health officer Lynchburg, Va.)

What do you consider modified milk? We modify milk for infant feeding. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Yes. (Health officer Richmond, Va.)

Yes. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

Probably; if exposed to infection after pasteurization. When sealed, it will keep for days. We sell it fresh every day, however, and only enough for one day at a time. (Straus Laboratory, Washington, D. C.)

This also depends on what it is modified with. (Sharon Dairy, District of Columbia.)

If it is modified condensed milk, it possesses much better keeping qualities than either raw or pasteurized milk. (Borden's Condensed Milk Co., New York, N. Y.)

As there has been no chemical change in the different constituents, it is as susceptible to deterioration as any other milk. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Practically so. (Dr. S. C. Prescott, Boston, Mass.)

No; as most of the modified milks are made up of high-grade raw milk as a basis. Most of the raw milks come from indifferent sources. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Yes; if modified by dilution and addition of other substances. (Health officer San Francisco, Cal.)

Yes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

No. (Health officer Scranton, Pa.)

QUESTION 21.—*Is it susceptible to deterioration as pasteurized milk?*

## ANSWERS.

There is probably no difference if both are prepared and handled under similar sanitary conditions. (Chief Bureau of Animal Industry.)

Yes. (Surgeon General U. S. Army.)

About the same. (Surgeon General U. S. Navy.)

Modified milk is often pasteurized, and it should be given equal or greater care than whole pasteurized milk in order to guard against deterioration because of the class of population that uses it. (Surgeon General Public Health and Marine-Hospital Service.)

It is more susceptible for reasons given above. (Dr. Henry L. Coit, Newark, N. J.)

Yes. (Dr. R. G. Freeman, New York, N. Y.)

Yes. (Dr. C. E. A. Winslow, New York, N. Y.)

Yes; depending on interpretation of "modified milk." (Health officer Ann Arbor, Mich.)

Depends upon conditions. (Health officer Baltimore, Md.)

No. (Health officer Bismarck, N. Dak.)

Why not? Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Yes; unless pasteurized milk is kept at too high a temperature. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Modified milk may be raw; ought to be. (Health officer Lynchburg, Va.)

What do you consider modified milk? We modify milk for infant feeding. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Yes. (Health officer Richmond, Va.)

Probably not. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

Yes. (Health officer Topeka, Kans.)

We pasteurize all our modified milk. (Straus Laboratory, Washington, D. C.)

Have not made any comparison. (Sharon Dairy, District of Columbia.)

If it is a modified condensed milk, it possesses much better keeping qualities than either raw or pasteurized milk. (Borden's Condensed Milk Co., New York, N. Y.)

Modified milk is delivered raw unless the physician's prescription calls for pasteurization, and if so, the physician usually names the temperature and length of time of heating. (Walker-Gordon Laboratory, Washington, D. C.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I have not compared them. (Dr. S. C. Prescott, Boston, Mass.)

No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Yes; more. (Health officer San Francisco, Cal.)

Yes. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

No. (Health officer Scranton, Pa.)

QUESTION 22.—*How does its price compare with that of raw milk?*

#### ANSWERS.

Modified milk commands a higher price than ordinary raw milk. (Chief Bureau of Animal Industry.)

I am not informed on this point. My impression is that it is more expensive. (Surgeon General U. S. Army.)

Probably higher. (Surgeon General U. S. Navy.)

Since modified milk is prepared in accordance with physicians' formulæ, and requires expert knowledge in its modification, it would naturally be more expensive. (Surgeon General Public Health and Marine-Hospital Service.)

The nurse or physician who directs its modification generally charges for his or her services; therefore, milk properly modified should have such expenses added to it. (Dr. Henry L. Coit, Newark, N. J.)

Considerable increase. (Health officer Baltimore, Md.)

Modified milk is higher in price because it is prepared under very exacting precautions. (Health officer Birmingham, Ala.)

Higher. (Health officer Bismarck, N. Dak.)

From 2 cents to 9 cents per quart more than ordinary market milk. (Health officer Cleveland, Ohio.)

Depends on method of modification. (Health officer Columbus, Ohio.)

Higher. (Health officer Detroit, Mich.)

Higher. (Health officer Kansas City, Mo.)

Modified milk, of course, is higher. (Health officer Lynchburg, Va.)

What do you consider modified milk? We modify milk for infant feeding. (Health officer Portland, Oreg.)

Much higher. (Health officer Providence, R. I.)

Cheaper (volume for volume) if made in the home. More costly if purchased from a laboratory making a specialty of modified milk. (Health officer Richmond, Va.)

Somewhat higher. (Health officer Seattle, Wash.)

Not known. (Health officer Syracuse, N. Y.)

The additional ingredients, the time it takes, and the necessity of trained help in modifying makes its cost much more. (Straus Laboratory, Washington, D. C.)

Higher price. (Sharon Dairy, District of Columbia.)

Its price is approximately the same, the price of course depending on the various modifications and price both of the condensed milk and also of the fluid milk used in comparison. (Borden's Condensed Milk Co., New York, N. Y.)

It is of course much more expensive in that intelligent persons must be trained for its preparation. (Walker-Gordon Laboratory, Washington, D. C.)

More. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Higher. (Dr. S. C. Prescott, Boston, Mass.)

Three to five times as expensive. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

We probably misunderstand this last series of questions. The only modified milk sold in the markets that we know of is the milk from the Walker-Gordon laboratories, which is naturally higher in price owing to the amount of time and skill and labor employed in its preparation. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Advance from 4 to 8 cents per quart. (Health officer Scranton, Pa.)

QUESTION 23.—*What effect does freezing have on the qualities of milk?*

ANSWERS.

Freezing has the effect of separating the butter fat and causing the fat globules to collect into granules. (Chief Bureau of Animal Industry.)

I believe it has no injurious effect, unless long continued, when it would probably diminish its germicidal power. (Surgeon General U. S. Army.)

Little or no influence. (Surgeon General U. S. Navy.)

It affects the fat globules. (Dr. William H. Park, New York, N. Y.)

It makes it less useful for modifications of milk because it is not so easily separated into its component parts. (Dr. Henry L. Coit, Newark, N. J.)

None that has been demonstrated, so far as I know. (Dr. R. G. Freeman, New York, N. Y.)

Said to be an excellent preservative without harmful action. (Dr. C. E. A. Winslow, New York, N. Y.)

Slight. (Health officer Ann Arbor, Mich.)

It is said to lessen the bacterial properties. (Health officer Baltimore, Md.)

Changes the character of milk slightly, and it is not always possible to obtain a good quality of milk when it has been melted. This practice has been tried in some parts of Europe without satisfactory success. (Health officer Birmingham, Ala.)

Very little. (Health officer Bismarck, N. Dak.)

Ruins it. (Health officer Cleveland, Ohio.)

Do not know of any injurious effect if the milk is consumed not too long after freezing. (Health officer Columbus, Ohio.)

Freezing alters the lact albumins. (Health officer Detroit, Mich.)

Milk is a perfect emulsion when in raw state; freezing breaks the emulsion, which can never be restored, consequently lowers quality of product. (Health officer Kansas City, Mo.)

Little, if any. Old idea was that it was bad; now discredited. (Health officer Lynchburg, Va.)

Little, if properly thawed out with cool water. (Health officer Providence, R. I.)

Freezing itself has probably no effect on chemical composition of milk. It kills some bacteria, but by no means all. Keeping milk frozen increases soluble nitrogen, lowering the nutritive value. It also inhibits growth of lactic acid bacteria, but allows growth of putrefactive bacteria. If kept too long, such milk may become highly poisonous without any evidence of its having gone wrong. (Health officer Richmond, Va.)

I do not know. We have no weather in Puget Sound Basin cold enough to freeze milk. Having been here 20 years, I could only give you the changes laid down in the text-books. (Health officer Seattle, Wash.)

Impairs it. (Health officer Syracuse, N. Y.)

None. (Health officer Topeka, Kans.)

Destroys the flavor and renders the milk less palatable. (Sharon Dairy, District of Columbia.)

Freezing has really no effect whatever itself on the quality of the milk, providing that the milk in being restored to its normal condition is carefully mixed. Milk, however, does not keep indefinitely in a frozen condition, as certain forms of bacteria multiply even in that condition, while the lactic bacteria are entirely dormant. Bacteria, moreover, are not destroyed by freezing, even when this frozen condition extends over a period of time. (Borden's Condensed Milk Co., New York, N. Y.)

I am informed that freezing for a short space of time has little, if any, effect on the qualities of milk. (Walker-Gordon Laboratory, Washington, D. C.)

Not good. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

I have never studied it. Frozen milks are sold in Europe and used with apparent impunity. (Dr. S. C. Prescott, Boston, Mass.)

No effect. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

Very little; practically only prevents temporary growth of bacteria. (Health officer San Francisco, Cal.)

It interferes, when the milk is once shaken up, in its re-separation from the cream. We have no knowledge of the effect upon its nutritive value. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

None. (Health officer Scranton, Pa.)

QUESTION 24.—*Have attempts been made, so far as you know, to secure legislation from Congress governing the production, transportation, or distribution of milk or milk products throughout the United States under authority for regulating commerce between the several States?*

## ANSWERS.

Some of those points are covered by the food and drugs act. A bill on this subject was introduced at the last session of Congress by Representative A. F. Lever, of South Carolina. [Appendix U.] (Chief Bureau of Animal Industry.)

I am not informed on this subject. (Surgeon General U. S. Army.)

Do not know of any. (Surgeon General U. S. Navy.)

I know of none. (Surgeon General Public Health and Marine-Hospital Service.)

I have no knowledge. (Dr. Henry L. Coit, Newark, N. J.)

No. (Dr. R. G. Freeman, New York, N. Y.)

The act of 1895, relating to the production of milk in and for the District of Columbia, was made by Congress quite as much by virtue of its power to regulate interstate commerce as by virtue of its power to legislate for the District of Columbia. The food and drugs act of 1898, enacted by Congress for the District of Columbia, regulated the sale of milk and cream in the District of Columbia, and having been enacted by Congress, would doubtless apply quite as well to "original packages" as to any other form in which milk might be sold. The Federal foods and drugs act of June 30, 1906, which is distinctly an interstate act, although it regulates local commerce within the District of Columbia, applies to milk and cream. (Health officer District of Columbia.)

I do not know. (Health officer Baltimore, Md.)

Not to my knowledge. (Health officer Birmingham, Ala.)

Do not know. (Health officer Bismarck, N. Dak.)

Only such as are found in the pure food and drug laws. (Health officer Cleveland, Ohio.)

Do not know. (Health officer Columbus, Ohio.)

No. (Health officer Detroit, Mich.)

Have not heard of any such movement. (Health officer Jacksonville, Fla.)

Unable to state. (Health officer Kansas City, Mo.)

Not that I know. (Health officer Lynchburg, Va.)

No. (Health officer Portland, Oreg.)

National pure food law does this, now in force; but as far as Rhode Island consumers are protected by it, not enforced. (Health officer Providence, R. I.)

I believe such an attempt was made in Washington some years ago, but unsuccessfully. It should by all means be put under control, as otherwise a city like New York has great difficulty in controlling its milk supply. I have had shippers from other States threaten us with the Interstate Commerce Commission for not allowing their milk to come into Richmond. I have told them to go ahead and do their worst; that we probably could not help their bringing

(or sending) their milk here from other States, and that we would not attempt to do so, but that we had complete control over the milk after it landed here and that if they wanted the satisfaction of putting milk here and having it at once seized and condemned they were welcome to send it along. (Health officer Richmond, Va.)

Only in an indirect way. The general opinion seems to prevail in this section of the country that condensed milk may be sold under the authority of the Government, no matter what percentage of butter fat it contains under the pure food and drug act, and, being an interstate product in many instances, that we have no right to prohibit shipment to our city. Whether these facts are true or not, I do not know. (Health officer Seattle, Wash.)

Not to our knowledge. (Health officer Syracuse, N. Y.)

Not to my knowledge. (Sharon Dairy, District of Columbia.)

We have heard of several suggested methods of regulation, but have never known of any positive attempt to regulate interstate commerce so far as milk is concerned, outside of the present pure food laws, which cover that ground quite thoroughly. (Borden's Condensed Milk Co., New York, N. Y.)

None so far as I know. (Walker-Gordon Laboratory, Washington, D. C.)

Know of none. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

No. (Dr. S. C. Prescott, Boston, Mass.)

No. (J. M. Houston, White Cross Milk Co., Washington, D. C.)

No. (Health officer St. Joseph, Mo.)

Not to our knowledge. (Dr. Samuel McC. Hamill, Philadelphia, Pa.)

Do not know. (Health officer Scranton, Pa.)

#### HEALTH DEPARTMENTS.

QUESTION 1.—*Please state what regulations, if any, relating to the production, transportation, and delivery of milk have been promulgated in your jurisdiction, and also what state or municipal laws or ordinances have been adopted relating to the same subject?*

#### ANSWERS.

Practically those of the State of Michigan. (Health officer Ann Arbor, Mich.)

We inclose copy of milk ordinance adopted in this city of Atlanta, Ga. [Appendix G.] (Health officer Atlanta, Ga.)

I send inclosed copy of our laws, ordinances, and regulations. [Appendix G.] (Health officer Baltimore, Md.)

We have rigid city ordinances regulating the production and handling of milk. Will send you copy later. (Health officer Birmingham, Ala.)

See inclosed regulations. [Appendix G.] (Health officer Cleveland, Ohio.)

See code. [Appendix G.] (Health officer Columbus, Ohio.)

Inclosed ordinance and rules for certification. [Appendix G.] (Health officer Detroit, Mich.)

I inclose copies of our ordinances, rules, and record cards. [Appendix G.] (Health officer Jacksonville, Fla.)

Stringent milk ordinance has passed common council, signed by mayor, regulating tuberculin test, temperature of milk, and bacterial count. (Health officer Kansas City, Mo.)

Pamphlet inclosed. [Appendix G.] (Health officer Lynchburg, Va.)

See sanitary code inclosed, pages 14 to 20. [Appendix G.] (Health officer Montclair, N. J.)

State laws. (Health officer Providence, R. I.)

(1) Copy of ordinance of June 9, 1904, and (2) copy of rules and regulations of Richmond City Board of Health, governing the production and handling of milk herewith inclosed. [Appendix G.] (Health officer Richmond, Va.)

Certified milk must contain less than 30,000 bacteria per cubic centimeter, and market milk less than 200,000 per cubic centimeter. Space is absolutely too small to give ordinances. (Health officer Seattle, Wash.)

See appended sheets. [Appendix G.] (Health officer Topeka, Kans.)

None known. (Surgeon General U. S. Navy.)

See inclosed city ordinance. [Appendix G.] (Health officer Los Angeles, Cal.)

See inclosures. [Appendix G.] (Health officer Wheeling, W. Va.)

Operating under State laws. (Health officer Scranton, Pa.)

QUESTION 2.—*Is the compulsory insistence on the tuberculin test, in your judgment, practicable and advisable?*

## ANSWERS.

- Yes. (Health officer Ann Arbor, Mich.)  
 We are now endeavoring to determine this. (Health officer Atlanta, Ga.)  
 It is desirable, but at present impracticable. (Health officer Baltimore, Md.)  
 Yes. (Health officer Birmingham, Ala.)  
 Yes. (Health officer Bismarck, N. Dak.)  
 Yes. (Health officer Burlington, Vt.)  
 Not under present conditions. (Health officer Cleveland, Ohio.)  
 Advisable; practicable with public cooperation in sustaining its share of loss from reacting animals. (Health officer Columbus, Ohio.)  
 Yes. (Health officer Detroit, Mich.)  
 Yes. (State board of health, Florida.)  
 I believe it is practicable and advisable. (Health officer Jacksonville, Fla.)  
 Yes. (Health officer Kansas City, Mo.)  
 Not at first; advice, etc., should precede for a number of years. (Health officer Lynchburg, Va.)  
 For small communities, yes; for large cities pasteurization will doubtless be necessary for a time, as the immediate insistence of the test would cause a milk famine. Conditions vary in each community. (Health officer Montclair, N. J.)  
 Yes; we have found it so. (Health officer Portland, Oreg.)  
 Yes; but we can not get country members of legislature to pass such a law. (Health officer Providence, R. I.)  
 If, after tuberculin testing, every reacting cow is to be destroyed, there are serious difficulties. To "insist" on this either means the appropriation of a large sum for (1) inspectors and (2) remuneration of producers, or an inevitable great rise in price of milk. (Health officer Richmond, Va.)  
 Yes. (Health officer Rochester, N. Y.)  
 Yes. (Health officer Seattle, Wash.)  
 Yes; if under competent supervision and paid for by Government. (Health officer Topeka, Kans.)  
 Yes. (Surgeon General U. S. Navy.)  
 Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 Advisable, but practicable only under certain conditions. (Health officer Los Angeles, Cal.)  
 No. (Health officer San Francisco, Cal.)  
 Yes. (Health officer St. Joseph, Mo.)  
 Yes. (Health officer Wheeling, W. Va.)  
 No. (Health officer Scranton, Pa.)

QUESTION 3.—*Is the insistence on a maximum temperature of 50° F. from the time of production to the delivery to the consumer practicable and desirable?*

## ANSWERS.

- Yes. (Health officer Ann Arbor, Mich.)  
 We find it so in a place like Atlanta. (Health officer Atlanta, Ga.)  
 It is desirable, but not yet practicable, first, because of the railroads; second, because few farmers have ice. (Health officer Baltimore, Md.)  
 It is desirable, but not always practicable in this climate, owing to the increased expense necessary to maintain this low temperature. (Health officer Birmingham, Ala.)  
 Yes. (Health officer Bismarck, N. Dak.)  
 Yes. (Health officer Burlington, Vt.)  
 Very desirable, but not practicable. (Health officer Cleveland, Ohio.)  
 The requirement is desirable certainly; 50° is too low for market milk under ordinary conditions, as experienced in Columbus. We have enforced a 65° rule for two years; 98 per cent of retail milk kept at 65°. Sixty per cent of wholesale milk kept at 65°. Great improvement during last summer. (Health officer Columbus, Ohio.)  
 Yes. (Health officer Detroit, Mich.)  
 Yes. (State board of health, Florida.)

I do not think that insistence to the letter is necessary, except to educate the dairymen. But too much leniency should not be shown. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Should be introduced gradually. (Health officer Lynchburg, Va.)

Yes; and easily attained. (Health officer Montclair, N. J.)

Desirable, but difficult to comply with. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Very difficult in South, where farmers can not always make ice. This presents such difficulties that we have had to modify this rule. [Appendix G.] (Health officer Richmond, Va.)

Yes. (Health officer Rochester, N. Y.)

It is not entirely practicable, but is desirable. The coast makes their own ice, therefore farmers can not ice their milk. But we have very cold water for cooling. We have a mild climate as you know all up and down the Pacific coast and, therefore, have no natural ice. It is impracticable for the farmers to produce ice under the conditions existing, at least in this State to-day. If their milk could be iced and reduced to a temperature of 50°, it would certainly be desirable. Our natural mountain streams are used in our concrete milk houses for cooling our milk after it has been run over the aeraters. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

We secure excellent results here with 60° F., although our best dairies deliver at about 50°. I would say that insistence on 60° would be satisfactory. (Health officer Topeka, Kans.)

Yes. (Surgeon General U. S. Navy.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Desirable, but not practicable under present conditions. (Health officer Los Angeles, Cal.)

Desirable; yes. Practicable; would raise prices. (Health officer San Francisco, Cal.)

It is desirable, but very hard to enforce in all instances in hot weather. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Yes. (Health officer Scranton, Pa.)

#### QUESTION 4.—*Is a prescribed bacterial count feasible and advisable?*

##### ANSWERS.

Yes. (Health officer Ann Arbor, Mich.)

Yes. (Health officer Atlanta, Ga.)

No; except for the guidance of inspectors. (Health officer Baltimore, Md.)

The fact of having a specified bacterial standard will cause dairymen to employ more careful methods, stricter cleanliness, and the striving for lower temperatures, and in this way the quality of milk supplied to the customers will be greatly improved. However, it is impracticable to expect milk to conform to a specified bacterial standard at all times, and the wisdom of bringing dairymen into court for all bacterial counts that run above a given standard is questioned. In other words, a bacterial count for milk should be used for a working basis for the inspector to bring about the desired results in improving a milk supply. (Health officer Birmingham, Ala.)

Doubtful. (Health officer Burlington, Vt.)

Not in my judgment. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (State board of health, Florida.)

I believe it is advisable, but not possible to the letter in most instances. It is educational. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Yes, I believe so. (Health officer Lynchburg, Va.)

Yes. (Health officer Montclair, N. J.)

Yes. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

Yes. (Health officer Richmond, Va.)

Feasible, but not advisable; bacterial count to be used as a rough index of dirty milk. (Health officer Rochester, N. Y.)

In this district, yes; and ought to be much lower. (Health officer Seattle, Wash.)

Yes. (Health officer Syracuse, N. Y.)

I believe not. (Health officer Topeka, Kans.)

Yes. (Surgeon General U. S. Navy.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes. (Health officer Los Angeles, Cal.)

Yes. (Health officer San Francisco, Cal.)

Yes. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Doubtful. (Health officer Scranton, Pa.)

QUESTION 5.—*If so, what number of bacteria should be specified?*

ANSWERS.

Seventy-five thousand to one hundred thousand per cubic centimeter. (Health officer Ann Arbor, Mich.)

We find 100,000 per cubic centimeter feasible. (Health officer Atlanta, Ga.)

Have not yet fixed a maximum limit. (Health officer Baltimore, Md.)

Our standard is 500,000 per cubic centimeter, which seems reasonable. (Health officer Birmingham, Ala.)

Under new conditions, 500,000 count is all that is practical; with education of the dairymen and continual enforcement of dairy rules 200,000 or 100,000 should be attained. (Health officer Columbus, Ohio.)

That depends upon conditions in general. (State board of health, Florida.)

Not over 100,000. (Health officer Jacksonville, Fla.)

Five hundred thousand to the cubic centimeter. (Health officer Kansas City, Mo.)

Five hundred thousand per cubic centimeter. (Health officer Lynchburg, Va.)

Should be as low as possible, depending on conditions. Small communities might have 100,000 limit, whereas large city with much wholesale milk would have to be satisfied with 500,000. (Health officer Montclair, N. J.)

Our limit is very high; 200,000 to 1 cubic centimeter. (Health officer Portland, Oreg.)

One hundred thousand. (Health officer Providence, R. I.)

Depends upon local conditions. See our rules. [Appendix G.] (Health officer Richmond, Va.)

One hundred thousand per cubic centimeter for this purpose. Every man having a count above this should be immediately investigated from source in country to the retailer's premises. (Health officer Rochester, N. Y.)

We have cool summers, cold mountain streams for cooling, and ice in dairy depots. Would recommend 10,000 for certified, 100,000 for common market milk. (Health officer Seattle, Wash.)

Not to exceed 250,000. (Health officer Syracuse, N. Y.)

Bacterial counts are unreliable because of conditions affecting multiplication. Useful only as an adjunct to regular inspection work. (Health officer Topeka, Kans.)

One hundred thousand. (Surgeon General U. S. Navy.)

Ten thousand per cubic centimeter. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Five hundred thousand. (Health officer Los Angeles, Cal.)

Five hundred thousand. (Health officer San Francisco, Cal.)

Three hundred thousand. (Health officer St. Joseph, Mo.)

Depends upon local conditions. (Health officer Wheeling, W. Va.)

Five hundred thousand per cubic centimeter. (Health officer Scranton, Pa.)

QUESTION 6.—*Is pasteurization, in your judgment, advantageous?*

ANSWERS.

No. (Health officer Ann Arbor, Mich.)

Pasteurization should not be needed. If needed, such milk should be destroyed. (Health officer Atlanta, Ga.)

It is, under present conditions. (Health officer Baltimore, Md.)

In my opinion pasteurization is advantageous when the work is carefully and efficiently done, but in order to show the age of the milk it would be advisable

to require caps to be dated, so that the age of the milk can be readily ascertained. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Yes. (Health officer Cleveland, Ohio.)

Yes; especially for milk from cattle not tubercular tested and for milk not delivered to consumer within 24 hours from time of milking. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Not when you can do better. Pasteurized milk is preferable to dirty milk or infected milk. (State board of health, Florida.)

Not in this community, where there is little shipped milk and few middlemen. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

No. (Health officer Lynchburg, Va.)

Yes; if safe, clean milk can not be obtained. (Health officer Montclair, N. J.)

Not advantageous unless kept at sufficiently high temperature for 15 or 20 minutes, which is generally not the case. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

For a large city it may be the best that can be done in lieu of competent inspectors, but it is not advisable when complete inspection and control can be had. [Appendix G.] (Health officer Richmond, Va.)

No. (Health officer Rochester, N. Y.)

No; not in this city. I believe we will arrive at wholesome milk sooner without the false security of pasteurization being introduced. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Yes; under present conditions in general, though not in Topeka. (Health officer Topeka, Kans.)

Yes. (Surgeon General U. S. Navy.)

Not if above is complied with (10,000 bacteria per cubic centimeter). (Dr. V. C. Vaughan, Ann Arbor, Mich.)

It is, when properly performed, with dirty milk and milk from nontuberculin tested cattle. (Health officer Los Angeles, Cal.)

No. (Health officer San Francisco, Cal.)

Not to pure, clean milk. And not to the dirty milk which would otherwise sour rapidly and thus cause dissatisfaction to the consumer and put him on his guard. (Health officer St. Joseph, Mo.)

It is, if the milk comes from a great distance, is unwholesome, or comes from a doubtful source. (Health officer Wheeling, W. Va.)

Yes. (Health officer Scranton, Pa.)

QUESTION 7.—*Does pasteurization tend to preserve milk?*

ANSWERS.

Yes. (Health officer Ann Arbor, Mich.)

We have investigated carefully in many cities, and we insist that pasteurization is bad. (Health officer Atlanta, Ga.)

For a short time. (Health officer Baltimore, Md.)

Yes. (Health officer Birmingham, Ala.)

Yes. (Health officer Bismarck, N. Dak.)

Within certain limits. (Health officer Cleveland, Ohio.)

Yes. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

It does for a while, but after it gets reinfected with organisms of decomposition it decomposes more rapidly than raw milk. (State board of health, Florida.)

If properly carried out; yes. (Health officer Jacksonville, Fla.)

Not unless it is kept from exposure and maintained at temperature of 50°. (Health officer Kansas City, Mo.)

Yes. (Health officer Lynchburg, Va.)

Yes; results depend upon the degree of pasteurization. (Health officer Montclair, N. J.)

Our experiments show that the ordinary so-called pasteurization does not. (Health officer Portland, Oreg.)

Yes. (Health officer Providence, R. I.)

It retards, or may even do away with, souring; but such milk may "rot" without ever getting sour. [Appendix G.] (Health officer Richmond, Va.)

Yes. (Health officer Rochester, N. Y.)

Yes and no. It will not sour as quickly, but becomes more deadly in the end unless drunk within 36 hours. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Not as ordinarily carried on. Generally merely kills lactic-acid producing germs, thus leaving others to multiply more advantageously. If properly pasteurized; yes. (Health officer Topeka, Kans.)

Certainly, as the lactic-acid germs are destroyed. (Creamery Packing Manufacturing Co., Chicago, Ill.)

Pasteurization preserves milk for a certain length of time, and if it is properly cared for it will keep for weeks. The hospitals of the Panama Canal are supplied with perfectly pasteurized milk that runs through one of my machines at the Sheffield Farms—Slawson, Decker Co., of New York City—and this will give you evidence enough that such pasteurized milk naturally has to keep, because without this it could not be shipped from New York to Panama and arrive there in perfect condition. (Dairy Machinery and Construction Co., Derby, Conn.)

Yes. (Surgeon General U. S. Navy.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes; when properly performed and the milk properly handled afterwards. (Health officer Los Angeles, Cal.)

Only in part and change in constituents. (Health officer San Francisco, Cal.)

It retards lactic fermentation, but augments putrefactive decomposition. (Health officer St. Joseph, Mo.)

Yes. (Health officer Wheeling, W. Va.)

Yes. (Health officer Scranton, Pa.)

QUESTION 8.—*Is compulsory pasteurization, in your judgment, practicable and advisable?*

#### ANSWERS.

With proper restrictions as to the installation of apparatus and as to the keeping of records, there would seem to be no reason why compulsory pasteurization should not be practicable. The fact that regulations directed to this end might in some cases be evaded, notwithstanding a proper system of inspection, is no reason why such regulation should not be made and enforced as far as practicable. Laws against murder, embezzlement, housebreaking, and all other kinds of crime and misdemeanors are very commonly avoided, notwithstanding a well-organized system of police protection, but that has never been set forth as a reason why such laws should not be kept on the statute books. The health department has for some time had under consideration the advisability of the compulsory pasteurization of all milk coming from cows not tuberculin tested, and believes that with respect to that part of the milk supply pasteurization should be enforced. (Health officer District of Columbia.)

No. (Health officer Ann Arbor, Mich.)

Never. (Health officer Atlanta, Ga.)

Not now. (Health officer Baltimore, Md.)

No. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

No. (Health officer Burlington, Vt.)

Advisable, but not practicable. (Health officer Cleveland, Ohio.)

Yes; especially for milk from cattle not tubercular tested and for milk not delivered to consumer within 24 hours from time of milking. (Health officer Columbus, Ohio.)

Yes. (Health officer Detroit, Mich.)

Not when you can do better. Pasteurized milk is preferable to dirty milk or infected milk. (State board of health, Florida.)

Where the dairies and depots can not be controlled and cleaned up; yes. I consider it a poor substitute for clean milk. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

No. (Health officer Lynchburg, Va.)

Yes; if it is impossible to have a safe milk otherwise, as in a large city like New York. (Health officer Montclair, N. J.)

I think that all milk from tubercular cows should be sterilized to 170° for 20 minutes, and all untested herds classed as T. B. infected. (Health officer Portland, Oreg.)

No. (Health officer Providence, R. I.)

It is "practicable" to insist on pasteurization, but it is certainly not advisable to have all milk pasteurized. Pasteurization is always a makeshift. [Appendix G.] (Health officer Richmond, Va.)

Not unless done by the municipality, and it could make a better investment by inspection. (Health officer Rochester, N. Y.)

It is not practicable and is not advisable. It is a delusion and a snare up to date. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

Probably as an adjunct to enforcement of tuberculin test or establishment of inspection in large cities, but should then be done by Government and not insisted upon in cases where not needed. (Health officer Topeka, Kans.)

The only way to protect the public against all kinds of infection from the filth that is found in all milk, except in certified milk, is to pasteurize it. It is a shame that in cities like New York and Boston there were epidemics of considerable extent this last week, due to infection through raw milk. In New York there was a typhoid fever epidemic of over 400 cases, and in Boston the scarlet fever epidemic had over 800 cases. When it comes down to determine if it is better for a city to have such epidemics or to heat such milk, then, in my judgment, there is only one answer, and that is to pasteurize the milk. For myself, as a specialist on milk, I would not dare to feed my own children on raw milk, even if it is certified, and I am happy to say that I have brought up children as strong as anybody can have, and all they ever got was boiled milk. (Dairy Machinery and Construction Co., Derby, Conn.)

There is no reason at the present time why the city milk plants from largest to smallest can not be equipped with proper pasteurizing machinery, at a cost within their means, if they have sufficient capital to properly handle their business. (Creamery Package Manufacturing Co., Chicago, Ill.)

Yes. (Surgeon General U. S. Navy.)

No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Practical with municipal controlled plant. Advisable only in dirty milk and milk from nontested cattle. (Health officer Los Angeles, Cal.)

No. (Health officer San Francisco, Cal.)

No. (Health officer St. Joseph, Mo.)

It is, if the milk is as described in No. 6. [If the milk comes from a great distance, is unwholesome, or comes from a doubtful source.] (Health officer Wheeling, W. Va.)

Yes. (Health officer Scranton, Pa.)

QUESTION 9.—*What effect in your judgment would compulsory pasteurization have upon the wholesale and retail price of milk in winter and summer?*

#### ANSWERS.

Will increase. (Health officer Ann Arbor, Mich.)

Such milk should be given away, or rather thrown away. (Health officer Atlanta, Ga.)

I do not know, but such milk is now sold at 9 and 10 cents a quart. (Health officer Baltimore, Md.)

A tendency to increase the price. (Health officer Birmingham, Ala.)

It would raise the price. (Health officer Bismarck, N. Dak.)

Probably none, but would tend to centralize the business in the hands of larger dealers. (Health officer Cleveland, Ohio.)

It is thought that in this city the pasteurization of milk has prevented an advance in the price of milk. (Health officer Columbus, Ohio.)

Little, if any. (Health officer Detroit, Mich.)

It would I believe increase the price a little. (Health officer Jacksonville, Fla.)

None whatever. (Health officer Kansas City, Mo.)

Cheaper it. (Health officer Lynchburg, Va.)

The expense per quart is so small that the price would probably remain the same, other factors being equal. (Health officer Montclair, N. J.)

None. (Health officer Portland, Oreg.)

Drive many first-class dealers out of business. (Health officer Providence, R. I.)

Probably none, especially if pasteurization is going to make inspection less rigid. [Appendix G.] (Health officer Richmond, Va.) (NOTE.—Commercial pasteurization is not likely to be thorough. In the laboratory or under special control, efficient pasteurization is practicable.)

None. (Health officer Rochester, N. Y.)

I have thought pasteurization dangerous, but in answer to your question I would believe that it would cheapen the price of milk. (Health officer Seattle, Wash.)

No effect for good. (Health officer Syracuse, N. Y.)

None. (Health officer Topeka, Kans.)

No. The saving in other directions offsets it in the increased volume of business, and the practical elimination of losses from sour milk more than makes up for the cost of pasteurization. (Answer applies to retail price.) (Creamery Packing & Manufacturing Co., Chicago, Ill.)

This is a question to be decided by the man who sells milk. (Dairy Machinery & Construction Co., Derby, Conn.)

It might slightly increase it. (Surgeon General U. S. Navy.)

Increase it. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Should have very little effect. (Health officer Los Angeles, Cal.)

The firms who pasteurize can compete with the market. (Health officer San Francisco, Cal.)

Very little. (Health officer St. Joseph, Mo.)

Compulsory pasteurization would probably put a city's milk supply in the hands of a few milk dealers, and it would depend upon them. (Health officer Wheeling, W. Va.)

Cause advance. (Health officer Scranton, Pa.)

QUESTION 10.—*Is the requirement that cows be stabled on concrete floors practicable?*

#### ANSWERS.

Yes. (Health officer Ann Arbor, Mich.)

Not having investigated this thoroughly, we can not say. (Health officer Atlanta, Ga.)

No. (Health officer Baltimore, Md.)

Yes. (Health officer Birmingham, Ala.)

No. (Health officer Bismarck, N. Dak.)

No. (Health officer Burlington, Vt.)

Yes. (Health officer Cleveland, Ohio.)

Yes; but other impervious floor is more desirable. (Health officer Columbus, Ohio.)

Yes; but not absolutely necessary. (Health officer Detroit, Mich.)

Yes; but not necessary, though desirable. (State board of health, Florida.)

No; nor do I think it necessary. (Health officer Jacksonville, Fla.)

Yes. (Health officer Kansas City, Mo.)

Yes. (Health officer Lynchburg, Va.)

Many dairymen do it voluntarily. It is certainly cleaner than putting plank over concrete for the stands. (Health officer Montclair, N. J.)

Yes, in cities; with open, movable, wooden floors over concrete floors. Stone floors are, in my opinion, too great a conductor of heat. Wooden floors are easily taken out for cleansing, if necessary. I say in cities, because facilities for flushing are usually better than in the country. We have quite a number of dairies in our city. (Health officer Portland, Oreg.)

No. (Health officer Providence, R. I.)

Yes. (Health officer Richmond, Va.)

Yes. (Health officer Rochester, N. Y.)

Yes; we have done it for two and one-half years without harm or lessening quantity of milk. (Health officer Seattle, Wash.)

Yes; if properly cared for. (Health officer Syracuse, N. Y.)

I prefer wood or dirt. (Health officer Topeka, Kans.)

Yes. (Surgeon General U. S. Navy.)

Yes. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Yes; in this country, where they are in stable only during milking. (Health officer Los Angeles, Cal.)

- Yes. (Health officer San Francisco, Cal.)  
 Questionable. (Health officer St. Joseph, Mo.)  
 It might be practicable. It is not necessary for the production of clean milk. A floor that can be kept clean is the essential. (Health officer Wheeling, W. Va.)  
 Questionable. (Health officer Scranton, Pa.)

QUESTION 11.—*Does such requirement tend to cause rheumatism in the animal?*

ANSWERS.

- Yes. (Surgeon General U. S. Navy.)  
 Uncertain. (Health officer Atlanta, Ga.)  
 No. (Health officer Birmingham, Ala.)  
 Yes. (Health officer Bismarck, N. Dak.)  
 Not if properly bedded. (Health officer Burlington, Vt.)  
 No. (Health officer Cleveland, Ohio.)  
 Yes; unless concrete overlies cinders (8 inches thick) and animals are well bedded. (Health officer Columbus, Ohio.)  
 Possibly. (Health officer Detroit, Mich.)  
 Not if permitted to graze upon pasture. If stabled it produces laminitis, not rheumatism. (Health officer Kansas City, Mo.)  
 Not that we have noticed. (Health officer Los Angeles, Cal.)  
 No. (Health officer Lynchburg, Va.)  
 I have no experience or knowledge to that effect. (Health officer Montclair, N. J.)  
 No. (Health officer Portland, Oreg.)  
 Yes, unless bedding used. (Health officer Providence, R. I.)  
 Not if proper bedding is used under cows. We have concrete floors in nearly every cow barn around Richmond, and have had no complaint whatever of injury to the cow. (Health officer Richmond, Va.)  
 Not if the floors are properly insulated. (Health officer Rochester, N. Y.)  
 No. We have as healthy stock as there is in the world, and many of our stables have concrete floors. (Health officer Seattle, Wash.)  
 Not if properly cared for. (Health officer Syracuse, N. Y.)  
 I believe so. (Health officer Topeka, Kans.)  
 No. (Dr. V. C. Vaughan, Ann Arbor, Mich.)  
 Not to my knowledge. (Health officer San Francisco, Cal.)  
 Questionable. (Health officer St. Joseph, Mo.)  
 I do not know. Many farmers think so. (Health officer, Wheeling, W. Va.)  
 It may. (Health officer Scranton, Pa.)

QUESTION 12.—*What other requirements in addition to the foregoing would you suggest with a view to improving condition of milk?*

ANSWERS.

- Sanitary inspection of all farms, milk wagons, and dairies selling milk products in the District. (Surgeon General U. S. Navy.)  
 All milk should be tuberculin tested or else pasteurized. All milk should be properly cooled and kept cool. Arrangements should be made for the instruction of mothers in caring for their infants, and this can in no other way be done so well as in connection with the free distribution of proper milk to persons unable to pay for it, and the distribution of milk at reduced prices to persons who are unable to pay the ordinary market price for a milk of proper quality. There are, of course, many other suggestions that might be made with respect to the improvement of the health of the District, but these seem to be those most directly connected with the subject now under consideration. (Health officer District of Columbia.)  
 Closer supervision at dairies, care of cattle and utensils, sterilization of bottles, etc. (Health officer Ann Arbor, Mich.)  
 Clean milk from healthy cows and the milk quickly and thoroughly cooled is all that is needed. Expensive manipulation is bad. (Health officer Atlanta, Ga.)  
 A further supervision and strict enforcement of the requirements as to the sanitary condition at the producers. (Health officer Baltimore, Md.)  
 Clean methods, prompt and thorough cooling, quick delivery. All milk containers to be thoroughly sterilized. (Health officer Birmingham, Ala.)

Keep stables sanitary. (Health officer Bismarck, N. Dak.)

Any regulation tending to increase rating of dairy when scored by the Dairy Division score card. (Health officer Burlington, Vt.)

Inclosed regulations cover about all requirements that are possible to enforce in any large city. [Appendix G.] (Health officer Cleveland, Ohio.)

See Code, page 36. [Appendix G.] (Health officer Columbus, Ohio.)

Inspection from udder to consumer. (Health officer Detroit, Mich.)

Systematic, frequent, and honest dairy inspection by an "educator" and the creation of a demand for clean milk among the general public. (Health officer Jacksonville, Fla.)

Absolute cleanliness; all milk placed in bottles, which can be sterilized when empty. (Health officer Kansas City, Mo.)

Educate dairymen to produce clean milk and make it necessary for transportation companies to keep milk cool while in transit. (Health officer Los Angeles, Cal.)

Absolute cleanliness of stable, milk room, vessels, cow, person that handles, etc. (Health officer Lynchburg, Va.)

See Sanitary Code inclosed. [Appendix G.] (Health officer Montclair, N. J.)

Regulations governing milk depots. (Health officer Portland, Oreg.)

See Rules and Regulations of Board of Health, city of Richmond. [Appendix G.] (Health officer Richmond, Va.)

A milk ordinance that can be enforced. (Health officer Rochester, N. Y.)

Laws against slop feeding; a clean feed trough when cattle are being milked. Shearing the flanks by clippers. (Health officer Seattle, Wash.)

Milk house not connected with stable, and prompt cooling by use of ice. (Health officer Syracuse, N. Y.)

Washing udder, cleanliness, etc. (Dr. V. C. Vaughan, Ann Arbor, Mich.)

Keep dairies clean. (Health officer San Francisco, Cal.)

The requirements of cleanliness and cold, as outlined on our "Barn Poster," we think sufficient. (Health officer Wheeling, W. Va.)

This space is too limited for explanation. (Health officer Scranton, Pa.)

QUESTION 14.—*Are there any regulations in your jurisdiction governing the sale of prepared, condensed, modified, or powdered milks?*

#### ANSWERS.

None that are supervised or compulsory, to our knowledge. (Surgeon General U. S. Navy.)

So far as the provisions of the act referred to (pure food and drugs act) are applicable to the products named—and, generally speaking, they are applicable to them quite as much as to other food products—the manufacture and sale of milk and milk products (including also prepared, condensed, modified, and powdered milk) is governed by the provisions of said act. (Health officer District of Columbia.)

No. (Health officer Ann Arbor, Mich.)

None other than the State pure-food law. (Health officer Atlanta, Ga.)

Yes. (Health officer Baltimore, Md.)

No. (Health officer Birmingham, Ala.)

Nothing but the pure-food law of the State. (Health officer Bismarck, N. Dak.)

General food law. (Health officer Burlington, Vt.)

No. (Health officer Cleveland, Ohio.)

None. (Health officer Columbus, Ohio.)

No. (Health officer Detroit, Mich.)

No. (Health officer Jacksonville, Fla.)

No. (Health officer Kansas City, Mo.)

No. (Health officer Los Angeles, Cal.)

No. (Health officer Lynchburg, Va.)

No local laws. State control. (Health officer Montclair, N. J.)

No. (Health officer Portland, Oreg.)

State pure-food law. (Health officer Providence, R. I.)

Not when in sealed, nonrefillable cans. In open, returnable cans we have same rules as for fresh milk. No control over powdered milks. (Health officer Richmond, Va.)

No. (Health officer Rochester, N. Y.)

Yes. (Health officer Seattle, Wash.)

No. (Health officer Syracuse, N. Y.)

See appended sheets. [Appendix G.] (Health officer Topeka, Kans.)  
 Must contain 3.4 fat when diluted to the degree of evaporation. (Health officer San Francisco, Cal.)  
 No. (Health officer St. Joseph, Mo.)  
 I can find none. (Health officer Wheeling, W. Va.)  
 No. (Health officer Scranton, Pa.)

UNITED STATES DEPARTMENT OF AGRICULTURE,  
 BUREAU OF ANIMAL INDUSTRY,  
 Washington, D. C., November 30, 1910.

Mr. J. LOUIS WILLIGE,  
 Chairman of Milk Committee,  
 Chamber of Commerce, 1202 F Street, Washington, D. C.

DEAR SIR: In further reply to your letter of the 24th to Dr. Melvin, in his absence I take pleasure in inclosing answers to the supplemental questions submitted by your committee.

Very truly, yours,

A. M. FARRINGTON,  
 Acting Chief of Bureau.

SUPPLEMENTAL DATA REQUESTED BY SPECIAL COMMITTEE OF THE WASHINGTON CHAMBER OF COMMERCE APPOINTED TO INVESTIGATE THE PRESENT MILK SITUATION IN THE DISTRICT OF COLUMBIA.

1. *Kindly furnish, if practicable, a generalized statement in a few words of the history of Federal inquiry into the production and distribution of milk?*

Prior to the establishment of the Dairy Division of the Bureau of Animal Industry in the United States Department of Agriculture on July 1, 1895, the Federal Government had given very little attention to the subject of milk production. As early as 1893, however, following the discovery of tuberculin and the development of the tuberculin test, the Bureau of Animal Industry prepared tuberculin for distribution free of charge to public health officers, with a view to restricting and eradicating tuberculosis of cattle. This distribution and use of tuberculin has been continued ever since to a steadily increasing extent. About the same period the bureau also began to study the subject of pasteurization and issuing literature on this subject.

Following the establishment of the Dairy Division active work dealing with the production and distribution of milk was undertaken, and in 1900 there was published a paper entitled "Market Milk: A Plan for its Improvement." This paper was issued to meet frequent requests for advice regarding improvement of the milk supply of cities and towns. The plan in brief was the creation in each community of an unofficial milk commission to inspect dairies and methods of producing and handling milk and to prescribe proper requirements governing these things. The proposed arrangement was to be purely voluntary, the dairymen who conformed to the conditions being given certificates which would enable them to obtain business.

The Bureau of Animal Industry has for several years done much to promote and introduce the score-card system of dairy inspection, which has been found to be a valuable agency for improving the wholesomeness of milk supplies. This system was first introduced and used by Dr. William C. Woodward, health officer of the District of Columbia, early in 1904, and has since been modified, improved, and extended.

In recent years the Bureau of Animal Industry has worked in various ways to bring about improvement in the wholesomeness of milk. It has made scientific investigations regarding tuberculosis, pasteurization, and other subjects; it has studied practical methods of dairying, with a view to helping dairymen to improve their methods for the benefit of both producer and consumer; it has cooperated with numerous cities and towns in the improvement of their milk supplies; it has furnished tuberculin to public-health officers and has applied the tuberculin test to a large number of cows; it has studied the milk supplies of various cities and the methods of producing, transporting, handling, and delivering milk; it has promoted competitive exhibitions of milk and cream to encourage the production of wholesome products, and has given

numerous lectures and addresses at public meetings; and it has prepared and distributed a large quantity of literature relating to the various phases of the milk question.

2. *Is the feeding of "wet malt" or other brewery products to cows prejudicial to milk derived from them?*

The feeding of wet malt to cows has a deleterious effect upon the milk derived from them. Wet malt under certain prescribed conditions, however, may be safely used to a limited extent. Brewery products other than wet malt are not believed to be injurious to the milk, especially if they are fed in dry form.

3. *Is the colon bacillus responsible for other diseases besides diarrheal disorders?*

The colon bacillus has often been found to be the active cause of appendicitis, chronic peritonitis, and abscesses of the liver. It is frequently found associated with other bacteria in cases of cystitis and in cases of fat necrosis, but has not been proved to be the primary invader.

4. *Has the Bureau of Animal Industry or the Bureau of Chemistry of the Department of Agriculture prescribed any requirements for the improvement of methods of producing or selling milk transported from one State to another, either under authority of the food and drugs act of 1906 or otherwise?*

The Bureau of Chemistry has prescribed the following requirements for market milk in interstate commerce: It must be the fresh, clean, lacteal secretion obtained by the complete milking of healthy cows, properly fed and kept, excluding that obtained within 15 days before and 10 days after calving, and must contain not less than 8.5 per cent solids not fat, and not less than 3.25 per cent of milk fat. Bacteriologically it must not contain more than 500,000 bacteria per cubic centimeter for market milk; not more than 100,000 for inspected milk; not more than 10,000 for certified milk. The kind of bacteria present may modify judgment as to its quality. When practicable, sanitary inspection of dairies and creameries furnishing the product is also taken into consideration in enforcing these standards.

5. *Has it been conclusively demonstrated that pathogenic microorganisms survive and retain their virulence in butter, cheese, and other milk products?*

Pathogenic microorganisms will live in butter and cheese for several months.

6. *Is there consequent reason for requiring that these products be maintained at low temperature; and if so, what maximum temperature should be maintained?*

While low temperatures retard and inhibit the growth and multiplication of pathogenic germs, they can not be relied upon to destroy such germs. The requirement that dairy products be held at low temperatures therefore would not remove the danger. Such contaminations should be guarded against and prevented so far as possible in the preparation of the products. The pasteurization of cream or milk before they are made into butter or cheese is considered the best method of accomplishing this object.

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UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF CHEMISTRY,  
Washington, D. C., November 30, 1910.

COMMITTEE ON MILK INVESTIGATION,  
Washington Chamber of Commerce,  
1202 F Street NW., Washington, D. C.

GENTLEMEN: I have your communication of the 24th instant asking my opinion on certain questions in regard to milk. I will reply as fully as I can.

1. The only regulations which have been formulated respecting the preparation or distribution of condensed, modified, powdered, or evaporated milks are those contained in the standards of purity for food products, Circular 19, issued by the Secretary of Agriculture in harmony with the authority of Congress, and they are as follows:

(1) Milk is the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within 15 days before and 10 days after calving, and contains not less than 8.5 per cent of solids, not fat, and not less than 3.25 per cent of milk fat.

(2) Blended milk is milk modified in its composition so as to have a definite and stated percentage of one or more of its constituents.

(3) Skim milk is milk from which a part or all of the cream has been removed, and contains not less than 9.25 per cent of milk solids.

(4) Pasteurized milk is milk that has been heated below boiling, but sufficiently to kill most of the active organisms present, and immediately cooled to 50° F. or lower.

(5) Sterilized milk is milk that has been heated at the temperature of boiling water or higher for a length of time sufficient to kill all organisms present.

(6) Condensed milk—evaporated milk—is milk from which a considerable portion of water has been evaporated and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat.

(7) Sweetened condensed milk is milk from which a considerable portion of water has been evaporated and to which sugar (sucrose) has been added, and contains not less than 28 per cent of milk solids, of which not less than 27.5 per cent is milk fat.

(8) Condensed skim milk is milk from which a considerable portion of water has been evaporated.

(9) Buttermilk is the product that remains when butter is removed from milk or cream in the process of churning.

(10) Goat's milk, ewe's milk, etc., are the fresh, clean, lacteal secretions, free from colostrum, obtained by the complete milking of healthy animals other than cows, properly fed and kept, and conform in name to the species of animal from which they are obtained.

#### CREAM.

(1) Cream is that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains not less than 18 per cent of milk fat.

(2) Evaporated cream—clotted cream—is cream from which a considerable portion of water has been evaporated.

2. I am of the opinion that there is a wide variation of ideas which may be properly entertained concerning "prepared" milk. I am inclined to the following: Natural milk, which has not been treated other than by straining, cooling, and bottling, would not be entitled to the term "prepared milk." All milk which has been modified in its composition in any way, by changing the properties of its ingredients or by sterilization or pasteurization, should be designated as prepared milk. Milk which is used in connection with other foods in a dried or semiliquid state is not prepared milk but milk used in compounding other foods.

3. While I have not made experimental determinations on the effect of freezing milk, I am of the opinion that it profoundly modifies its character, perhaps not so much in regard to its potability as to its wholesomeness and nutritive qualities. My belief in this matter is based on the well-known fact that the freezing of wine or beer, or of meat or fruits, profoundly affects their character. For this reason milk, especially if intended for the nutrition of infants, should never be frozen.

4. I am unable to give the commission any information respecting the comparative retail prices of condensed, powdered, evaporated, and modified milks as compared with raw milk. I will say, however, that I do not believe that milk should have the prefix "raw" attached to it. The term "milk" means pure, fresh, clean, and properly handled milk, and the term "raw" is unnecessary and discriminatory.

5. I do not believe that any milk which has undergone any so-called preparation or modification of any kind is as wholesome and nutritious as the pure article. In my opinion pasteurization seriously injures milk in its nutritive value, especially for infants, and milk should never be pasteurized except as a choice between two evils. Insanitary milk, if used at all, should undoubtedly be pasteurized. Dirty milk is just as dirty after pasteurization as it was before. Pure, clean, properly handled milk needs no pasteurization and no modification, and no preparation, except as indicated in the modifications of milk under proper medical control and advice for the feeding of infants.

I use the term "milk" solely as the lacteal secretion of the cow and do not refer to mothers' milk, or the milk of sheep, goats, or asses. In my opinion large cities, and in that I include Washington, might be able to get a much better milk supply than is now afforded by the establishment of clean, sanitary milk plants in regions devoted to the dairy industry, drying the milk to a powder by one of the modern sanitary processes and transporting it to the city

for speedy consumption. I would not, however, advise the use of milk powder by any means for infant feeding. I strongly urge upon every municipality to establish a milk plant under the direct control of the municipality where pure, clean, wholesome, unpasteurized, unmodified, and unprepared milk may be kept for the use of those infants who are fed artificially. I would have in this plant a modifying chamber under the direction of a competent specialist to modify the pure milk without any other change to as nearly the composition of fresh mothers' milk as possible, or to make special modifications of milk, under the direction of a physician, for those who are diseased. I would make it a penal offense for any person feeding an infant artificially to use any other food than that supplied from this central establishment. As far as grown people are concerned, in my opinion, a properly prepared milk such as I have described as coming from a distance can be used with safety and without danger of interfering with the nutritive processes. The municipal milk supply, therefore, would be only for the use of infants artificially fed.

Respectfully,

H. W. WILEY, *Chief.*

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EXECUTIVE OFFICE,  
STATE BOARD OF HEALTH OF FLORIDA,  
*Jacksonville, Fla., November 18, 1910.*

CHAMBER OF COMMERCE,  
*Washington, D. C.*

GENTLEMEN: Inclosed, I return herewith answers to certain of the questions sent out.

I have only undertaken to answer those which have been definitely settled by research and experience; the others, from my point of view, at least, are largely speculative, and matters in which I do not care to enter.

Very truly, yours,

JOSEPH Y. PORTER,  
*State Health Officer.*

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OFFICE OF BOARD OF HEALTH COMMISSIONERS,  
BUREAU OF VITAL STATISTICS,  
*Hartford, Conn., November 10, 1910.*

WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C.*

GENTLEMEN: I am in receipt of your questionnaire relative to the control of production and handling of milk. The questions appear to me to be so diffuse as to render impossible the categorical answers which you evidently expect. The ground covered by each of the questions is so broad that to my mind it is impossible to give the answers without a large number of exceptions. Such being the case I am sending you a copy of the Connecticut State law and our municipal ordinances on the subject.

Very truly, yours,

C. P. BOTSFORD, *Superintendent.*

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OFFICE OF HEALTH OFFICER,  
*Lynchburg, Va., November 9, 1910.*

CHAIRMAN COMMITTEE ON MILK SITUATION, CHAMBER OF COMMERCE,  
*Washington, D. C.*

DEAR SIR: I inclose you blanks filled out as you requested. I believe that the great thing necessary in milk supply is instructive inspection. It is true that the inspector must be clothed with power to get rid of those who won't respond to reasonable demands, but only a few have been found here who had to be closed out. There is no compulsory tuberculin test here, but a number of dairymen have of their own accord had their herds tested, and all of them are interested and mostly making arrangements to test. This is a highly desirable condition and is ripe for a law for those few, if any exist, who will not soon test. The dairymen here have the idea that the test is for the protection of their own herds more than for anything else.

Yours, very truly,

MOSBY G. PERROW, *Health Officer.*

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES,  
Philadelphia, December 8, 1910.

J. LOUIS WILLIGE, Esq.,  
Chairman Milk Committee,  
Washington Chamber of Commerce, Washington, D. C.

DEAR SIR: The Philadelphia milk commission, which has been making a study of the milk problem in Philadelphia, has not as yet made its report. When such has been received I will be pleased to take up with you the questions mentioned in your letter of recent date. This commission is going into the matter extensively and I feel that its findings will be of great importance to the city of Philadelphia.

Very truly, yours,

J. S. NEFF, *Director.*

DEPARTMENT OF HEALTH AND SANITATION,  
Seattle, Wash., November 21, 1910.

THE WASHINGTON CHAMBER OF COMMERCE,  
Washington, D. C.

GENTLEMEN: Please find inclosed answers in full to questions submitted.

You must realize that I am 3,000 miles away from Washington and laboring under somewhat different conditions, but I have answered the questions as it seems to me they should be answered in a district in which we have practically an all-year's outdoor pasturage, and in a district in which we have no very hot weather.

You will notice that a tone of antagonism runs through my answers in reference to pasteurization. I hardly know what I would do were I commissioner of health in a hot, eastern city. I am satisfied, however, that I would regard it only as a makeshift and would oppose it with all my strength and manhood as a permanent proposition, since I believe that it would be an insult to the intelligence of civilized men to admit that, with all our skill and cunning, we can not produce a good wholesome milk just as God Almighty made it, unmodified by man. If pasteurization shall be unnecessarily adopted in any community and for any greater length of time than is absolutely necessary, I believe that it will put back the time when we can expect to see safe milk produced many, many years. In other words, by pasteurization the milk can be taken to a city and sold containing such contamination originally as would have condemned such milk had it not been pasteurized. Therefore the stimulus to produce milk without contamination has been removed and the tendency will be, without the slightest doubt, to deteriorate the standard of excellence from day to day and from year to year.

Look at the difference in the quality of milk in most American cities to-day as compared to what it was, say, five years ago. Think of the swill-fed dairies of Cincinnati; then realize what has been accomplished without pasteurization and think what may be accomplished during the next 10 or 20 years. In the meantime, however, under carefully drawn lines, pasteurization will save many lives.

Yours, very truly,

J. E. CRICHTON,  
*Commissioner of Health.*

DEPARTMENT OF PUBLIC SAFETY,  
Syracuse, November 11, 1910.

Mr. THOMAS GRANT,  
Secretary Chamber of Commerce, Washington, D. C.

DEAR SIR: I have answered the questions to the inclosed circular letter to the best of my ability. The answers to many of the questions have been made off-hand, and so may be of little value to you. We have been carrying on an extensive milk campaign here in Syracuse for some four years, and we have done a great deal along the line of betterments in our milk supply. We are far from perfection in all of this work. The problems are very great, and many of them difficult of solution. Our aim has been to lessen the infant mortality in our city. We feel that something has been done in this line, but much still remains to be done. If you can give us any helpful suggestions from your studies and investigations, we should be very glad to get them.

Yours, very truly,

D. M. TOTMAN, *Health Officer.*

DEPARTMENT OF HEALTH,  
*Wheeling, W. Va., November 14, 1910.*

THE WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C.*

GENTLEMEN: I have tried to answer the list of questions you submitted, but in some instances it is impossible to answer in a few words.

We have tried to make our people understand that clean raw milk from healthy cattle is far preferable to pasteurized milk.

We try to make them understand that bacteria grow perhaps more rapidly in pasteurized milk than in raw milk, and therefore pasteurized milk requires the same amount of care.

We tell them that in a city where the milk supply is as close as Wheeling's there is no excuse for pasteurized milk.

Some of our dairymen can and do bring in practically perfect milk. Why shouldn't the others do the same?

In a large city where the milk supply comes from a great distance the situation is different.

Our newspapers print our milk reports, and we are thus able to bring this before the people.

Yours, truly,

W. H. McLAIN, M. D.

KENSINGTON, MD., *November 10, 1910.*

J. LOUIS WILLIGE, Esq.,  
*Washington Chamber of Commerce,*  
*Washington, D. C.*

DEAR SIR: I am inclosing herewith short answers to most of the questions submitted on the subject of the tuberculin test. I confine myself to one list of questions, as that has been my work abroad for a number of years. Should you care to request further information on the tuberculin test it will give me great pleasure to answer any questions or to appear before your committee personally, if they so desire.

Very respectfully,

T. A. GEDDES.

PHILADELPHIA, *December 28, 1910.*

Mr. J. LOUIS WILLIGE,  
*Chairman Washington Chamber of Commerce,*  
*Washington, D. C.*

DEAR SIR: I herewith return the questionnaire which you sent me some weeks ago.

I have answered the questions as intelligently as possible. The ones relating to the tuberculin tests I turned over to Dr. C. J. Marshall, of the veterinary department of the University of Pennsylvania, whom I consider the best-qualified person I know to answer such a series of questions. The replies attached are his.

If the answers given will prove of any benefit to you it will be very gratifying both to Dr. Marshall and myself.

Very truly, yours,

S. MCC. HAMILL.

WISCONSIN STATE HYGIENIC LABORATORY,  
*Madison, November 19, 1910.*

CHAIRMAN OF MILK COMMITTEE,  
*1202 F Street NW., Washington, D. C.*

MY DEAR SIR: Your circular letter inclosing several lists of questions were received on my return recently from Europe, and I take pleasure in giving answers.

Many of these questions are general in character and almost impossible to answer without taking consideration of modifying circumstances. I have, however, given as succinct answers as possible, and beg you to remember that much more could be said on practically all of them. However, as an expression of opinion, I judge you wish the answers put as briefly as possible. The general

questions from 13 to 23 I have not replied to, partly because most of them come more directly under men engaged in other lines of work than my own, and partly because much can be said in answer to each question, so much depending on circumstances. For instance, question 13, "What is condensed milk?" There are a number of ways of condensing milk, as you no doubt know. A milk preserved by the addition of much sugar would be susceptible to changes entirely different from that simply condensed, but to which no sugar has been added. The same consideration is applicable in regard to the nutritive qualities and digestibility and keeping qualities of such milks, much depending on circumstances, so that I do not feel able to answer these questions in the space allotted. However, as said before, you can get very much better opinions from men who are especially engaged in this line of work.

I am, with high regard, very sincerely, yours,

MAYŶCK P. RAVENEL.

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY,  
*Boston, November 9, 1910.*

DEAR SIR: I am sorry that I have no time to study and make careful answers to the interesting questions which you lay before me.

Having been absent from my desk for six months in Europe, I am now overwhelmed with work and regret that I shall not be able to assist you.

Very truly, yours,

W. T. SEDGWICK.

CHAIRMAN CHAMBER OF COMMERCE,  
*Washington, D. C.*

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HARVARD UNIVERSITY MEDICAL SCHOOL,  
*Boston, Mass., November 15, 1910.*

The WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C.*

DEAR SIR: I have duly received your circular letter and accompanying series of questions dealing with the problem of dairy sanitation. On looking over the questions I find it impossible to give any categorical answers to them. My own views are more or less determined by opposing considerations and I should be giving an erroneous impression if I were to answer them briefly. I am sure that a few men in Washington holding fairly conservative views could furnish the desired information, since there are no widely divergent opinions among scientists at the present time on the subjects you have introduced.

Very truly, yours.

THEOBALD SMITH.

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UNIVERSITY OF MINNESOTA,  
*Minneapolis, Minn., December 1, 1910.*

WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C.*

GENTLEMEN: Immediately upon receipt of your blanks I set about trying to formulate answers which would be of use to you. There were so many questions, however, that I did not know quite what to do. Upon some of them my opinion would be purely academic; on certain others I felt a right to express an opinion, but it appeared to be quite impractical for me to contribute anything which would be of real use to you.

You have in Washington, in your medical health officer, and in the various Federal services, including the United States Public Health and Marine-Hospital Service and the various divisions of the Department of Agriculture, men whose opinions have the greatest weight with sanitarians throughout this and other countries. In addition to their general knowledge, they have specific information without which it would be impossible to discuss intelligently the Washington situation. Outsiders, no matter how much they know about a subject in general, are at a disadvantage in dealing with a local situation, and, instead of being helpful, might be positively detrimental. Your blanks are comprehensive, but they should be filled out by those who see all sides of the local situation and are familiar with local conditions.

In answer to yours of November 28, I have to say that I believe you have, right on the grounds in Washington, all the necessary authorities and should be able to receive a complete report upon the local situation which would form the basis of action which would be at once suitable to the needs of Washington and prove of profit to the rest of us in the solution of our own local problems.

I should be glad to be of help in any way possible, but feel personally that this letter is the best help that I can give you.

Yours, very truly,

F. F. WESBROOK.

THE COLLEGE OF THE CITY OF NEW YORK,  
New York, November 17, 1910.

WASHINGTON CHAMBER OF COMMERCE,  
Washington, D. C.

DEAR SIR: I inclose replies to as many of the questions in your excellent set of papers on milk supply as I felt that I could answer.

If the results of this questionnaire are published, I should be very glad to receive a copy of it, as I should think they would be of great value.

Sincerely, yours,

C. E. A. WINSLOW.

BORDEN'S CONDENSED MILK Co.,  
New York City, November 10, 1910.

WASHINGTON CHAMBER OF COMMERCE,  
1202 F Street NW., Washington, D. C.

DEAR SIR: This is to acknowledge receipt of your communication of the 1st instant, with inclosures, and to say that we will be glad to answer the various questions, as far as possible, as soon as we can find an opportunity to get the data together.

Very truly, yours,

BORDEN'S CONDENSED MILK Co.,  
F. J. TAYLOR, *President*.

BORDEN'S CONDENSED MILK Co.,  
New York City, November 30, 1910.

THE WASHINGTON CHAMBER OF COMMERCE,  
1202 F Street NW., Washington, D. C.

DEAR SIR: Referring to your favor of the 28th instant reminding us of your previous communication, would say that if you have made very much of an examination of the milk question you certainly are aware that it is an intricate one. We do not wish to make any haphazard or premature answers to the questions which you have so intelligently compiled, and, considering the vast amount of general misinformation circulated on the milk question and the premature conclusions in some quarters, we felt that the inquiry which you had in hand was a movement along the right line, for it is time that the public itself, and the consuming public in particular, be informed more correctly on some of the phases of the milk question that seem to be debatable. Our standpoint is that the so-called milk question involves the producer, distributor, and consumer, and, therefore, can not be intelligently considered unless these factors are properly investigated. We expect to have the report ready in a few days and will forward to you promptly.

Very truly, yours,

BORDEN'S CONDENSED MILK Co.,  
F. J. TAYLOR, *President*.

BORDEN'S CONDENSED MILK Co.,  
New York City, December 5, 1910.

WASHINGTON CHAMBER OF COMMERCE,  
1202 F Street NW., Washington, D. C.

GENTLEMEN: Supplementing our exchange of correspondence on this question, we herewith hand you our memorandum of replies to the questions presented in your request. Our answers are based upon an earnest desire to view the

whole subject from the practical standpoint of recognizing the dependency of the consumer upon the producer and the necessity of the distributor, for it goes without saying that the individual consumer can not go to the individual dairy for his personal requirements. Therefore, the milk problem necessarily evolves itself into a commercial basis; for without the commercial incentive the consumer can not receive any milk unless he produces it himself. There can be no obligation compelling the existence of dairymen, their production of milk at a cost not commensurate with their selling price, or the distribution of it not contingent on a revenue basis.

We have made a special study of the tuberculin test, its advantages and disadvantages, in connection with the litigation which has been forced upon us by the requirements of the town of Montclair, of New Jersey, which case has been in litigation for some time, and in which we have endeavored to procure the testimony of the most learned, unbiased experts upon all the questions involved of bovine tuberculosis, tuberculin test, and the transmissibility of bovine tuberculosis to human beings; all of these subjects having been exhaustively examined and testified to in connection with that case.

Very truly, yours,

BORDEN'S CONDENSED MILK Co.,  
F. J. TAYLOR, *President*.

#### HEARINGS ON THE MILK SUBJECT BEFORE THE COMMITTEE OF CHAMBER OF COMMERCE.

MR. CHAIRMAN AND GENTLEMEN OF THE COMMITTEE: You have asked me to appear before you and state my views as to the best methods of procuring a safe and clean supply of milk for the District of Columbia. It must be conceded by all fair-minded and self-respecting men that the District of Columbia is entitled to and should have a good, fresh, pure, supply of milk at reasonable prices. As to just what constitutes the required or ideal supply of milk seems to be the subject for discussion to-day. After 40 years' experience in the business myself, and aided by the experience of the very best medical thought to-day, I feel safe in saying that the one and only safe milk for the people of the District to use is pure, clean, cow's milk in its raw state. To adopt either of the substitutes that are now before the commissioners, namely, the compulsory tuberculin testing of cattle or compulsory pasteurization, would result in an expensive and serious failure. If you will permit me I will give you a short history of tuberculin and what it has done since discovered. About 1882 Prof. Koch discovered what he claimed to be a diagnostic for the tubercle bacilli and published the same to the world. He was pounced upon by the medical profession and the pathologists, not only in the Old World but in America. So hard was he pressed for proof of his discovery that he asked the medical world to suspend judgment and give him sufficient time to make further research, and if possible substantiate what he said or back down from the position he had taken. For several years (I do not know the exact time) the matter was allowed to lay dormant and was not heard from again until about 1890, if I remember correctly, when Prof. Koch came before the medical world like an honest man and declared to the medical profession that he "had made a mistake in the assertions he had made before, and that his tuberculin was not a reliable diagnostic." He steadfastly stood by that assertion (until his death a few months ago), notwithstanding the pressure from the medical men in both European countries and America. Prof. Bangs, of Copenhagen, has had more to do with tuberculin than any other man that I know of, and after using it for many years declared that tuberculin was "not a true diagnostic and could not be relied upon at all times." About 18 years ago, as well as I remember, the tuberculin testing of cattle was taken up in the United States. Most of the New England States at different times have tried it, and while there may be some laws on the statute books yet which require it, so far as I can learn none of them enforce it. Pennsylvania was next to take it up after the New England States, and after slaughtering many herds decided it was not practical. Only a few years ago the great dairy State of New York passed a law and made an effort to enforce it, but soon abandoned it. Since that time many of the Western States have taken it up, but so far as I know now there is not one State in the Union that enforces it, and it was only a few weeks ago that the Supreme Court of the great dairy State of Iowa decided that the law was unconstitutional.

## PROBABLE RESULTS IF THE TUBERCULIN TEST IS MADE COMPULSORY.

Assuming that the figures given out by the dairy division of the Agricultural Department are correct, and I haven't any reason to doubt them, the per cent of reacting cattle in the District was about 18 per cent. Basing our estimate on these figures we must look for something like 16 or 18 per cent of reacting cattle in the States of Maryland and Virginia, and it is only reasonable to assume that something like 10 per cent of the farmers will be forced out of the business or will abandon it sooner than submit to the test. Conceding this to be true we must look for something like 25 or 30 per cent decrease in the herds in the States of Maryland and Virginia. If this supposition is borne out we must naturally expect something like 25 per cent shrinkage in the supply of milk. With the present shortage of milk added to what we may look for if compulsory tuberculin testing is insisted on, it will surely drive off all competition, and when competition is destroyed it must be apparent to anyone that an unreasonably high price will obtain. Nor is this the only bad result. Should the price of milk be forced up to something like 10 or 12 cents a quart it will surely put it beyond the reach of from 40,000 to 60,000 people in the District, and a large portion of this class must necessarily be young children, who will never have an opportunity to indulge in a glass of milk. If the commissioners and the Agricultural Department deem this action wise and philanthropic they should proceed on lines that will insure milk from tuberculin tested cattle. But before doing this it might be well to consider, first, whether they are justified in taking this milk from the mouths of these people without offering them any substitute that is as cheap and as good as the milk they now have; second, whether they are getting any better milk than they would at 8 or 9 cents a quart, since no one can dare come forward and say that they have proof positive that tuberculosis can be transmitted from the bovine to the human family and since no one can bring proof positive that even one case can be shown to have been introduced into the human family by milk. Nor is this all. The preponderance of evidence to-day with those who have had experience with the tuberculin test declare it is not an infallible diagnostic, and will not cause a reaction after cattle have been tested with it three or four times, and opens the way for more duplicity and rascality than any other test I know of.

## COMPULSORY PASTEURIZATION.

There is very little that can be said in favor of pasteurized milk, and from my viewpoint there is only one condition under which milk should ever be allowed to be pasteurized, and that is in the home under the instructions and advice of a practicing physician. To permit the pasteurization of milk under any other conditions is dangerous in the extreme and should not have the sanction of any conscientious gentlemen. The use of pasteurized milk in founding asylums, children's hospitals, and similar institutions has long since been abandoned and is now regarded by most all physicians of note as an unsafe diet and should not be tolerated. To temporize with either of the above expedients will only defer for 5 or 10 years the accomplishing of what we might call an ideal dairy supply for the District of Columbia, and might in the end defeat the very object for which the authorities are working. To destroy competition is detrimental to the consumer, and anything that tends to decrease the supply must necessarily aid in the destruction of competition. It should be the object of the authorities to make the laws covering the milk traffic sufficiently broad to protect the dairy producers in their property rights and at the same time stringent enough to safeguard the public and induce capital to invest in the dairy business, instead of making short-sighted, vexatious, and drastic regulations that will drive the business in the hands of unscrupulous men, as it is a well-known fact that it is next to impossible to properly police the milk business.

Respectfully submitted.

C. THOMPSON.

SHEFFIELD FARMS-SLAWSON DECKER Co.,  
New York, October 21, 1910.

Mr. J. L. WILLIGE,  
Chairman Chamber of Commerce Milk Committee,  
Washington, D. C.

DEAR SIR: I have been following the crusade that the authorities in Washington are making for the betterment of the milk supply of that city and their endeavors to make the pasteurization of all milk that does not come from tuberculin-tested herds compulsory. I notice in this morning's issues of the New York Times and New York Herald that the Milk Dealers' Association have brought in, as a defense, that if pasteurization is required that it would place the dealers in the hands of a trust, who are reaching out to control the entire milk supply of the country. The only dairy products organization that I know of, members of which were named in the issue, is the American Farm Products Co., a concern that has confined its efforts to the renovating of butter, and which, if my memory does not fail me, has gone in the hands of a receiver.

I trust that the crusade the authorities are making will be successful, as it is the logical ultimate outcome for a pure-milk supply all over the world.

The pasteurization of milk recommends itself from every standpoint. It is cheaper to pasteurize and bottle milk in the city in large plants than it is to bottle the milk in the country without pasteurization. Pasteurizing machinery is very cheap, and can be obtained from half a dozen or more concerns, and where the work can be done properly under official supervision, as is possible in the city, the public gets all the benefit and no increase in the retail price is necessary.

Yours, very sincerely,

D. S. HORTON, *Secretary.*

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NATHAN STRAUS PASTEURIZED MILK LABORATORIES,  
Washington, D. C., October 28, 1910.

Mr. J. LOUIS WILLIGE,  
Chamber of Commerce, Washington, D. C.

MY DEAR SIR: In connection with the investigation now being carried on of the milk situation, I beg to invite you and your committee to visit the Nathan Straus Laboratory here in Washington. We are endeavoring to carry out the most approved methods in the care and pasteurization of milk, principally of modified milk for infants, and I feel it would doubtless be of assistance to you to see our plant in operation.

The milk is received before 8.30 in the morning and is immediately modified and pasteurized, being ready for distribution by 11. If you could come to see us while we are at work, we should be very glad to have you. However, we are open daily until 5, and I would be glad at any time to explain our methods to yourself and committee.

Trusting I may have the pleasure of seeing you here, I am,

Yours, very respectfully,

(Miss) REBA J. HURN.

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NATHAN STRAUS PASTEURIZED MILK LABORATORIES,  
Washington, D. C., November 17, 1910.

Mr. J. LOUIS WILLIGE,  
Chairman Chamber of Commerce Committee,  
603 Thirteenth Street NW., City.

MY DEAR MR. WILLIGE: I beg to inclose herewith the list questions sent me by your committee, answered as best I can. Many of the questions can be answered only by scientists, whom I have followed in my answers and whom you fortunately have been able to interview personally.

May I remind your committee of the invitation to visit this laboratory and see both how we handle the milk and also the philanthropic side of our work in caring for the poor babies? I trust you may find it possible to come at some early date.

Yours, very respectfully,

REBA J. HURN.

BURNSIDE (POST OFFICE ECCLESTON), MD.,  
December 6, 1910.

J. L. WILLIGE, Esq., *Chairman,*  
*Washington, D. C.*

DEAR SIR: Your letter to the Walker-Gordon Laboratory of Washington has been referred to me, and I herewith inclose the question sheets answered so far as I feel competent.

I am also inclosing pamphlet, issued some little time ago, descriptive of the farm where Burnside milk is produced. Here all employees report any sickness in their families. Our medical adviser is at once consulted, and until he decides that the disease is not contagious that employee takes no further part in the handling of the milk. I consider this second only to integrity in the safeguarding of milk.

The purpose of the Walker-Gordon Laboratories is to fill the prescriptions of physicians for milk containing definite percentages of fat, protein, sugar, etc., and to furnish such other food for infants as the physician may prescribe. While the laboratories sell a high grade of milk and creams for nursery and table use, and a number of milk preparations, such as buttermilk, kephir, koumiss, etc., they offer nothing that could properly be classed with proprietary foods. No modified or prescription milk is sold except on the order of a physician, who rarely has difficulty in so changing his prescription as to make the milk entirely suited to the digestion of the patient. The modifiers, or prescription clerks, use carefully prepared tables by which many thousands of different combinations can be effected without any chemical change in the milk constituents. Where the child is doing well at the breast, but the mother has not sufficient milk, the physician may have the mother's milk analyzed, and, as nearly as is possible in cow's milk, reproduced for additional feedings.

I have endeavored to give you some idea of our aims, but it would be far more satisfactory if I might have the pleasure of showing you and the other members of your committee our plant, and I should be glad to know that it would be agreeable to you to visit us. So far as I know now I shall be free to meet you here any day you may select except the 9th, 10th, and 15th instant, and hope you will name an early date.

Yours, sincerely,

S. M. SHOEMAKER.

NEW YORK WHITE CROSS MILK Co.,  
*New York City, November 30, 1910.*

CHAIRMAN OF MILK COMMITTEE,  
*Chamber of Commerce, Washington, D. C.*

DEAR SIR: I am herewith returning you the list of questions asked by your special committee. You will note that there are many questions I have made no attempt to answer, but if it is of interest to you, I will write you on pasteurized milk, condensed milk, and concentrated milk, in comparison with raw milk. I will treat the condensed milk and concentrated milk without the addition of sugar as a preservative in either case.

Condensed milk is a product of milk, not milk. It is really milk from which a portion of the water has been removed and is carried a few degrees higher in temperature than pasteurized milk (190 to 200°) for the purpose of coagulating and albumin and casein, but this condensed milk has the same vital objection to be used as a general milk that follows with pasteurized milk, while when freshly made, it would show a very low bacteria count and the absence of pathogenic germs, but as it spoils it develops a putrefaction, and hence is liable to produce a toxic condition. It is well understood that in milk subjected to a vacuum there is a breaking down of cells and is followed by a sensible decomposition of the proteids.

Pasteurized milk is a milk that is subjected to a temperature varying from 140 to 165°; different temperature depending on the length of time of the exposure of milk to this temperature. It is much safer when freshly pasteurized than it is as it grows older, as it is a well-recognized fact that in the city of New York pasteurized milk is not permitted to be sold by a dealer after it is 24 hours old, and while the bacteria count might be low, it is liable to decomposition, and as often decomposition has no taste the very warning that is necessary for spoiled milk is not there in the shape of souring and the conditions are right for a toxic poison. If the temperature has been carried

high enough, there will be a change in the albumin and casein, and certainly a destruction in the enzymes. There are three conditions that render the pasteurization of milk impractical from a commercial standpoint, if a perfect milk is to be served:

First. If the milk is pasteurized at the creamery, and their lack of proper skill and integrity makes it impractical.

Second. If the milk is pasteurized in the city, the increase in the number of bacteria from the farmer to the city increases the number of bacteria, and consequently the milk is more liable to the putrefaction, above referred to.

Third. There is no positive way of knowing or no physical change in the milk that absolutely guarantees that the product has been so treated, and can only be determined after a day or two when the milk is all consumed and the harm done, and in this case, the digestibility of the milk is impaired and is not as safe as pasteurized milk.

To my mind the great quantity of milk consumed by large cities can never be properly guaranteed as clean, pure milk unless there is a physical change in the milk, and this must be brought about at the creamery; such change not to affect the component parts of the milk; to have no effect on the enzymes, and when the product becomes old it should develop a lactic ferment.

Concentrated milk is a milk from which three-fourths of the water has been removed. This is the object at the creamery, and the removal of *B. coli* and all pathogenic forms are mere incidents; the force at the creamery have but one object in view—the removal of the water and the reducing of the product to a certain specific gravity. Concentrated milk when it becomes old invariably produces a lactic ferment. The fat globules are the same in concentrated milk as in the normal milk. The enzymes are unchanged and the digestibility is not impaired, and in no instance in the many tests has there been any sign of a putrefaction as the product becomes old.

Trusting I have furnished you some information that will be of value, and if you would like to have any data confirming what I have just written I will be pleased to send it, as we have reports from scientists of recognized ability.

Yours, very truly,

C. H. CAMPBELL.

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THE CREAMERY PACKAGE MANUFACTURING CO.,  
*Chicago, Ill., November 11, 1910.*

THE WASHINGTON CHAMBER OF COMMERCE,  
*1202 F Street NW., Washington, D. C.*

GENTLEMEN: Your favor of the 5th instant, with list of questions, received and very carefully noted. We attach hereto this list with our answers. We have given you the very best information we are able in this connection without prejudice from the standpoint of being interested in the manufacture and sale of pasteurizing machines.

We are in pretty close touch with this situation throughout the country and believe that our advices can be considered of a conservative character.

Very truly, yours,

CREAMERY PACKAGE MANUFACTURING CO.,  
H. B. OSGOOD, *Sales Manager.*

INFORMATION DESIRED BY SPECIAL COMMITTEE APPOINTED BY THE WASHINGTON CHAMBER OF COMMERCE TO INVESTIGATE THE MILK SITUATION OF THE DISTRICT OF COLUMBIA.

1. Please state the advantages of pasteurization.

Destruction of lactic-acid bacteria, insuring keeping qualities; also destruction of disease germs, protecting health.

2. What valid objections have been presented in opposition to pasteurization?

No valid objections to proper pasteurization have ever been presented. It is claimed by some who are opposed to pasteurization that it acts as a cloak for all sorts of improper care and handling of milk. We believe, however, you are considering this from the standpoint of milk handled under modern sanitary conditions and pasteurized in accordance with the most approved methods.

3. What is the cost of pasteurizing milk per pound or per gallon?

About one-eighth cent per quart. The cost is dependent to a large extent upon the amount of milk handled and the cost of fuel, etc.

4. Should this cost, in your judgment, properly add to the retail price of milk?

No. The saving in other directions offsets it in the increased volume of business, and the practical elimination of losses from sour milk more than makes up for the cost of pasteurization.

5. What is the cost of an efficient pasteurizing machine with its accessories and of what capacity?

With a capacity of 4,000 pounds per hour, about \$2,500.

6. What is the estimated cost of a pasteurizing plant completely installed?

With a capacity of 4,000 pounds per hour, \$5,000 and up, depending upon whether this question is intended to cover equipment for bottling, refrigerating machinery, etc.

7. Is compulsory pasteurization, in your judgment, feasible and advisable?

Yes. There is no reason at the present time why the city milk plants, from largest to smallest, can not be equipped with proper pasteurizing machinery at a cost within their means if they have sufficient capital to properly handle their business.

8. Would you recommend the establishment of a municipal pasteurizing plant (or plants) if compulsory pasteurization be insisted upon, so far as concerns milk and milk products consumed in the District of Columbia?

No; we do not believe that a proposition of this sort can be successfully and economically handled by municipal government.

9. At what temperature and for what length of time should the milk be heated in the pasteurizing process to produce the best results?

One hundred and forty-five degrees Fahrenheit for 30 minutes.

10. Is pasteurized milk, in your judgment, more or less easily digested than raw milk?

If properly pasteurized at 145° F., there would be no difference whatever.

11. What advantages has pasteurized milk compared with modified condensed and powdered milk?

Pasteurized milk and other kinds of milk mentioned are so different in character that there is no basis of comparison.

12. Does pasteurization tend to preserve milk?

Certainly, as the lactic acid germs are destroyed.

13. Is it necessary to preserve the same precautions with pasteurized as with raw milk?

Certainly.

14. Are there a number of efficient makes of pasteurizing machines?

Only three that have undertaken to embody the latest principles of pasteurizing and holding.

15. Is there, so far as you know, a monopoly controlling the production or sale of pasteurizing machinery?

No. Manufacturers of these machines are all independent of each other and in keen competition.

16. In your judgment would compulsory pasteurization dispense with the necessity or feasibility of applying the tuberculin test?

A reply to this question we think would depend entirely upon the final conclusions of scientific authorities as to the efficiency of the tuberculin test. It is our understanding at the present time there is a very wide difference of opinion on this point. So long as there is any question as to the efficiency of the tuberculin test in our judgment all milk should be pasteurized.

17. What maximum temperature should be prescribed for the preservation of pasteurized milk?

From 35 to 40° F.

DERBY, CONN., *November 15, 1910.*

CHAMBER OF COMMERCE,  
*Washington, D. C.*

GENTLEMEN: We have your favor of November 5 asking us to answer questions with regard to pasteurization.

The writer does not care to give you any information for the simple reason that there are quite a number of questions that we feel should not be answered by us.

For instance, your question 1: "State the advantages of pasteurization." Although we are expert engineers on milk, we leave it up to the medical authorities to decide if pasteurization is an advantage, but as far as we know

this has been settled by the Department of Agriculture. The Dairy Division recommends that all commercial milk should be pasteurized for 30 minutes at 145°. As this is an invention of the writer, all he can say is that he is proud that the Government recommends his work.

2. This question has to be answered by physicians. All I can say is that 99 per cent of all physicians do not know the first thing about milk, and therefore I am not in a position to criticize either raw milk or pasteurized milk.

3. The cost of pasteurization of milk depends entirely on the quantity of milk that is handled and on the process used.

We naturally are steadily working along the lines of reducing the cost of operation, and on the very latest machines which we are building the cost for steam and refrigeration is only a small percentage of what it has been up to the present.

The cost of pasteurizing, therefore, of 1 quart of milk is only a very small fraction of a cent in large plants.

4. This is a question to be decided by the man who sells milk.

5. Our perfect pasteurizers, 12,000 pounds capacity per hour, cost \$5,000 per machine. However, it is necessary to have refrigerating plants in connection with this machine, and therefore the price will naturally be a great deal higher.

6. Pasteurizing plant installed, with refrigerating machine necessary to take care of the milk, varies according to its size. We build plants from 3,000 pounds per hour up to 12,000 pounds per hour. We have one at Mr. Oyster's plant in Washington, D. C., of about 6,000 pounds per hour, and a plant of that size, including refrigerating machine and boiler, is worth between \$15,000 and \$18,000. For a 12,000-pound plant the cost of the pasteurizing outfit, with refrigerating machine, etc., would amount to between \$25,000 and \$30,000.

7. The only way to protect the public against all kinds of infection from the filth that is found in all milk, except in certified milk, is to pasteurize it. It is a shame that in cities like New York and Boston there were epidemics of considerable extents this last week, due to infection through raw milk. In New York there was a typhoid-fever epidemic of over 400 cases, and in Boston the scarlet-fever epidemic had over 800 cases. When it comes down to determine if it is better for a city to have such epidemics or to heat such milk, then, in my judgment, there is only one answer, and that is to pasteurize the milk.

For myself, as a specialist on milk, I would not dare to feed my own children on raw milk even if it is certified, and I am happy to say that I have brought up children as strong as anybody can have, and all they ever got was boiled milk.

8. We believe that in the United States it is better to have individual pasteurizing plants—that is, handled by individual concerns.

The milk business, as a rule, is to-day in the hands of a great many ignorant people, and there are only a very small percentage of men handling these products who have any brains at all. Therefore the few that have intelligence should be separated by the communities in which they live, and the others have no right to be in business and sell their low-class products.

I am personally afraid that if pasteurizing plants would be run by cities it would not be satisfactory. If they would be in charge of a high-class chemist or engineer it would be a different proposition.

9. Our Mr. Willmann is the inventor of the pasteurizing process of heating milk continuously for 30 minutes at between 145 to 150° F. We have mentioned above that the Government is recommending this process; therefore we have nothing else to add.

10. From my experience with my own children I never found that raw milk agrees better with them than pasteurized milk.

11. Pasteurized milk has the same taste, like good raw milk, while condensed milk has been subjected to such high temperatures that it always has a cooked taste. Further, the pasteurized product is sold fresh, while condensed milk is sometimes very old before it is consumed. It is always better to get an article as fresh as possible, because there may be some chemical changes that may take place with the age, although we have no scientific proof that such is the case.

Some of the milk powders are made from high temperatures, and in nearly all of them the casein has been denaturalized, and therefore is not as easy to digest as casein in pasteurized milk. The sugar, salts, and fats, and powders are naturally not changed.

12. Pasteurization preserves milk for a certain length of time, and if it is properly cared for it will keep a few weeks. The hospitals of the Panama

Canal are supplied with perfectly pasteurized milk that runs through one of my machines at the Sheffield Farms-Slawson Decker Co., of New York City, and this will give you evidence enough that such pasteurized milk naturally has to keep, because without this it could not be shipped from New York to Panama and arrive there in perfect condition.

13. Pasteurized milk should be handled at least just as carefully as very high-class raw milk. The average raw milk is handled by farmers, and their hands are naturally dirty, and therefore raw milk is naturally dirty.

Milk should not only be pasteurized, but it should also be subjected to very thorough filtration, so that the dirt, which is chiefly cow manure, can be removed from the milk beforehand.

Pasteurization should not mean treatment of dirt but treatment of reasonably good raw milk, which can be rendered safe by that process. It is impossible for the next generation to change the farmers, and it will be impossible to change them for generations to come; therefore pasteurization will be the only process that will give us a safeguard against infections that are conceived through raw milk.

14. This is a question that has to be answered by the authorities. We build our machines and do not want to criticize any other make.

The process of perfect pasteurization is our patent, but every housewife can heat the milk for the same length of time and at the same temperatures without infringing on our process; therefore we can say that apart from the large machinery that works automatically on the holding process, pasteurization is public property.

15. There is absolutely no monopoly controlled by the sale or a production of pasteurizing machinery. All we know is that the different manufacturers fight each other in the worst way for trade.

16. In my own judgment the tuberculin test should be applied gradually to the various herds. Pasteurization will have to be used anyway, because scarlet fever, typhoid fever, etc., are much more important from a milk standpoint than tuberculosis. Every farmer should pasteurize all the milk that he feeds to his stock, so that he does not infect the young animals with tuberculosis. Under the present conditions it is absolutely impossible to have all the herds tested, because there are not veterinarians enough to do the testing in 25 years.

17. Pasteurized milk should be kept at temperatures of 50° F. Such a regulation would be in the interest of the milk dealer as well as of the consumer, because it will protect both.

If you need any more detailed information about the subject, I will be very glad to take this matter up with you.

Very truly, yours,

DAIRY MACHINERY & CONSTRUCTION Co.  
J. WILLMANN, *President*.

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## APPENDIX D.

### CORRESPONDENCE WITH TRANSPORTATION COMPANIES CONCERNING REFRIGERATOR-CAR SERVICE FOR TRANSPORTATION OF MILK.

NOVEMBER 5, 1910.

PRESIDENT OF THE PENNSYLVANIA RAILWAY Co.,  
*Philadelphia, Pa.*

DEAR SIR: The special committee appointed by the Washington Chamber of Commerce to investigate the present milk situation in the District of Columbia is desirous of obtaining, if practicable, information as to the feasibility of supplying refrigerator cars for the transportation over your lines from producers shipping to the Washington market, together with a statement of the cost of refrigeration of each car per day or per trip, and the cost of shipment per pound or per gallon of milk from varying distances to Washington.

Any information along these lines which you may be able to supply for the edification of the committee will be greatly appreciated.

Very respectfully, yours,

J. LOUIS WILLIGE, *Chairman.*

P. S.—Kindly indicate additionally how much ice per day or per trip is required to refrigerate a car for the transportation of milk at a maximum temperature of 50° F.

NOTE.—Letters similar to the above were sent to the presidents of the Baltimore & Ohio Railroad Co., the Chesapeake & Ohio Railway Co., the Southern Railway Co., the Atlantic Coast Line, and the Seaboard Air Line.

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THE PENNSYLVANIA RAILROAD Co.,  
*Philadelphia, November 8, 1910.*

THE WASHINGTON CHAMBER OF COMMERCE,  
*Washington, D. C.*

DEAR SIR: I beg to acknowledge the receipt of a letter from the chairman of a special committee of the Washington Chamber of Commerce, requesting certain information in connection with the transportation of milk in refrigerator cars over our lines to the Washington market from points in that vicinity, and I have referred it to the third vice president, in charge of traffic, with the request that prompt reply be made thereto.

Yours, truly,

JAMES MCCREA, *President.*

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THE PENNSYLVANIA RAILROAD Co.,  
*Philadelphia, November 21, 1910.*

CHAIRMAN WASHINGTON CHAMBER OF COMMERCE,  
*1202 F Street NW., Washington, D. C.*

DEAR SIR: Your favor of the 5th instant, addressed to the president of the Pennsylvania Railroad Co., having reference to the feasibility of supplying refrigerator cars for the transportation of milk over our lines from producers shipping to the Washington market, together with a statement of the cost of refrigeration of each car per day or per trip, etc., has been referred to this department for reply.

More prompt answer would have been given, but it has been found necessary to refer these questions to the superintendent of passenger transportation and the general superintendent of motive power, and the careful consideration which those officials have found it necessary to make in connection therewith has delayed replies.

It is very difficult to answer a general question of this kind; that is, as to the cost of refrigeration per car per day or per trip, and how much ice per day or per trip is required for a refrigerator car for the transportation of milk at a maximum temperature of 50° F., as there are so many conditions surrounding a general proposition of that kind that would have a material bearing on this question.

There are three factors that would enter into the hauling of milk under refrigeration, namely, length of the haul, temperature of the milk when placed in the car, and whether the cars would be loaded all at one point or at intervals between originating point and destination.

If a class "Rf" refrigerator car was used for this purpose, the initial icing would require 7,400 pounds. After precooling, 4,000 pounds would be sufficient to carry the milk under a temperature of 50° F. for a distance of 300 miles, or a 24-hour run. However, if the car were to be opened at different points to receive milk, the temperature would fluctuate according to outside conditions.

The cost for icing a car with 12,000 pounds of ice would approximately be \$15; this on the basis of ice at \$2.50 per ton, including the necessary labor. By keeping the same cars in this milk service the bunkers would retain a percentage of ice from one trip until the next, and thus would require an average of only about 3,000 pounds of ice, at a cost of \$4, on the same basis as above. The cost per gallon for refrigerated milk would depend on the number of gallon cans that would be loaded in a car.

The length of the haul would make no material difference in the refrigeration cost, due to the fact that the requisite amount of ice and the necessary space for lading would have to be provided from the starting point of the car to place of receiving and discharging the lading.

The present cost of shipment per gallon of milk from varying distances to Washington is:

For distance of less than 30 miles, 1½ cents per gallon.

For distance of 30 miles and not exceeding 60, 2 cents per gallon.

For distance of over 60 miles and not exceeding 90, 2½ cents per gallon.

These are the rates for milk, and double said rates are charged for cream.

Yours, truly,

J. R. WOOD,  
*Passenger Traffic Manager.*

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SOUTHERN RAILWAY Co.,  
*Washington, D. C., November 9, 1910.*

Mr. J. LOUIS WILLIGE,  
*Chairman Milk Committee,*  
*Washington Chamber of Commerce, Washington, D. C.*

DEAR SIR: I have your letter of the 5th instant requesting information as to the feasibility of supplying refrigerator cars for the transportation of milk into Washington.

I have brought your communication to the attention of Vice President Culp, who is in general charge of traffic matters, and have asked him to write you direct on the subject.

Yours, truly,

W. W. FINLEY, *President.*

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SOUTHERN RAILWAY Co.,  
*Washington, D. C., November 16, 1910.*

Mr. J. LOUIS WILLIGE,  
*Chairman Milk Committee,*  
*Washington Chamber of Commerce, Washington, D. C.*

DEAR SIR: Please see your letter of November 5 to Mr. Finley requesting information as to the feasibility of supplying refrigerator cars for the transportation of milk from points on the rails of this company to Washington.

We have never given consideration to a proposition of this character; therefore it is a matter that we will have to determine, and before we can reach a conclusion it will be necessary to have complete information. I assume your committee fully understands that the handling of milk in refrigerator cars means transportation by freight service, whereas the milk is at present being handled by passenger trains. Refrigerator cars, if put into service, would, of course, stop at practically all local stations within a certain radius of Washington; therefore they would have to be handled on our local freight trains, which, as now adjusted, would, no doubt, be entirely impracticable in so far as the schedule is concerned.

This entire matter can doubtless be handled in conference much more satisfactorily than by correspondence, and I suggest, if practicable, that you call at the office of our freight traffic manager, Mr. Green, or if you prefer, we can have a representative call upon you for the purpose of fully discussing this matter.

Yours, truly,

J. M. CULP, *Vice President.*

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NOVEMBER 5, 1910.

THE PRESIDENT NEW YORK CENTRAL & HUDSON RIVER RAILWAY,  
*New York City, N. Y.*

SIR: I am requested by the special committee of the Washington Chamber of Commerce appointed to investigate the present milk situation in the District of Columbia to ask that if practicable you will be so good as to arrange for the enlightenment of the committee a statement as to the cost per day, or per trip, of car refrigeration for the shipment of milk and the cost per pound or gallon of milk when transported in refrigeration cars for varying distances.

The committee is endeavoring to decide whether it is feasible to recommend a compulsory maintenance of a maximum temperature of 50° F. in the shipment of milk from the producer to the consumer in the District of Columbia.

Assuring you in advance that any information which you may be able to furnish along the line indicated will be deeply appreciated by the committee, I am,

Very respectfully, yours,

J. LOUIS WILLIGE, *Chairman.*

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NEW YORK CENTRAL LINES,  
New York, November 14, 1910.

Mr. J. LOUIS WILLIGE,  
*Chairman the Washington Chamber of Commerce,  
Washington, D. C.*

DEAR SIR: Replying to your letter of November 5, in regard to the cost of refrigeration of milk, butter etc.:

I regret to say that it will be impossible for me to give you any definite figures to base your arguments upon, for the reason that the cost of refrigeration varies on different parts of our line. It is governed by weather conditions, the kind of container in which the product is shipped, length of haul, facilities and rapidity of unloading at destination, etc.

While an average cost might be prepared, yet it would be of no value for the purpose you desire, as conditions in the District of Columbia are different from those in New York State.

As I understand it, 50° is the maximum permitted in our refrigeration, as above that temperature bacteriological conditions are said to be undesirable.

There is, on the other hand, a minimum below which it is unnecessary to go, and, all things considered, to obtain the best results, the temperature of the car should be somewhere between 45° and 50°.

Trusting that this information will be of service to you, I am,

Very truly, yours,

W. C. BROWN.

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## APPENDIX E.

COMMUNICATION ADDRESSED TO PRESIDENT OF MILK PRODUCERS' ASSOCIATION OF MARYLAND, VIRGINIA, AND DISTRICT OF COLUMBIA.

NOVEMBER 26, 1910.

Mr. JOHN THOMAS,  
*President Milk Producers' Association  
of Maryland, Virginia, and District of Columbia, Ednor, Md.*

DEAR SIR: The special committee appointed by the Washington Chamber of Commerce to investigate the present milk situation begs to acknowledge the receipt of your valued replies to the series of inquiries forwarded you several weeks ago.

In so far as information has not already been supplied by the milk producers' association, the committee will be pleased to receive, if possible, an expression of the sense of the association on the following points:

1. Is the dairy farmer supplying milk to the District of Columbia receiving, in the judgment of the association, his proper share of the proceeds of sale of milk and milk products?

2. Is an uniform standard the year round of prices received by the producer for milk supplied to the District feasible?

3. If compulsory pasteurization, the general application of the tuberculin test, and the maintenance of temperature below 50° F. be insisted upon, what would be the effect, in the judgment of the association, on the prices asked for milk by the producer?

Your kind cooperation with the committee in providing intelligent information on the above points will be deeply appreciated.

Respectfully, yours,

J. LOUIS WILLIGE, *Chairman.*

## APPENDIX F.

LIST OF PUBLICATIONS CONSULTED BY SPECIAL COMMITTEE OF WASHINGTON CHAMBER OF COMMERCE APPOINTED TO INVESTIGATE THE MILK SITUATION IN THE DISTRICT OF COLUMBIA.<sup>1</sup>

A Study of Milk in Relation to Health and Disease, by George M. Kober, M. D., Sacramento, Cal., 1896.

Report Upon the Results with Different Kinds of Pure and Impure Milk in Infant Feeding in Tenement Houses and Institutions of New York City: A Clinical and Bacteriological Study, by William H. Park, M. D., and L. Emmett Holt, . . D.; read before the Association of American Physicians, Washington, D. C., May 12, 1903; from Archives of Pediatrics, December, 1903.

Sanitary Dairy Products for the District of Columbia, Senate Report No. 804 (accompanying S. 2402), second session Fifty-eighth Congress, February 12, 1904.

The Milk Supply of Twenty-nine Southern Cities, by C. F. Doane, M. S.; Bulletin No. 70, Bureau of Animal Industry, United States Department of Agriculture, 1905.

Report on the Origin and Prevalence of Typhoid Fever in the District of Columbia, by M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle; Bulletin No. 35, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, February, 1907.

Sanitary Milk Production; Circular 114, Bureau of Animal Industry, United States Department of Agriculture, issued August 20, 1907.

The Milk Supply of Washington, D. C., by G. Lloyd Magruder, M. D.; reprinted from The Journal of the American Medical Association, Vol. XLIX, pp. 1088-1093, September 28, 1907.

A City Milk and Cream Contest as a Practical Method of Improving the Milk Supply, by C. B. Lane, B. S., and Ivan C. Weld; Circular 117, Bureau of Animal Industry, United States Department of Agriculture, issued October 28, 1907.

Report of United States Consul T. H. Norton on German Milk Handling, Daily Consular and Trade Reports, Bureau of Manufactures, Department of Commerce and Labor, No. 3016, November 5, 1907.

The Unsuspected but Dangerously Tuberculous Cow, by E. C. Schroeder, M. D. V.; Circular 118, Bureau of Animal Industry, United States Department of Agriculture, issued December 21, 1907.

Thermal Death Point of Pathogenic Micro-Organisms in Milk, by M. J. Rosenau; Bulletin 42, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, January, 1908.

The Causes of Typhoid Fever in the District of Columbia; read and discussed before the Medical Society of the District of Columbia, February 19 and 26, 1908; Washington Medical Annals, pp. 33-132.

Report No. 2 on the Origin and Prevalence of Typhoid Fever in the District of Columbia (1907), by M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle; Bulletin No. 44, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, May, 1908.

Notices of Judgment, Food and Drugs Act; Board of Food and Drug Inspection, United States Department of Agriculture, issued at intervals between August 13, 1908, and November 12, 1910.

The Economic Importance of Tuberculosis of Food-Producing Animals, by A. D. Melvin, D. V. S.; reprinted from Twenty-fifth Annual Report of the Bureau of Animal Industry (1908), 1910; read before the International Congress on Tuberculosis, Washington, D. C., September 29, 1908.

Report of a Commission on Certain Features of the Federal Meat-Inspection Regulations; reprinted from the Twenty-fourth Annual Report of the Bureau of Animal Industry, United States Department of Agriculture (1907), 1909.

Milk and Its Relation to the Public Health, by various authors; Bulletin No. 41, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, January, 1909.

Milk and Its Relation to the Public Health; Bulletin No. 56, Hygienic Laboratory, Public Health and Marine-Hospital Service of the United States, Treasury Department, March, 1909.

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<sup>1</sup> Arranged in order of publication.

The Score-card System of Dairy Inspection, by Clarence B. Lane and George M. Whitaker; Circular 138, Bureau of Animal Industry, United States Department of Agriculture, issued April 26, 1909.

Report No. 3 on the Origin and Prevalence of Typhoid Fever in the District of Columbia (1908), by M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle; Bulletin No. 52, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, October, 1909.

The Outbreak of Typhoid Fever in Cassel during 1909, by Emile Berliner; Washington, October, 1909.

The Future of Milk Supplies of Large Cities from a Sanitary Standpoint, by Ernst J. Lederle; Journal of the American Medical Association, Vol. LIV, No. 12, March 19, 1910.

The Dissemination of Disease by Dairy Products and Methods for Prevention; Circular No. 153, Bureau of Animal Industry, United States Department of Agriculture, issued April 28, 1910.

Notes in Relation to Public Health, by George M. Kober; Senate Document 441, first session, fifty-seventh Congress, June 28, 1902.

An important paper on the Nation's Great Problem: A Sanitary Milk Supply; extract from paper read by Dr. G. Lloyd Magruder, of Washington, in the section on preventive medicine and public health of the American Medical Association at the sixty-first annual session held at St. Louis June, 1910.

Facts and Problems of Rabies, by J. M. Stimson; Bulletin No. 65, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, June, 1910.

Standard Methods for the Bacterial Examination of Milk and Bacterial Examination of Air, by Committees of the Laboratory Section, American Public Health Association; reprinted from the American Journal of Public Hygiene, Vol. VI, No. 3, August, 1910.

Further Observations on the Milk Supply of Washington, D. C., by G. Lloyd Magruder, M. D.; reprinted from the Journal of American Medical Association, Vol. LV, pp. 581-589, August 13, 1910.

The Care of Milk and Its Use in the Home, by George M. Whitaker, L. A. Rogers, and Caroline L. Hunt; Farmers' Bulletin 413, United States Department of Agriculture, issued August 30, 1910.

Officials, Organizations, and Educational Institutions Connected with the Dairy Interests (1910); Circular 162, Bureau of Animal Industry, United States Department of Agriculture, issued September 13, 1910.

The History, Development, and Statistics of Milk Charities in the United States, by J. W. Kerr; reprint from Public Health Reports (No. 50), Vol. XXV, No. 39, September 30, 1910.

The Milk Reporter, Vol. XXVI, No. 10, October, 1910.

Tuberculosis in Market Milk of Chicago, by F. O. Tonnev, M. D.; Journal of the American Medical Association, Vol. LV, No. 15, p. 1252, October 8, 1910.

Hoard's Dairyman, Vol. XXXXI, No. 37, October 14, 1910.

Journal of the American Medical Association, Vol. LV, No. 16, pp. 1419, 1420, October 15, 1910.

The Bacteriology of Commercially Pasteurized and Raw Market Milk, by S. Henry Ayers and William T. Johnson, jr.; Bulletin 126, Bureau of Animal Industry, United States Department of Agriculture, issued November 14, 1910.

The Pasteurized Milk Fraud, by Arno Dosch; Pearson's Magazine, Vol. XXIV, No. 6, December, 1910, pp. 721-729.

Journal of American Medical Association, Vol. LV, No. 26, p. 2238, December 14, 1910.

The Relative Importance of the Bovine and Human Types of Tubercle Bacilli in the Different Forms of Human Tuberculosis, by William H. Park and Charles Krumwiede, jr.; Journal of Medical Research, Vol. XXIII, 205.

Standards of Purity for Food Products, Circular No. 19, Bureau of Chemistry, United States Department of Agriculture.

The Relation of Milk to Public Health, by William H. Park, presented before the Members of the Medical Faculty and Students of Queen's University; offprint from publication No. 1.

High Typhoid Mortality in Washington Hospitals and Their Milk Supply; reprinted from Washington Medical Annals, Vol. IX, No. 1.

## APPENDIX G.

LAWS, ORDINANCES, RULES, REGULATIONS, ETC., CONCERNING THE PRODUCTION AND DISTRIBUTION OF MILK IN CERTAIN MUNICIPALITIES THROUGHOUT THE UNITED STATES.

## BALTIMORE, MD.

LAWS, ORDINANCES, RULES, AND REGULATIONS GOVERNING THE SALE AND HANDLING OF MILK IN BALTIMORE CITY.

[In force June 1, 1908.]

STATE LAWS.

[1898, ch. 306.]

20. It shall be the duty of all dairymen or herdsmen or private individuals supplying milk to cities, towns, and villages to register their herds or cattle with the live-stock sanitary board, in violation of which the parties offending shall be fined not less than \$1 nor more than \$20 for each offense.

[Ibid.]

21. It shall be the duty of the live-stock sanitary board to have inspected at least annually without notice to the owner or those in charge of any dairy or parties supplying milk as named in section 20 the premises wherein cows are kept, and if such premises are found in an unsanitary condition the said board may prohibit the sale and shipment of milk from such premises until such time as the premises shall conform to the following sanitary rules:

Rule 1. No building or shed shall be used for stabling cows for dairy purposes which is not well lighted and well ventilated, and which is not provided with sufficient feed trough or box and suitable floor laid with proper grades and channels to immediately carry off all drainage; and if a public sewer abuts the premises upon which such building is situated they shall be connected therewith whenever the inspector considers such sewer connection necessary.

Rule 2. No water-closet, privy, cesspool, urinal, inhabited room, or workshop shall be located within any building or shed used for stabling cows for dairy purposes or for the storage of milk or cream; nor shall any fowl, hog, sheep, or goat be kept in any room used for such purposes.

Rule 3. It shall be the duty of each person using any premises for keeping cows for dairy purposes to keep such premises thoroughly clean and in good repair and well painted or whitewashed at all times.

Rule 4. It shall be the duty of each person using any premises for keeping cows for dairy purposes to cause the buildings in which cows are kept to be thoroughly cleaned and remove all dung from the premises, so as to prevent its accumulation in great quantities.

Rule 5. Any person using any premises for keeping cows for dairy purposes shall provide and use a sufficient number of receptacles made of nonabsorbent materials for the reception, storage, and delivery of milk, and shall cause them at all times to be cleaned and purified, and shall cause all milk to be removed without delay from the rooms in which cows are kept.

Rule 6. Every person keeping cows for the production of milk for sale shall cause every such cow to be cleaned every day and to be properly fed and watered with abundance of pure, clean water.

Rule 7. Any inclosure in which cows are kept shall be graded and drained so as to keep the surface reasonably dry; no garbage, fecal matter, or similar matter shall be placed or allowed to remain in such inclosure unless sufficient straw or similar good absorbent materials be used to keep the inclosure clean at all times, and no open drains shall be allowed to run through it.

And any person who shall ship or sell milk contrary to the aforesaid order of said board shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than \$1 nor more than \$20 for each day during which shipments shall be made after notice of such order.

[1898, ch. 306.]

22. The live-stock sanitary board shall, at the request of the owner or owners of dairy herds, furnish them with a certificate of health whenever the provisions of this subtitle are complied with and there is no visible sign of disease amongst such herds; such certificates shall be revocable in the discretion of the board.

[Ibid.]

23. For the purpose of paying the expenses required in carrying out the provisions of this subtitle the sum of \$3,000 is hereby appropriated annually, or so much thereof as is necessary, out of the moneys in the treasury not otherwise appropriated, and the comptroller is authorized and directed to draw his warrant on the treasury for such sum as the said board shall produce vouchers for, not exceeding the amount appropriated, payable monthly.

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SALE OF IMPURE OR ADULTERATED MILK.

[Code of Public General Laws.]

*Article XXVII.—Crimes and punishments.—Health—Milk, pure, skimmed.*

[1900, ch. 459.]

232. For the purposes of sections 232, 233, and 234, the standard for pure milk shall be not more than  $87\frac{1}{2}$  per cent of water or fluids, and not less than  $12\frac{1}{2}$  per cent of milk solids, of which at least  $3\frac{1}{2}$  per cent shall be butter fats.

[Ibid.]

233. For the purposes of said sections milk shall be deemed to be sophisticated, adulterated, or unwholesome when it does not contain  $12\frac{1}{2}$  per cent of milk solids, of which  $3\frac{1}{2}$  per cent shall be butter fats; or to which has been added salt, boracic acid, salicylic acid, salicylate of soda, formaldehyde or any other acid, drug, compound, or substance, or to which ice or water has been added for any purpose whatsoever; or which has been taken from an animal 10 days before or 5 days after parturition; or which has been taken from a sick or diseased animal; or which has been taken from animals fed in whole or in part on garbage or any substance in a state of fermentation or putrefaction, or food that produces impure, diseased, or unwholesome milk; or from cows stabled near a house where there is an infectious disease; or from which a portion of the cream has been taken; but nothing in these sections shall be construed as prohibiting the addition of sugar in the manufacture of condensed or preserved milk, or as prohibiting the sale of pure skimmed milk, when sold as such and from cans plainly and conspicuously marked with the sign or placard "Skimmed milk," in capital letters, each of a size not less than 1 inch square; or as prohibiting the sale of pure, wholesome milk not complying with the provisions of section 232, for the manufacture therefrom of butter, cheese, or other products. Nothing in this section shall be construed as prohibiting the feeding of ensilage from silos.

[1900, ch. 459.]

234. Whoever shall violate any of the provisions of sections 232 and 233 shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not more than \$100 or imprisoned for not more than 60 days, or both fined and imprisoned in the discretion of the court, for each offense; said sections not to apply to Montgomery County, except when residents of said county shall ship or sell milk to Baltimore City, nor to limit the powers of the mayor and city council of Baltimore to enact ordinances and regulations not inconsistent with the provisions of these sections for the inspection and sale of milk or the products thereof in the city of Baltimore.

235. No condensed or preserved milk shall be manufactured, sold, or exchanged, or offered or exposed for sale or exchange, unless the same be manufactured from or out of pure, clean, healthy, fresh, unadulterated, and wholesome milk, from which the cream has not been removed either wholly or in

part, or unless the proportion of milk solids of same shall be in quantity the equivalent of 12.51 per cent of milk solids in crude milk, and of which milk solids 3.51 per cent shall be butter fats. No person shall manufacture, sell, or exchange, or offer or expose for sale or exchange, any condensed or preserved milk unless the same be put up, packed, or contained in packages with the name of the manufacturer of the said milk distinctly branded or stamped thereon. Whoever by himself or another violates any of the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than \$25 nor more than \$100, or be imprisoned for not less than 10 days nor more than 30 days, or be punished by both such fine and imprisonment for the first offense, and by a fine of \$100 or imprisonment for 3 months, or both such fine and imprisonment, for each subsequent offense.

236. No person or persons shall hereafter, without the consent of the owner or shipper, use, sell, dispose of, buy, or traffic in any milk cans, cream cans, or cases belonging to any dealer or shipper of milk or cream residing in the State of Maryland or elsewhere, who may ship milk or cream to any city, town, or place within this State, having the name or initials of the owners, dealers, or shippers stamped, marked, or fastened on such cans, or willfully change by re-marking or otherwise said name or initials of any such owner, dealer, or shipper so stamped, marked, or fastened upon such cans; nor shall any person, without the consent of the owner, use such cans for any other purpose than for milk or cream; nor shall any person or persons, without the consent of the owner, place in any such cans any substance or product other than milk or cream. And any person who shall violate any of the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction before a justice of the peace of the city or county wherein the offense was committed, or in a court of competent jurisdiction, shall be fined not more than \$50 and cost of prosecution; one-half of all fines imposed shall be paid to the informer, and the other half of said fine shall be paid to the board of school commissioners of the county or city of Baltimore in which the offense shall be committed; and in default in the payment of said fine shall be confined in the jail for a period not less than 30 days nor more than 60 days.

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CHARTER.

[1894, ch. 53.]

74. The commissioner of health shall appoint all inspectors and analysts for the proper inspection of milk or any and all other products offered for sale in the city of Baltimore, or intended for consumption therein, as by ordinance may be prescribed.

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ORDINANCES.

*Cows, cow stables, and dairies.*

[Ord. 56, May 13, 1902, sec. 1.]

33. *Keeping cows—Registration and permits.*—It shall not be lawful for any person, persons, or corporation to keep or possess within the corporate limits of Baltimore city any cow or cows, either for the conduct of dairy business or for his or her personal use, unless and except such cow or cows shall be stabled on or located and kept in and upon ground of not less than one-quarter acre in area, all of said area not occupied by the stable to be accessible to said cows and set apart for them for exercise and fresh air; and upon the further express condition precedent that a permit shall have first been obtained from the commissioner of health permitting such cow or cows to be located within the corporate limits of the city of Baltimore as by this subdivision of this article prescribed, which permit must designate upon its face specifically the location for the keeping of such cow or cows. The violation of any of the regulations and restrictions of this section shall subject the person, persons, or corporation so violating to a fine of not more than \$20 nor less than \$5, and a further fine of \$1 for each day that the violation is continued after notice is given to discontinue. (See *State v. Broadbelt*, 89 Md., 565.)

[Ord. 56, May 13, 1902, sec. 2.]

34. It shall be unlawful for any person, persons, or corporation to keep more than eight cows on each such area of one-quarter acre of ground; any person, persons, or corporation violating this section shall be subject to a penalty of not more than \$20 nor less than \$5, and \$1 per day additional for each day that the offense is continued after notice is given to discontinue said violation, and such permits to be revocable by the commissioner of health whenever said cow stables are not kept in good hygienic and sanitary condition.

[Ord. 56, May 13, 1902, sec. 3.]

35. Whenever under the two next preceding sections of this article cows may be kept, pasturage must be provided for them. Any person, persons, or corporation violating this section shall be subject to a penalty of not more than \$20 nor less than \$5, and \$1 per day additional for each day that the offense is continued after notice is given to discontinue said violation.

[Ord. 56, May 13, 1902, sec. 4.]

36. The owners of cows that may be kept within the city limits under the provisions of the three next preceding sections of this article shall register with the commissioner of health the place where said cows are kept, and the commissioner of health shall keep a complete register thereof. Failure on the part of the owners or possessors to register the place of their keeping shall subject such persons to a penalty of not more than \$20 nor less than \$5.

[Ord. 56, May 13, 1902, sec. 6.]

37. The commissioner of health shall, however, issue annual permits to persons desiring to keep not more than four cows on unimproved lots of less than one-fourth acre, but not less than one-eighth acre in area, providing said stable or stables have floors of cement or other nonabsorbent material, and have windows on at least two sides, giving 3 square feet of window space for each animal, and stables to have air space in that part occupied by the animals of 1½ cubic feet for every pound, live weight, of the animals kept therein; and provided further, that said stables have all other necessary equipments and appliances for securing absolutely perfect sanitary and hygienic condition.

[Ord. 56, May 13, 1902, sec. 7.]

38. That part of section 33 of this article regulating the size of the lot on which cows may be kept within the corporate limits of the city of Baltimore shall not apply to stables in which cows are temporarily kept for sale or exchange only; provided said stables have floors of cement or other nonabsorbent material, and have windows on at least two sides, giving 3 square feet of window space for each animal, and stables to have air space in that part occupied by the animals of 1½ cubic feet for every pound, live weight, of the animals kept therein; and provided further, that said stables have all other necessary equipment and appliances for securing absolutely perfect sanitary and hygienic conditions.

[Ord. 56, May 13, 1902, sec. 8.]

39. Nothing in sections 33 and 38, inclusive, of this article shall be construed as repealing any ordinances or provisions of any section of this article or regulations of the commissioner of health now existing for compelling perfect hygienic and sanitary conditions of all cow stables within the corporate limits of the city of Baltimore.

[Ord. 65, Apr. 21, 1896, sec. 1.]

40. *Cow stables and dairies—Sanitary regulations.*—No building shall be used for stabling cows for dairy purposes which is not lighted, ventilated, drained, and constructed according to the provisions of section 37 of this article.

[Ord. 65, Apr. 21, 1896, sec. 2.]

41. No building shall be used for stabling cows for dairy purposes which is not provided with a suitable floor of cement or other nonabsorbent materials, laid with grades and channels to carry off all drainage; if a public sewer abuts the premises upon which such building is situated they shall be connected therewith.

[Ord. 65, Apr. 21, 1896, sec. 3.]

42. No building shall be used for stabling cows for dairy purposes which is not provided with good and sufficient feeding troughs or boxes and with a covered water-tight receptacle outside of the building for the reception of dung or other refuse.

[Ord. 65, Apr. 21, 1896, sec. 4.]

43. No water-closet, privy, cesspool, urinal, inhabited room, or workshop shall be located within any building or shed used for stabling cows for dairy purposes or for the storage of milk or cream; nor shall any fowl, hog or horse, sheep or goat, be kept in any room used for such purposes.

[Ord. 65, Apr. 21, 1896, sec. 5.]

44. The space in buildings or sheds for stabling cows for dairy purposes shall conform to the requirements of section 37 of this article, provided that no stall shall be less than 4 feet in width.

[Ord. 65, Apr. 21, 1896, sec. 6.]

45. It shall be the duty of each person using any premises for keeping cows for dairy purposes to keep such premises thoroughly clean and in good repair and well painted or whitewashed at all times.

[Ord. 65, Apr. 21, 1896, sec. 7.]

46. It shall be the duty of each person using any premises for keeping cows for dairy purposes to cause the building in which cows are kept to be thoroughly cleaned, and to remove all dung from the premises, so as to prevent its accumulation in great quantities.

[Ord. 65, Apr. 21, 1896, sec. 8.]

47. Every person keeping cows for the production of milk shall cause every such cow to be cleaned every day and to be properly fed and watered.

[Ord. 65, Apr. 21, 1896, sec. 9.]

48. Every person using any premises for keeping cows shall cause the yard used in connection therewith to be provided with a proper receptacle for drinking water for such cows, none but fresh clean water to be used in such receptacles.

[Ord. 65, Apr. 21, 1896, sec. 10.]

49. Any inclosure in which cows are kept shall be graded and drained so as to keep the surface reasonably dry and to prevent the accumulation of water therein, except as may be permitted for the purpose of supplying drinking water. No garbage, urine, fecal matter, or other similar substances shall be placed or allowed to remain in such inclosure, and no open drain shall be allowed to run through it.

[Ord. 65, Apr. 21, 1896, sec. 11.]

50. Any person using any premises for keeping cows for dairy purposes shall provide and use a sufficient number of receptacles made of nonabsorbent materials for the reception, storage, and delivery of milk, and shall cause them at all times to be cleaned and purified, and shall cause all milk to be removed without delay from the room in which the cows are kept.

[Ord. 65, Apr. 21, 1896, sec. 12.]

51. *Contagious and infectious diseases.*—It shall be the duty of any person having charge or control of any premises upon which cows are kept to notify the commissioner of health in writing of the existence of any contagious or infectious disease among such cows immediately upon the discovery thereof, and to thoroughly isolate any cow or cows affected, or which may reasonably be believed to be affected, and to exercise such other precautions as may be directed by the commissioner of health.

[Ord. 65, Apr. 21, 1896, sec. 13.]

52. It shall be the duty of any person owning or having control of cows used for the production of milk for sale or exchange to submit said cows to the tuberculin test for tuberculosis.

[Ord. 65, Apr. 21, 1896, sec. 14.]

53. It shall be the duty of any person having charge or control of any premises upon which milk or cream is produced, handled, stored, or distributed to notify the commissioner of health immediately upon the discovery of any case of Asiatic cholera, croup, diphtheria, measles, scarlet fever, smallpox, typhoid fever, typhus fever, or any other contagious or infectious disease upon such premises. No milk or cream shall be sold, exchanged, given away, or in any other manner distributed from such infected premises until all danger of spread of disease has been removed, and the commissioner of health certifies to that effect. No person who attends cows or milks them, or who has the care or handling of vessels for the sale, storage, or distribution of milk or cream, shall enter any place or premises wherein exists any of the diseases mentioned herein, nor shall any such person have any communication, direct or indirect, with any person who resides in or is an occupant of such infected place.

[Ord. 65, Apr. 21, 1896, sec. 15.]

54. Strict cleanliness of the hands and persons of milkers and those engaged in the handling of milk and cream, and of the bodies of the cows, especially of the udders and teats, must be enforced at all times, to the end that no impurity or foreign substance may be added to the milk or cream.

[Ord. 65, Apr. 21, 1896, sec. 16.]

55. Any person who violates, disobeys, omits, neglects, or refuses to comply with, or who resists any of, the provisions of sections 40 to 54, inclusive, of this article shall be fined not less than \$10 nor more than \$25 for each offense.

[Ord. 103, May 6, 1908.]

55A. *Permits.*—Every person or corporation desiring to sell, offer for sale, expose for sale, dispose of, exchange, or deliver milk or cream in the city of Baltimore shall make application to the commissioner of health for a permit so to do. Such application shall be made on a printed form, to be furnished by the commissioner of health upon demand, and the applicant, if an individual, shall state therein his full name and residence, and if a corporation shall state therein full name and residence of each of its officers. Such application shall also state the location of the place at which it is proposed to carry on the business. It shall also contain a statement of the number and character of wagons or other vehicles to be used by the applicant in or about his or its business; also the number of cows, if any, owned or controlled by the applicant, and such other data concerning the conduct of such business as the commissioner of health may require.

The commissioner of health, upon receipt of such application, shall cause to be investigated the place of business described in such application and the wagons and other vehicles, if any, intended to be used by such applicant. If such places of business and such wagons or other vehicles are found upon such investigation to be in a sanitary condition and fit for the use and purposes to which they are intended to be put, said commissioner of health shall forthwith register said applicant in a proper record to be kept for the purpose and issue a permit authorizing such applicant to carry on, engage in, and conduct the business of vendors of milk in Baltimore city at the place designated in such application. All permits granted pursuant to this ordinance may at any time be revoked by the commissioner of health for the persistent, repeated, or willful violation of any law or ordinance or of any regulation of the commissioner of health governing the sale of milk in Baltimore city: *Provided, however,* That no such permit shall at any time be revoked by the commissioner of health unless he shall first have given the holder of the same not less than 10 days' notice in writing of his intention to revoke such permit and an opportunity to be heard by him as to why such should not be done, this proviso not to be taken to apply to cases where the sale of milk or cream may be temporarily prohibited

by the commissioner of health because of disease on the premises, temporary insanitary condition, or similar causes. Such permits shall not be transferable, and no permit issued hereunder shall entitle or authorize the holders thereof to carry on, engage in, or conduct the business of vendor of milk in any place or places other than that described and set out in such permit. If any person having a permit to vend milk, as aforesaid, shall change the location of his or its place of business, notice of such proposed change shall be given to said commissioner of health, and his consent in writing received to conduct such business at such new location; and no business shall be conducted or carried on at such new location until such consent has been received. Any person or corporation, or officer, agent, or servant thereof, who shall sell or offer for sale, expose for sale, dispose of, exchange, or deliver, or with intent to do so, as aforesaid, have in his, its, or their possession, care, custody, or control in Baltimore city, or who shall cause to be offered or sold milk or cream for human food without first having obtained a permit, as aforesaid, shall be fined not less than \$5 nor more than \$100 for each offense.

[Ord. 103, May 6, 1908.]

55b. Every vendor of milk having a permit, as aforesaid, shall, whenever so required, furnish the commissioner of health a statement of all changes in the data and information provided for in the preceding section, and shall also, whenever so required, furnish him a list of all persons from whom he or it receives milk or cream for use in his said business, whether said shipments be from within or outside the city of Baltimore; and said commissioner of health shall have power by regulation to require that changes or additions in said lists of shippers shall be furnished him from time to time as they occur. Said commissioner of health shall keep a record of such shippers, when furnished as aforesaid, for the use of his office, but the same shall not be open to the inspection of other persons. Any person or officer of a corporation failing to furnish lists, data, or information, as aforesaid, when so required by the commissioner of health, shall be fined not more than \$50 for each offense.

[Ibid.]

55c. The permit to engage in the vending of milk, hereinbefore referred to, shall be posted conspicuously in the applicant's place of business, at a point to be designated by the commissioner of health or a health inspector. Each vendor of milk shall, before engaging in the sale of milk or cream, cause his name or the name of the dairy and the permit number, the former in letters of a readable size and permit number in figures not less than 3 inches in height, to be placed and remain on each outer side of all wagons or other vehicles used by such vendors in the conveyance or sale of milk or cream. Any persons or corporation failing to so display said permit or to cause the lettering aforesaid to be displayed on any wagon or other vehicle used as aforesaid, as in this section provided, shall be fined not less than \$10 nor more than \$100 for each offense; and each and every day on which said person or corporation shall fail to display such permit, as herein provided, or shall drive or operate, or cause to be driven or operated, any such wagon or other vehicle in violation of the provisions of this section, shall constitute a separate and distinct offense.

[Ord. 103, May 6, 1908.]

55d. The commissioner of health shall have power to adopt such regulations as he may deem proper and necessary to insure all milk and cream intended for consumption in Baltimore city being produced, transported, stored, kept, distributed, retailed, and delivered under conditions rendering them suitable for consumption as human food and to compel perfect hygienic and sanitary conditions of all cow stables, creameries, and dairies from which milk and cream so intended for consumption in Baltimore city are produced; such regulations not to be inconsistent with existing laws or ordinances, and copies of the same to be printed and kept for free distribution to the public; and said commissioner of health shall have power to prohibit the sale within the corporate limits of Baltimore city of milk or cream produced, transported, stored, kept, distributed, retailed, or delivered contrary to such regulations, whether said milk or cream be produced within or outside the corporate limits of the city of Baltimore; and to the end that said regulations may be enforced in the case of milk or cream produced outside the corporate limits of the city of

Baltimore, but intended for consumption therein, said commissioner of health may require such of the city milk inspectors as he may designate for the purpose to make inspections at such intervals and times as he may deem expedient of all dairy farms, stables, and other places outside the city of Baltimore from which milk or cream is shipped for consumption in Baltimore city. In case full access to such premises or a full opportunity to investigate all the conditions under which milk is there produced or kept shall be denied said inspectors, or in case upon such inspection the conditions are found such as in the opinion of said commissioner of health, render such milk or cream unsuitable or unsafe for human food, and warrant the exclusion of said milk or cream from sale in Baltimore city, said commissioner of health shall have power to absolutely prohibit the sale thereof at any place in Baltimore city until such time as the reason for their exclusion shall, in his opinion, have ceased, and he shall adopt such means of identifying such milk and cream as to him may seem proper and expedient. In case of the exclusion of any milk or cream as aforesaid from sale within Baltimore city, said commissioner of health shall immediately make a record of such fact in a properly indexed book, kept for that purpose, said book to be open to the inspection of all vendors of milk who may desire to inspect the same. Any person or corporation, or officer, agent, or servant thereof, who shall sell, offer for sale, expose for sale, dispose of, exchange, or deliver, or with intent to do so, as aforesaid, have in his, its, or their possession, care, custody, or control any milk or cream which said commissioner of health shall so record as excluded from sale in Baltimore city, shall, upon conviction, be fined not less than \$50 nor more than \$100 for each offense.

56. *Food, food products, and milk.—Adulterating milk.*<sup>1</sup>—It shall not be lawful for any person or persons to adulterate milk offered for sale or sold within the limits of the city of Baltimore, by mixing therewith water, or any drug or other articles whatsoever, under a penalty of not less than \$20 for each and every offense; and any person or persons who shall sell or offer for sale any milk of a diseased cow within the limits of the city shall pay a fine of \$20 for not less than \$50 nor more than \$100 for each offense.

[Ord. 103, May 6, 1908.]

56A. All consumers who receive milk or cream from vendors in cans, bottles, vessels, or other containers which are to be returned to said vendors shall, immediately after emptying the same and before their return as aforesaid, cause such cans, bottles, vessels, or other containers to be washed and thoroughly cleansed. All dealers in milk or cream receiving such milk or cream in cans, bottles, vessels, or other containers which are to be returned to the person shipping or delivering the same to such dealers shall immediately after emptying the same and before their return as aforesaid cause such cans, bottles, vessels, or other containers to be rinsed or cleansed; and all dealers in milk or cream retailing the same in cans, bottles, vessels, containers, or receptacles of any kind shall thoroughly cleanse and sterilize all such cans, bottles, vessels, receptacles, and containers before such milk or cream is placed therein for delivery to customers. Any violation of any of the provisions of this section shall be punishable by a fine of not less than \$5 nor more than \$50 for each offense.

[Ord. 103, May 6, 1908.]

56B. No person shall transfer milk or cream from one receptacle, can, bottle, or vessel of any kind to another vessel of the same or any other kind on wharves, at railroad depots, on streets, or in wagons, except that milk being delivered on wagons carrying the same in bulk, as herein elsewhere provided, may be transferred to the vessel of the purchaser at the time of delivery, and except that nothing herein contained shall be taken to prohibit the transfer of milk or cream from a relief wagon of a vendor in milk to the proper receptacle in a delivery wagon of such vendor, or to prohibit the replenishing of the supply in a churn or similar receptacle in a delivery wagon from a can or other vessel carried thereon for that purpose, or to prohibit the transfer of the contents of a leaking can or other receptacle to some other receptacle, provided such excepted transfers are made in accordance with the regulations of the commissioner of health governing the same. Any violation of this section shall be punishable by a fine of not less than \$5 nor more than \$100.

<sup>1</sup> City Code (1879), art. 23, sec. 48. City Code (1893), art. 23, sec. 70.

[Ibid.]

56c. It shall be unlawful for any person, firm, or corporation engaged in the business of bottling or vending milk or cream to have on his, their, or its premises, or in any wagon used in the delivery of milk or cream, any acid, drug, chemical, substance, or compound to be used for coloring, adulterating, sophisticating, or preserving milk or cream; and no such person, firm, or corporation shall have any such acid, drug, chemical, substance, or compound which can be used for coloring, adulterating, sophisticating, or preserving milk or cream, unless such person, firm, or corporation shall have a written permit from the commissioner of health in Baltimore city to keep the same for experimental or other purposes not connected with or related to the coloring, adulterating, sophisticating, or preserving of milk or cream as such. Any violation of this section shall be punished by a fine of not less than \$5 nor more than \$100 for each offense.

[Ord. 62, Mar. 19, 1904, sec. 1; ord. 87, May 16, 1894, sec. 1.]

57. It shall not be lawful for any person or persons to sell, offer for sale, expose for sale, barter, deliver, or bring to another, or have on his, her, or their premises, store, stall, stand, or vehicle, or in or upon the premises of any other person or persons whatsoever, from or in which milk or any other food products are sold or delivered, any impure, adulterated, sophisticated, or unwholesome milk or other food products, or any tainted, unsound, rotten, or partly decomposed fish, fruit, or vegetables or meat, or any food product that is kept fresh by salicylic or boracic acid or any other preservative.

[Ord. 62, Mar. 19, 1904, sec. 2.]

58. It shall not be lawful for any person or persons to secrete or remove, or assist in secreting and removing, any impure or unsound food products as above specified, after the same shall have been condemned as unsound by or by the authority of the commissioner of health, or in any way to impede or hinder the action of the subordinates of his subdepartment in confiscating and destroying the aforesaid impure food products so condemned as such; but nothing herein contained shall be taken as imposing upon the said commissioner of health or any subordinate of his subdepartment, the duty or expense of removing the aforesaid impure food products so condemned as such.

[Ord. 103, May 6, 1908.]

59. Only pure, unadulterated, unsophisticated, and wholesome milk shall be sold or offered for sale in Baltimore city, and such article shall be understood to be the natural product of healthy cows, and which has not been deprived of any part of its cream, and to which no additional liquid or solid or preservative has been added, and which at a temperature of 60° F. shall have a specific gravity of not less than 1.029, not less than 12½ per cent of total solids, and not less than 3½ per cent of butter fats. All milk sold, received, kept, offered for sale, or delivered in the city of Baltimore shall not in any particular be under the standard herein prescribed without being considered impure, adulterated, sophisticated, or unwholesome. Nothing in this subdivision of this article shall be construed to prevent the sale of skim milk or buttermilk, or of modified milk under the prescription of a physician, provided they be sold as such and that the purchaser be in every instance notified of their true character.

[Ord. 87, May 16, 1894.]

60. It shall be the duty of the commissioner of health to carry out the provisions of this subdivision of this article, and to make or cause to be made inspections of milk, meats, vegetables, fruits, and fish, wherever such articles are sold, kept, or offered for sale in the city of Baltimore, and to obtain samples of milk and all other food products whose qualities are to be determined by chemical or microscopical examination. It shall also be the duty of the commissioner of health to make such rules and regulations as may be required under this subdivision of this article for the better protection of the health of the city.

[Ord. 87, May 16, 1894.]

61. In order to provide for the additional duties imposed by the next two preceding sections of this article upon the commissioner of health, there shall be appointed, pursuant to authority conferred by the city charter, a competent analytical chemist and three inspectors of food, who shall be under the direction of the commissioner of health, and who must be bona fide residents and registered voters of Baltimore city; the chemist shall be a practical analyst and skilled in the chemical and microscopical examination of milk and other food products; he shall not be a member of or interested in any trust, corporation, or company dealing in food products; he shall make such chemical and microscopical examinations as will be required under the provisions of this subdivision of this article, and shall report the result of all such examinations to the commissioner of health; he shall be present at the hearing and trials of all cases wherein he shall have made an examination. The specific duties of each food inspector shall be determined by the commissioner of health. The salary of each food inspector shall be \$1,000 per annum.

[Ord. 103, May 6, 1908.]

61A. The commissioner of health and all other officers of the health department and any inspector or police officer authorized by the commissioner of health shall have the right and power to enter and have full access to any building, structure, or premises where any milk and cream, or either of them, is stored or kept for sale, and shall have the right of access to all wagons, railroad cars, or other vehicles of any kind used for the conveyance or delivery of milk and cream, or either of them, and to any building, structure, or premises where he believes or has reason to believe milk and cream, or either of them, is stored or kept for sale; and shall have the right to take samples of milk and cream therefrom (such samples not to exceed 1 quart) for the purpose of inspecting, testing, or analyzing the same. Any person or corporation refusing to allow such right of entry or access or refusing to allow such samples of milk and cream to be taken or hindering or obstructing any officer named herein in carrying out the power conferred by this section shall be fined not less than \$5 nor more than \$100 for each offense.

[Ord. 103, May 6, 1908.]

61B. Every sample of milk delivered to any officer of the health department or inspector shall have a label attached to the vessel containing such sample, which shall have written thereon at the time of the delivery of such sample the number of the dealer's permit, the number of the sample, the date of collection, and the name of the inspector or officer taking the same; and a memorandum shall be made by the officer or inspector collecting such sample of the number of the sample and the name of the owner and driver from whom collected; and no conviction shall be had of any person for selling or having in his possession adulterated milk as in these ordinances defined unless at the time of taking the sample upon the evidence of which conviction is asked a duplicate sample, properly sealed and marked for identification, shall have been delivered to the person from whose possession such original sample was taken. In taking samples the milk in the receptacle from which the same is taken shall be so agitated as to insure a fair mixture of the contents.

[Ord. 87, May 16, 1894.]

62. The term "food product" as used in the five next preceding sections of this article shall be construed to mean any natural or artificial product that, with or without admixture, preparation, or cooking, is intended to be taken into the human stomach by way of food and not as a medicine; *Provided*, That alcoholic or fermented drinks shall not be classed as food products; also, that the term "adulteration" shall be construed to mean any artificial addition to normal constituents; and the term "sophistication" shall be construed to mean the substitution of one product for another, or any abstraction of or artificial change in the normal constituents; *Provided*, That goods canned according to the rules of the Canned Goods Exchange of Baltimore shall not be considered sophisticated; and the term "unwholesome" shall be construed to mean deleterious to health, or liable to introduce, cause, or increase sickness or impair-

ment or derangement of the functions of the body by the temporary or continuous use of the unwholesome product; and the term "impure" shall be construed to mean natural change or decomposition of normal constituents, or absorption of or commingling with deleterious gases, liquids, or solids: *Provided*, That in a warrant, indictment, or legal paper or proceeding the term "impure" as applied to a food product shall be a good and sufficient description of the terms "adulterated," "sophisticated," "unwholesome," "unsound," "tainted," "rotten," "partly decomposed," or "impure" as used in this article, or of two or more of these terms.

[Ord. 87, May 16, 1894, sec. 6; ord. 130, July 9, 1894; ord. 62, Mar. 19, 1894.]

63. Any person or persons who violate, disobey, neglect, or refuse to comply with any of the provisions of the six next preceding sections of this article shall be subject to a penalty of not less than \$20 nor more than \$100 for each offense. And the milk or food products in the possession of the person or persons so violating, disobeying, refusing, or neglecting to comply with the provisions of this ordinance may be confiscated and destroyed by the inspector examining the same.

[City Code (1879), art. 23, sec. 33; City Code (1893), art. 23, sec. 50.]

126. *Stables*.—If any person having a cow or cows, horse or horses in any stable within the city, shall keep the same in such manner that the filth and stench therefrom shall become offensive to or annoy any neighbor or other person, the person keeping such cow or horse, as aforesaid, shall forfeit and pay for each offense \$5, and the further sum of \$5 for each and every day the nuisance shall be suffered to remain, notice having first been given to the party offending. (*Metropolitan Sav. Bank v. Manion*, 87 Md., 68; *King v. Hamil*, 97 Md., 103.)

[City Code (1879), art. 23, sec. 12; City Code (1893), art. 23, sec. 21.]

202. *Fines and penalties*.—If any person or persons shall refuse or neglect to comply with any order or notice of the commissioner of health, authorized by the provisions of any section of this article, and no other penalty is herein provided for such neglect or refusal, such person or persons shall forfeit and pay the sum of \$20 for each offense, and \$5 for every day that such neglect or refusal shall continue.

203. All fines, penalties, and forfeitures incurred by any violation of this article shall be recovered as other fines, forfeitures, and penalties imposed for the violation of city ordinances are recoverable, and the moneys so collected shall be paid to the comptroller.

203A. No prosecution of any person or corporation on a charge of violating any law, ordinance, or regulation relating to or governing the sale of milk or cream in Baltimore city shall be had or maintained unless at the initial stage thereof such prosecution shall have been authorized and directed by the written order of the commissioner of health, signed by him or by an assistant commissioner of health, such written order to be filed with the papers in the proceeding.

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#### HEALTH DEPARTMENT'S RULES AND REGULATIONS.

1. Milk or cream shall not be kept for sale nor stored in any stable or room used for sleeping or domestic purposes, or in any room having any communication with such stable or rooms or with water-closet apartments.

2. Milk or cream must not be sold or stored in any room which is dark, poorly ventilated or dirty, or in which rubbish or useless material is allowed to accumulate, or where there are offensive odors.

3. Cans or other receptacles containing milk or cream for sale shall not be allowed to stand on the sidewalk or outside the store door.

4. Cans in which milk or cream is kept for sale shall be kept either in a milk tub, properly cooled, or in a clean ice box or refrigerator, in which only these or similar articles of food are stored, and the said milk or cream shall be kept at a temperature not more than 50° F.

5. The vessels which contain milk or cream while on sale must be so protected by suitable covers and must be so placed in the store or dairy that the milk or cream will not become contaminated by street dust and dirt.

6. All cans, bottles, and other receptacles in which milk or cream is handled, transported, or sold must be thoroughly cleaned and sterilized by steam or hot water before filling. Such cleansing must be done in accordance with section 1 of these rules and regulations.

7. All dippers, measures, or other utensils used in handling milk or cream must be kept clean and sanitary while in use, and shall be thoroughly washed and sterilized directly after each day's use.

8. The ice box, or ice tub or refrigerator in which milk or cream is kept must be thoroughly cleaned by scrubbing at least twice a week.

9. The overflow pipe from the ice box or refrigerator in which the milk or cream is kept must not be connected directly with the drain pipe or sewer, but must discharge into an open sink, which is supplied with water, sewer connected and properly trapped, or which discharges upon the surface of the ground; or else it must discharge into a movable receptacle, which shall be kept clean and free from odors.

10. Any person having a contagious disease or caring for or coming in contact with any person having a contagious disease shall not handle milk.

11. All cases of infections or contagious diseases within the premises where milk or cream is sold or stored must be reported to the health office at once.

12. In selling milk the contents of the can or other receptacle should be thoroughly mixed before measuring out the amount desired.

13. Ice must not be placed in the milk or cream to cool it.

14. In testing milk by dealers samples must be removed from the receptacle containing the milk, and if the samples are tasted or if fingers are put into the milk, or in any other way be subjected to the possibility of being contaminated, the samples must be thrown away and not put back into the milk containers or sold.

#### INSPECTION RECORD BALTIMORE HEALTH DEPARTMENT, DISTRICT NO. —.

The conditions under which milk and cream are kept and handled for sale at this dairy or store, No. ———, have been examined and found to accord with the requirements of law, as signified by the undersigned inspectors on the dates entered below.

#### RULES AND REGULATIONS.

1. Milk or cream shall not be kept for sale nor stored in any stable or room used for sleeping or domestic purposes, or in any room having communication with such stable or rooms or with water-closet apartments.

2. Milk or cream must not be sold or stored in any room which is dark, poorly ventilated or dirty, or in which rubbish or useless material is allowed to accumulate, or where there are offensive odors.

3. Cans or other receptacles containing milk or cream for sale shall not be allowed to stand on the sidewalk or outside the store door.

4. Cans in which milk or cream is kept for sale shall be kept either in a milk tub, properly cooled, or in a clean ice box or refrigerator, in which only milk or similar articles of food are stored, and the said milk shall be kept at a temperature not more than 50° F.

5. The vessels which contain milk or cream while on sale must be so protected by suitable covers and must be so placed in the store or dairy that the milk will not become contaminated by street dust and dirt.

6. All cans, bottles, and other receptacles in which milk or cream is handled, transported, or sold must be thoroughly cleaned and sterilized by steam or hot water before filling.

7. All dippers, measures, or other utensils used in handling milk or cream must be kept clean and sanitary while in use, and shall be thoroughly washed and sterilized directly after each day's use.

8. The ice box or ice tub or refrigerator in which milk or cream is kept must be thoroughly cleaned by scrubbing at least twice a week.

9. The overflow pipe from the ice box or refrigerator in which the milk or cream is kept, must not be connected directly with the drain pipe or sewer, but must discharge into an open sink, which is supplied with water, sewer

connected and properly trapped, or which discharges upon the surface of the ground; or else it must discharge into a movable receptacle, which shall be kept clean and free from odors.

10. Any person having a contagious disease, or caring for or coming in contact with any person having a contagious disease, shall not handle milk.

11. All cases of infectious or contagious diseases within the premises where milk or cream is sold or stored must be reported to the health office at once.

12. In selling milk the contents of the can or other receptacle should be thoroughly mixed before measuring out the amount desired.

13. Ice must not be placed in the milk or cream to cool it.

14. On testing milk by dealers samples must be removed from the receptacles containing the milk, and if the samples are tasted or if the fingers are put into the milk, or in any way be subjected to the possibility of being contaminated, the samples must be thrown away and not put back into the milk containers or sold.

Date.	Inspector.	Date.	Inspector.	Date.	Inspector.

**BURLINGTON, VT.**

**AN ORDINANCE Relating to the sale of milk and cream.**

It is hereby ordained by the city council of the city of Burlington, as follows:

SECTION 1. Written applications for licenses to sell or supply milk or cream within the city of Burlington to be used by the inhabitants thereof shall be filed with the milk inspector on or before the 15th day of May in each year. Such licenses shall take effect on the 1st of June in each year, and shall continue in force one year. If applications for licenses shall be made after May 15, they shall be acted upon by the board of health as soon as conveniently may be. Licenses granted after June 1 of any year shall expire on the 31st day of the next May.

SEC. 2. The license fee shall be \$5, which amount shall be deposited with the milk inspector at the time application for a license is made. If a license should not be granted, the money so deposited shall be returned to the applicant.

No fee shall be required for the issuance of an additional license provided for in paragraph 4 of section 284 of the charter of said city.

SEC. 3. A license shall not be granted hereunder unless the cows from which such milk or cream is to be produced are in a healthy condition, nor unless the barns, stables, premises, and utensils used in connection therewith are in good sanitary condition, nor unless such milk and cream are obtained and sold in a neat and cleanly manner.

The stables and premises shall be kept light, dry, clean, and well ventilated. The walls and ceilings of the stables shall be kept well whitewashed and free from any accumulation of manure. The manure shall be removed from the stables at least once daily, and there shall not be a great accumulation of manure in the yard.

The barnyard shall be well drained, the animals shall be allowed plenty of outdoor exercise, and shall be bedded when in the stable with clean, dry litter. Ample space shall be allotted for each cow. The cows shall be fed liberally with wholesome feeding stuff and supplied with an abundance of fresh, pure water.

The cows shall at all times be kept clean and the udders and flanks be wiped with a clean cloth or washed before milking. All milkers and other attendants employed about the dairy shall be personally clean before entering upon their duties.

SEC. 4. No milk or cream shall be sold or supplied or kept for sale or supply within said city, to be used by the inhabitants thereof, which was drawn from cows within 15 days before or 4 days after calving, nor unless the cows from which it was derived have within one year been examined by a competent veterinary surgeon, approved by the board of health, and found to be free from diseases dangerous to the public health.

SEC. 5. Such milk or cream in said city shall not be stored, cooled, strained, or otherwise handled in any room which is occupied by horses, cows, or other animals, or in any room used for domestic or sleeping purposes. All rooms in which said milk or cream is stored, cooled, strained, or otherwise handled shall be kept constantly clean and free from obnoxious odors. Such rooms shall contain proper appliances for washing or sterilizing all utensils employed in the handling and sale of milk and cream.

SEC. 6. All such milk produced for the purpose of sale in the city of Burlington shall be strained and cooled as soon as it is drawn from the cow.

SEC. 7. Milk or cream kept for sale as aforesaid in any store, creamery, milk depot, or other establishment within said city shall be stored in a covered cooler or refrigerator, which shall be used only for the purpose of storing milk or cream. No receptacles containing milk or cream for sale shall be allowed to stand outside said cooler or refrigerator except while a sale is being made. Every such cooler or refrigerator shall be properly drained and cared for and shall be kept tightly closed except during such intervals as are necessary for the introduction or removal of milk, cream, or ice, and they shall be kept only in such location and under such condition as shall be approved by the board of health.

SEC. 8. No cans, bottles, or other receptacles shall be used in the sale, delivery, or distribution of milk or cream except such as have been thoroughly cleansed and sterilized by steam or boiling water and are smooth and free from rust, and all such receptacles shall be cleansed and sterilized before they are again used for the same purpose, and such receptacles shall be protected from dust while standing. No person shall use a milk or cream receptacle as a container for any other substance than milk or cream. During transportation the milk shall be tightly covered to protect from dust.

SEC. 9. All vehicles used in the distribution of milk or cream for such sale or supply shall be kept in a cleanly condition. Such vehicles shall have the name of the owner of said milk or cream marked on them in plain letters not less than 1 inch in height and so placed as to be distinctly seen and read.

SEC. 10. Every person engaged in the production, storage, transportation, sale, or distribution of such milk or cream immediately upon the occurrence of any case of communicable disease, either in himself or his immediate associates, or within the building where such milk or cream is stored, sold, or distributed, shall notify said board of health. The sale and distribution of such milk and cream shall be suspended by the board of health until all danger of infection is passed.

SEC. 11. No person shall remove from any dwelling that has in it a communicable disease any bottle or receptacle which has been used for the storing or receiving of milk or cream. No receptacle which has been handled by persons suffering from a communicable disease shall be used to hold or convey milk or cream until such receptacle shall have been thoroughly sterilized.

SEC. 12. No persons shall within said city furnish, supply, sell, or distribute milk to the inhabitants thereof, or shall for that purpose keep or have the same in possession which contains less than 8.5 per cent solids not fat nor less than 3.25 per cent milk fat, and such milk shall contain not more than 100,000 bacteria per cubic centimeter, nor have a temperature higher than 50° F.

SEC. 13. No person shall sell or supply within said city milk or cream to be used by the inhabitants thereof, or shall for that purpose keep or have the same in his possession, which contains any adulterant, preservative, or any substance added for the purpose of modifying the physical properties of said milk or cream.

SEC. 14. It shall be the duty of the milk inspector to inspect all dairies, creameries, milk depots, or stores wherever milk or cream is produced, stored, sold, or distributed in said city to be used by the inhabitants thereof at least three times a year, and as much oftener as in his judgment seems necessary or as he may be directed by the board of health. He shall keep a careful record of each inspection, giving date and name of person controlling or operating each place, and such other information as may be desired by the board of health, and he shall issue a certificate of inspection to the owner or person in charge of each dairy inspected and found to meet the requirements of this ordinance.

SEC. 15. The said milk inspector shall at least semiannually, and at any other time or times in his own discretion or upon reasonable complaint procure and send to the State laboratory of hygiene for examination samples of milk or cream from the dairy of each party for the sale or supply of whose milk or cream a license has been obtained hereunder.

Said samples for examination shall be taken from the common stock of milk at such time and place as may be convenient for said milk inspector, and shall be furnished by the owner, or his servant or agent, to said milk inspector upon tender of the value thereof. Any money paid or advanced by the inspector for such samples shall be reimbursed to him from the city treasury.

SEC. 16. The milk inspector shall report to the board of health all violations of these ordinances which come under his observations.

SEC. 17. The board of health may revoke a license granted by them whenever they deem it to be for the best interests of the public so to do.

Passed in board of aldermen at meeting held May 3, 1909.

Attest:

M. C. GRANDY, *Clerk.*

Approved May 3, 1909.

JAMES E. BURKE, *Mayor.*

#### LICENSE TO SELL MILK OR CREAM.

SEC. 284. The board of health is hereby authorized to regulate and grant licenses for the selling or supplying of milk and cream within the city of Burlington, and no person shall sell or supply milk or cream within said city to be used by the inhabitants thereof unless he shall first have procured a license therefor from said board of health.

Before granting such license said board of health shall make or cause to be made proper inspection of the cows producing said milk or cream, and of the barns and premises used in connection therewith, and of the places where said milk or cream is stored or kept for sale.

Each license shall state the dairies from which the licensee is authorized to sell or supply milk or cream under this section, and no licensee shall sell or supply milk or cream within the city of Burlington produced from any other dairy not specified in his license.

The board of health may issue from time to time to any licensee an additional license to sell or supply milk or cream from any dairy not specified in his license upon the terms and conditions hereinbefore prescribed.

No license tax shall be required of a person selling or supplying milk or cream in said city to licensed milk dealers who sell the same at retail.

A person who violates any provision of this section shall be subject to the penalties hereinbefore prescribed for a violation of a city ordinance. (See also No. 118, acts of 1908.)

#### CHICAGO, ILL.

[Department of health, city of Chicago, W. A. Evans, M. D., commissioner.]

#### RULES REGULATING THE HANDLING AND SALE OF MILK—FOR DAIRY FARMS OUTSIDE THE CITY.

[Approved by the city council Apr. 13, 1908.]

Rule 46. *Unclean milk not to enter the city of Chicago.*—All milk entering the city of Chicago, and all milk sold, offered for sale, or received with the intention of selling or offering for sale must be clean, wholesome, and uninfected with disease germs or anything liable to convey and transmit disease.

Rule 47. *Unclean milk—Defined.*—All milk produced on farms, or prepared, handled, or otherwise treated on the premises or in places where the rules of the department are violated shall be declared unclean, unwholesome, and infected. The sale of or offering for sale of such milk is prohibited.

Rule 48. *Unclean milk condemned.*—All unclean, unwholesome, or infected milk shall be condemned for human food. Such milk shall be returned to the producer and tagged with the "department condemned" tag, and condemnation slip shall be mailed to the shipper at once. If, following this, the said producer or shipper again sends into the city unclean, unwholesome, or infected milk, the same shall be condemned and rendered unfit for human food by coloring or otherwise treating or shall be poured into the sewer.

Rule 49. *Condition and care of cows for production of milk.*—The cows must be healthy and free from tuberculosis. If an examination by the dairy inspector shows evidence of excessive emaciation, glandular enlargement, nodular formations, mastitis, tumor, recent parturition, cough, dyspnoea, fever, pneumonia, exhaustion, lockjaw, blackleg, anthrax hemorrhagic septicemia, or any other infectious disease, or any evidence of tuberculosis, the milk of the herd shall be declared infected until the unhealthy cow or cows have been removed and until an acceptable statement from a recognized, licensed veterinarian or regular dairy inspector is filed with the milk division showing that such suspicious cow or cows are free from infectious disease. Milk from cows reacting to tuberculin shall be rejected unless it shall have first been pasteurized at a temperature of 175° F. or over for 30 seconds or longer in a stream not more than a quarter of an inch thick. Milk from cows 15 days before and 1 week after calving shall be rejected. Cows must be kept as clean as possible on flanks, belly, udder, and tail. Long hair must be clipped from the udder and sufficiently from the tail to clear the ground. The feeding of slops, refuse of any distillery or brewery, glucose, or any malt and ensilage that has been subject to fermentation, putrefaction, or decomposition is prohibited. Pure water in sufficient quantities must be at hand at all times. The cows must not be overheated by hard driving, nor be allowed to stand in mudholes, dirty sloughs, or ditches. Mudholes, dirty sloughs, and ditches shall not be allowed to exist in the pastures or cow yards where cows for the production of milk are kept.

Rule 50. *Condition of barnyard for production of clean milk.*—The barnyard or cow yard must be kept reasonably clean and free from mud, soft manure, and must be well drained. Piles and heaps of manure shall not be less than 25 feet away from any stable door or window between December 1 and April 1 and not less than 300 feet away during the other months of the year.

Rule 51. *Stable for production of clean milk.*—The floors must be tight, preferably constructed of cement, and free from defects. The ceilings should be tight if a storage loft is kept above. The walls should be whitewashed every spring and fall and kept clean at all times. Each cow must have at least 400 cubic feet of air space, and there must be ample provision for movement of air and ventilation, so that the air never gets foul. At least 2 square feet of unobstructed window-glass space shall be provided for each cow. Soiled bedding must be removed daily and the manure must be removed from the stalls and open manure gutters twice a day. All bedding, removing of manure, sweeping, and cleaning of mangers must be done at least one-half hour before milking. The stable must be reasonably free from flies. Cats and dogs must not be permitted in the stable.

Rule 52. *Milkers in relation to production of clean milk.*—Milkers should neither have nor come in contact with contagious disease. Should any case of communicable disease—such as scarlet fever, smallpox, typhoid fever, diphtheria, measles, or chicken pox—occur on the dairy farm among the milkers or their families, the division of milk inspection must be promptly notified.

The contagious diseases of importance in relation to milk are:

#### CONSUMPTION.

Milkers and attendants in the cow stable and milk room should be free from tuberculosis. A consumptive can be harmless if he is intelligent and can be trusted to carry out the physician's instructions, viz, to receive all the sputum in a sputum cup or on clean cloths and properly destroy it by fire or immersing in 1 to 5,000 bichloride or 5 per cent carbolic-acid solution.

Consumptives should never be allowed to cough without using a clean cloth before their mouth, and under no circumstances be permitted to moisten their hands with saliva before milking. They should always wash their hands well before beginning to milk and after each handling of sputum cloths. If the individual can not be relied upon to do this at all times he should be excluded from the dairy and given employment out of doors.

If consumption occurs in the milker's family or in the family of the farmer where the milker is rooming or boarding, the same instructions in regard to the care and disposition of the sputum should be issued.

In case of death, the house should be thoroughly disinfected by using 8 ounces of formaline to 1,000 cubic feet, spread upon sheets left in the rooms for 8 hours, with the windows and doors tightly closed.

## TYPHOID.

The milkers affected with or convalescent from this disease should be absolutely excluded from the dairy. On account of the infectiousness of the excreta from such individuals, it might be good practice to keep them away from the handling of milk for at least four to six weeks after convalescence.

When typhoid fever occurs in the families of milkers or attendants, the greatest care should be exercised in the disposition of the excreta and handling of the bed linen and other clothes coming in contact with the patient. The bowel movements and urine should be disinfected with 4 per cent chloride of lime or 5 per cent carbolic-acid solution and buried. The bed linen and other clothes should be soaked in 1 to 10,000 bichloride solution or 5 per cent carbolic-acid solution and then thoroughly boiled. Special attention should be given to the exclusion of flies from the sick room and also from the dairy. The other members of the family should be permitted in the dairy only if intelligent and after having been thoroughly instructed in regard to cleanliness and other details. The milking utensils should not be brought into the house, and should always be washed with cloths and brushes that have not come in contact in any way with things from the typhoid patient. Samples of the water used should be sent to the city laboratory in boiled bottles for examination.

## SCARLET FEVER.

Milkers should neither have nor come in contact with scarlet-fever cases. After scarlet fever the scales on the hands carry the contagion for about four weeks and sometimes longer. Scarlet-fever cases during convalescence should not be permitted to come in contact with the handling of milk in any way until the scaling has been completed and they have been given an antiseptic bath, such as a 1 to 10,000 bichloride of mercury solution and their hands anointed with 5 per cent carbolic salve.

When scarlet fever occurs in the families of the farmers, milkers, or other attendants, the house should be quarantined. This means that no member of the household or other person must leave that house and mingle with attendants in the dairy in any manner or form while the quarantine exists. The sale of milk and cream from the quarantined premises is not permitted unless the cows are taken care of, the milking done, and the utensils handled by individuals entirely disassociated with the quarantined family. The quarantine is terminated only after a thorough disinfection of the premises and the patient in the manner indicated under "Tuberculosis."

## DIPHTHERIA.

Milkers affected with diphtheria or sore throat should be excluded from the dairy. They should not be permitted to return to the care of cows, milking, and handling of utensils until from 10 to 14 days after an attack of diphtheria. Throat cultures should be made to determine the absence of diphtheria bacilli before the patient is pronounced well. In cases of simple sore throat the patient should be examined by a physician before he is permitted to reenter upon his work. When diphtheria occurs in the families of milkers and dairy attendants, the house should be quarantined until the disease has been properly terminated by throat cultures and disinfection of the premises.

## SMALLPOX.

When smallpox occurs in milkers, attendants, and their families, a strict quarantine must be established at once. The members of the families not affected should be vaccinated and the quarantine should be continued for about 20 days. This means that the milk and cream produced on these premises shall not be sold for domestic use if handled by individuals who come in contact with such a smallpox case and are still under quarantine. In such cases the milking must be done, the utensils handled, and the cows taken care of by individuals entirely disassociated with the quarantined family. All milkers and attendants should be vaccinated to prevent such outbreaks.

## MEASLES.

Milkers should neither have nor come in contact with measles cases. Measles cases during convalescence should not be permitted to come in contact with the handling of milk in any way until the scaling has completed and they have

been given an antiseptic bath such as a 1 to 10,000 bichloride of mercury solution and their hands anointed with 5 per cent carbolic salve.

When measles occurs in the family of the farmer, the house should be quarantined and the same precautions taken as for scarlet fever.

#### CHICKEN POX.

Milkers should neither have nor come in contact with chicken-pox cases. Chicken-pox cases during convalescence should not be permitted to come in contact with the handling of milk in any way until the scaling has been completed and they have been given an antiseptic bath, such as a 1 to 10,000 bichloride of mercury solution, and their hands anointed with 5 per cent carbolic salve. When chicken pox occurs in the families of the farmer, milkers, or other attendants, the house should be quarantined and the same precautions taken as for scarlet fever and measles.

Rule 53. *Milking in the production of clean milk.*—Before each milking the udder should be wiped with a clean damp cloth or washed with soap and water if necessary. The hands should be washed before starting to milk and again well dried with a clean towel. The hands and teats should be kept dry during milking. If they become moistened with milk, they should be wiped dry with a clean towel. Suitable clean outer garments, such as overalls and jumpers, should be put on before milking. The milk stool must be clean. Milking should be done regularly, having the periods of as nearly equal length as possible. The first few streams from each teat should be rejected. The first half of the milk given should not be separated from the latter half or strippings and be sold separately. The top of the milk pail should be as small as possible—not larger than 6 or 8 inches—to keep out dirt, and if anything falls into the milk, such as straw or manure, then the milk should be rejected. The milk from each cow should be removed from the stable immediately after it is obtained.

Rule 54. *Milk cans and utensils for keeping and shipping of clean milk.*—All utensils used in the production and shipping of milk, such as cans, covers, bottles, dippers, skimmers, measures, strainers, stirrers, etc., must be so constructed that all parts are absolutely free from places where milk can accumulate or soak in, so that it can not be removed by simple washing. The surface coming in contact with milk and cream must be smooth and free from excessive rust. All utensils, including cans, must be kept scrupulously clean, inside and outside, at all times. They should be cleansed by washing with a brush and soap or washing powder and hot water and thorough rinsing. After this cleansing they should be sterilized with boiling water and then kept inverted in a place free from dust and flies. Strainers, whether metal, gauze, or cotton, must be absolutely clean when used for the straining of milk. Milk cans should be used for no other purpose. Bottle caps must be kept in clean, covered, dry, and dust-proof receptacles. All cans and utensils must be free from defects and rough or uneven surfaces.

Rule 55. *Care of milk on the dairy farm.*—The room where utensils, milk pails, strainers, and the milk are kept should be separated from both the house and the stable and be used only for dairy purposes. It should be kept neat, clean, well ventilated, and free from flies and dust. No odds and ends or other unnecessary things should be stored in the milk room. The milk room must be free from odor.

Milk should be strained through a piece of clean linen or cotton, then it should be rapidly cooled to 50° F. within two hours after milking and kept below that temperature until delivery. The evening milk must not be mixed with the morning milk, and old milk must not be mixed with the fresh. The cans must be tightly closed when kept in the cooler and sealed when hauled to the milk platform. During this transportation they must be covered and protected from the heat. This is best accomplished by carrying in a covered spring wagon. Cans should never be delivered too early to the milk platform. They should be covered with a damp cloth in the warm weather while standing there.

Rule 56. *Water supply in relation to clean milk.*—The water supply on the farm must be ample and free from any danger of pollution with animal matter or refuse. Water used for the washing of cans and utensils must be free from all nitrites and not contain more than nine thousandths of 1 part of free ammonia and nine thousandths of 1 part of albuminoid ammonia in 100,000 parts. It must not contain more than 1,000 bacteria per cubic centimeter and be free from pathogenic bacteria, including colon bacilli. Water from sloughs ponds, ditches, or other sources subject to contamination must never be used

for the washing of cans or utensils. When typhoid fever occurs, the use of the water on the farm must be discontinued for the washing of cans and utensils until it has been passed upon by the director of the laboratory of the department of health.

Rule 57. *Sanitary standard for milk.*—All milk sold, offered for sale, kept with the intention of selling, or sent to the city for the purpose of selling must be free from dirt, foreign material, and sediment. Not more than a perceptible sediment shall be left on a piece of white linen cloth 4 inches square when a quart of well-mixed milk is strained through it. Milk on arrival in the city must not contain more than 1,000,000 bacteria per cubic centimeter from May 1 to September 30 and not over 500,000 bacteria per cubic centimeter between October 1 and April 30. Milk for delivery to the consumer shall not contain an excessive number of bacteria. The sale of milk containing over 3,000,000 bacteria per cubic centimeter is prohibited, and the dealer selling or offering for sale such milk shall, after three examinations of his milk on successive days by the bacteriologist and showing bacterial counts above 3,000,000, be prohibited from selling milk until the method of production and handling of his milk supply has been properly regulated by the department. The sale of milk containing tubercle, typhoid, diphtheria, or other pathogenic bacteria is prohibited. The sale of milk containing excessive numbers of putrefying and gas-producing microorganisms is prohibited.

RULE, MADE BY DR. W. A. EVANS, COMMISSIONER OF HEALTH, REQUIRING OPERATORS OF DAIRY FARMS TO FURNISH INFORMATION ABOUT CONTAGIOUS DISEASE.

This card must be filled out in detail and sent to the Chicago health department on the 1st and 15th days of each month. If this is not done promptly, the milk supply will be considered suspicious and will not be admitted until an investigation can be made.

Date ———, 190—.

CHIEF DAIRY INSPECTOR.

DEAR SIR: We have had contagious disease in our home ——— and in the families of milkers ——— and attendants ———, as follows: Typhoid, ———; diphtheria, ———; chicken pox, ———; tuberculosis, ———; scarlet fever, ———; smallpox, ———; measles, ———; sore throat, ———. (Answer "Yes" or "No" in each blank space.) Patient took sick on (give date) and is attended by Dr. ———.  
Address ———.  
Signed ———.  
P. O. address ———.

#### AN ORDINANCE REQUIRING TUBERCULIN TEST OF COWS.

[Passed by city council July 13, 1908.]

#### MILK.

*Be it ordained by the city council of the city of Chicago:*

SECTION 1. No milk, cream, buttermilk, or ice cream shall be sold, offered for sale, exposed for sale, or kept with the intention of selling within the city of Chicago after January 1, A. D. 1909, unless such milk or cream, or the milk or cream contained in buttermilk and ice cream, be obtained from cows that have given a satisfactory negative tuberculin test within one year. The cows having been satisfactorily tested shall be marked "tuberculin tested," and shall be numbered and a certificate shall be filed with the division of milk inspection of the department of health of the city of Chicago, upon forms furnished by the commissioner of health, giving the number, a brief description of the animal, the date of the taking of said test, and the name of the owner. Said certificate shall be signed by the person making such test: *Provided, however,* That from January 1, 1909, for a period of five years, to wit, until January 1, 1914, milk or cream or buttermilk and ice cream made from milk or cream obtained from cows not tuberculin tested or not free from tuberculosis may be sold within the city of Chicago if the milk or cream from said cows is pasteurized according to the rules and regulations of the department of health of the city of Chicago.

SEC. 2. Any milk, cream, buttermilk, or ice cream offered for sale, exposed for sale, or kept with the intention of selling within the city of Chicago which shall be found within the city in violation of section 1 shall be forthwith seized, condemned, and destroyed by the milk and food inspectors or other duly authorized agents or employees of the department of health of the city of Chicago.

SEC. 3. This ordinance shall be in full force and effect from and after January 1, 1909.

#### BUTTER.

*Be it ordained by the city council of the city of Chicago:*

SECTION 1. No butter shall be sold, or offered for sale, or kept with the intention of selling in the city of Chicago after January 1, 1909, unless such butter be made from milk or cream obtained from cows that have given a satisfactory negative tuberculin test within one year: *Provided, however,* That from January 1, 1909, for a period of five years, to wit, until January 1, 1914, butter made of milk obtained from cows not tuberculin tested or not free from tuberculosis may be sold in the city of Chicago if the milk or cream from which such butter was made was pasteurized according to the rules and regulations of the department of health of the city of Chicago.

SEC. 2. It shall be unlawful to sell any butter in the city of Chicago unless there be stamped on the package in plainly legible letters of not less than one-eighth-inch type: "Made of milk (or cream) from cows free from tuberculosis, as shown by tuberculin test," or "Made from milk (or cream) pasteurized according to the rules and regulations of the department of health of the city of Chicago."

SEC. 3. Any butter offered for sale, exposed for sale, or kept with the intention of selling in the city of Chicago which shall be found within the city in violation of this ordinance shall be forthwith seized, condemned, and destroyed by the milk and food inspectors or other duly authorized agents or employees of the department of health of the city of Chicago.

SEC. 4. This ordinance shall be in full force and effect from and after January 1, 1909.

#### CHEESE.

*Be it ordained by the city council of the city of Chicago:*

SECTION 1. No domestic cheese shall be sold, or offered for sale, or kept with the intention of selling in the city of Chicago after January 1, 1909, unless such cheese be made from milk or cream obtained from cows that have given a satisfactory negative tuberculin test within one year: *Provided, however,* That from January 1, 1909, for a period of five years, to wit, until January 1, 1914, domestic cheese made of milk obtained from cows not tuberculin tested or not free from tuberculosis may be sold in the city of Chicago if the milk or cream from which such cheese was made was pasteurized according to the rules and regulations of the department of health of the city of Chicago.

SEC. 2. It shall be unlawful to sell any such cheese in the city of Chicago unless there be stamped on the package in plainly legible letters of not less than one-eighth-inch type: "Made of milk (or cream) from cows free from tuberculosis, as shown by tuberculin test," or "Made from milk (or cream) pasteurized according to the rules and regulations of the department of health of the city of Chicago."

SEC. 3. Any cheese offered for sale, exposed for sale, or kept with the intention of selling in the city of Chicago which shall be found within the city in violation of this ordinance shall be forthwith seized, condemned, and destroyed by the milk and food inspectors or other duly authorized agents or employees of the department of health of the city of Chicago.

SEC. 4. This ordinance shall be in full force and effect from and after January 1, 1909.

### RULES REGULATING THE HANDLING AND SALE OF MILK FOR MILK DEPOTS.

[Approved by the city council Apr. 13, 1908.]

#### LICENSE.

Rule 1. *Application for license.*—Application for a milk license shall be made in writing to the commissioner of health. Such application shall set forth the name and residence of the applicant, if an individual, and the names and

residences of the principal officers, if the applicant is a corporation, together with the location of the place for which such license is desired. Such application shall also state whether the milk is to be sold in a store, depot, or also from a delivery wagon. It shall further state whether the milk and cream is to be sold in bottles exclusively or in bulk and bottles. It shall also state if cows are to be kept; and if so, shall state the number.

Rule 2. *Inspection and investigation of previous record.*—No application for license shall be approved by the commissioner of health after May 1, 1908, if the records of the milk division show that the depot, store, or any part of the establishment in which the business is to be conducted is in an insanitary condition.

If the applicant's record is not on file in the office, or if he is newly engaging in the milk business, an inspection of his place shall be made within five days after making the application, to determine the sanitary conditions. No application for license shall be approved if applicant has a bad record.

The applicant, if refused a license on account of bad sanitary conditions or for repeated adulterations of milk and cream, may make application to the commissioner of health for a hearing. The commissioner of health may then recommend the applicant for a license if he is satisfied that the regulations of the department will be complied with in the future.

Rule 3. *Revoking of license.*—If at any time after the granting of such license the holder fails to comply with the sanitary regulations of the department, or repeatedly sells, or offers for sale, or has in his possession for the purpose of selling, milk and cream below the grade prescribed by the ordinances or rules of the department of health, the chief food inspector shall recommend to the commissioner of health that his license be revoked with or without further notice. Said commissioner of health may grant the defendant a hearing if he deems this necessary.

Rule 4. *Reissuing of revoked license.*—If all the regulations of the department have been complied with the commissioner of health may recommend that the license be reissued.

Rule 5. *License exhibited.*—Every milk dealer shall post his license in a conspicuous place on the premises for which it has been issued.

#### MILK DEPOTS.

Rule 6. *Definition.*—By "milk depot" is meant any place, house, or room where milk is received from the farm, or large wholesale dealer, in bottles or cans and prepared for distribution. The milk depot shall not be used for any other purpose, nor shall any other business be conducted therein.

Rule 7. *Where to be established.*—No milk depot shall be established or maintained in a room or rooms which communicate directly with any living rooms, kitchen, sanitary closet, laundry, or stable, and places where animals are kept or slaughtered. No milk depot shall be maintained which communicates in any way with a horse or cow barn and shall be separated therefrom by an air and odor proof partition or wall. After May 1, 1908, milk depots shall not be maintained in any building where horses and cows are kept. The immediate vicinity of the milk depot, especially the place within 10 feet of the doors and windows thereof, shall be kept free from the accumulations of rubbish, garbage, manure, and any other putrefying, decomposing, infectious, and bad-smelling substances.

Rule 8. *Construction.*—The floor shall be smooth, free from crevices and defects, and water tight. When below the street level it must be constructed of impervious material, such as cement, asphalt, or tiles laid in cement. It shall be well drained, and the drains must be trapped and ventilated. The walls and ceilings shall be smooth, tight, and free from unnecessary projections, niches, etc., and kept well painted or lime washed.

Windows: Glass space corresponding to 15 per cent of the floor space shall be provided. All windows must be so located as to admit light freely and be unobstructed.

Screens: Between May 1 and November 1 all windows shall be provided with fly and dust screens, and all doors shall be provided with self-closing door screens.

Ventilation: All depots shall be provided with adequate ventilation by means of windows, air shafts, air ducts, or other mechanical apparatus, if required, so as to insure free circulation of fresh air at all times.

Rule 9. *Wash rooms.*—Wherever milk is bottled or otherwise prepared, a separate room shall be maintained for the purpose of receiving, storing, and

cleaning cans, bottles, and utensils, known as the "wash room." This shall be separated from that part of the milk depot where the milk is stored and bottled, known as the "milk room," by a complete partition and door. The wash room shall be so located that dirty utensils do not have to pass through or be received in the room where the milk is handled or prepared. The floor of the wash room shall be so arranged that its drainage does not run into the milk room. Dirty cans and utensils shall not be taken into, kept, or stored in the milk room.

Rule 10. *Appliances*.—Vats shall be constructed preferably of impervious material and should have a smooth inner surface. They shall be provided with dust-proof covers and be drained indirectly into the sewer. The water in the vats shall be kept clean, sweet, and free from sediment and odor. The vats shall always be kept clean, free from dust, slime, sediment, or milk crusts. The temperature of the water shall not be above 50° F.

Refrigerator and ice boxes: The inner wall of the compartment of the refrigerator and ice boxes where the milk is kept shall be smooth and preferably metal or porcelain lined. The floor shall be drained indirectly into the sewer. The milk compartment shall be kept clean and free from any odor. Nothing but milk, cream, and butter shall be stored in the ice box.

Bottling machine: The bottling machine shall be so constructed that it can readily be taken apart and cleaned, especially the springs and plungers. It shall be cleaned thoroughly every day, and when not in use it shall be kept covered with a clean cloth.

Drying racks: Drying racks shall be provided on which bottles can be placed in an inverted position, for proper drainage and drying. In no instance shall bottles be inverted in bottle cases for the purpose of draining and drying.

Pasteurizers and separators: Pasteurizers and separators shall be so constructed that all parts, including pipes, can be readily cleaned and sterilized. These appliances must be kept scrupulously clean, inside and outside, at all times.

Rule 11. *Utensils*.—All shipping cans, bottles, dippers, skimmers, measures, strainers, stirrers, and other utensils must be so constructed that all parts are absolutely free from spaces where milk can accumulate or soak in so that it can not be removed by simple washing. The surface coming in contact with milk and cream must be smooth and free from excessive rust. All utensils must be kept scrupulously clean, inside and outside, at all times. Utensils must be kept in good repair and free from rough surfaces of any kind. When not in use they should be kept dry, inverted, and on specially provided racks or hooks, when possible. Bottle caps must be kept in clean, covered, dry, and dust-proof receptacles.

Rule 12. *Maintenance and care*.—The floor shall be kept clean and scrubbed. Dry sweeping and dusting is not to be permitted. The walls and ceiling, shelves, windows, and all other surfaces must be clean and kept free from dust by washing or wiping with a damp cloth. Unnecessary articles, such as boxes, old utensils, reserve stock, blankets, harnesses, lanterns, paint cans, oil cans, and other articles not required in the milk business shall not be kept in the milk depot. Dogs and cats should be kept out. Children should not be permitted to play or gather in the milk depot.

Rule 13. *Attendants*.—Every person in charge of such milk depot shall keep himself and his employees in a clean condition and cleanly clothed while engaged in the bottling, pouring, measuring, and skimming of milk. Smoking, snuffing, or chewing of tobacco is forbidden in a milk depot, and a plain notice shall be posted forbidding all persons from using tobacco or spitting on the floor.

Rule 14. *Communicable diseases*.—No person with consumption, venereal diseases, or communicable skin disease shall work in a milk depot or engage in the handling of milk. When typhoid, scarlet fever, diphtheria, smallpox, measles, or chicken pox occur in the house or families of anyone engaged in the handling of milk, it shall be the duty of the milk dealer to notify the division of food inspection at once of this fact, so that the necessary regulations can be enforced in cooperation with the bureau of contagious diseases to prevent the spread of disease. No one afflicted with or convalescent from typhoid, scarlet fever, diphtheria, smallpox, measles, chicken pox, or any other communicable disease shall engage in the handling of milk or cream, nor enter a milk depot. When typhoid fever, scarlet fever, diphtheria, or smallpox exists in the house or families of anyone engaged in the handling of milk, he shall at once discontinue his work in the milk depot and vehicles. The depot and wagon shall be declared infected, if anyone with or convalescent from typhoid, scarlet

fever, diphtheria, or smallpox, or residing in a house or apartment where these diseases exist, has worked therein, together with all milk and cream therein, except such cans as are still properly sealed and closed and have not been opened since they were closed and sealed in the country. No person convalescent from contagious disease or living in houses or premises in which contagious disease exists shall reengage in the handling of milk until the bureau of contagious diseases has enforced suitable quarantine regulations and the necessary disinfection has been done by the department. No individuals residing in a quarantined house or place shall be permitted to enter a milk depot.

Rule 15. *Operation.*—All milk shall be stored at a temperature not above 50° F. No can or bottle of milk shall be completely submerged in impure water or water from impure or insanitary ice. Impure ice, especially such ice sold for refrigerating purposes only, must not come in contact with milk and milk utensils or be used in water or milk vats. Sour milk must not be permitted to stand in the farmers' cans. Nothing except milk, cream, or butter shall be permitted in the milk vats, ice boxes, and coolers. Returned empty bottles and other utensils must be thoroughly cleaned and sterilized before being taken into the milk room.

#### CITY DAIRIES.

No cow or cows shall be kept in the city for the purpose of producing milk, except in conformity with the following rules:

Rule 36. *Permit to keep cows required.*—A permit to keep cows must be secured from the health department for each location, meaning thereby each barn or closely related system where such cows are to be kept. The application for this permit must show: (a) The number of cows; (b) the cubic feet of air space; (c) the facilities for disposing of manure; (d) the ventilation; (e) the distance from human habitation; (f) the facilities for excluding flies.

Rule 37. *Location.*—No cows shall be stabled within 30 feet of a residence, the distance being measured in a straight line from the nearest point of the stable to the nearest point occupied by a person.

Rule 38. *Construction.*—A permit shall not be issued unless the facilities are such that the stable shall have ample ventilation, to wit, 3,000 cubic feet of fresh air per cow or other animal per hour, or unless the stables are clean, well lighted, and capable of being so maintained. Manure and urine must be cared for so as not to become a nuisance. The barn must be so constructed that flies can not reach the animal or the manure.

Rule 39. *Revoking of permit.*—The permit shall be canceled if the premises are not kept clean, or the manure is allowed to accumulate, flies breed or congregate therein, or the place becomes or is allowed to become a nuisance.

Rule 40. *Cows must be free from tuberculosis.*—Cows kept for the purpose of producing milk shall be tested with tuberculin once each year. The results of such tests shall be open to the inspection of the health department at all times. No tubercular cow or markedly undernourished cow shall be allowed in any herd or stable, except a special permit be granted therefor. The milk from such cows shall be pasteurized at a temperature not less than 175° F. for more than 30 seconds in a stream not more than one-quarter of an inch thick before it shall be deemed fit for human food.

Rule 41. *Keeping and care of milk.*—Milk from cows held in the city shall not be kept in the same room with the cows nor any other animal, nor in any place ventilating into such room.

Rule 42. *Standards of purity for such milk.*—The milk in all particulars shall conform to the same rules and regulations as those pertaining to country-produced milk.

Rule 43. *Maintenance.*—The stables shall be cleaned every day. The manure shall be hauled away every day from May 1 to October 1 and once a week for the remainder of the year, provided the stable is within 200 feet of a house. If the distance to the nearest house is over 200 feet then it shall be hauled away not less often than once a week.

Rule 44. *Keeping of cows.*—No cows shall be confined in any yard or tethered on any street or common within 30 feet of any dwelling, church, school, store, or hall.

Where an owner tethers a cow on a street or common he shall maintain the tether zone free from anything which may make it a nuisance.

Rule 45. *Maintenance of nuisance prohibited.*—Nothing in these rules shall be construed as allowing the maintenance of a nuisance.

Rule 57. *Sanitary standard for milk.*—All milk sold, offered for sale, kept with the intention of selling, or sent to the city for the purpose of selling, must be free from dirt, foreign material, and sediment. Not more than a perceptible sediment shall be left on a piece of white linen cloth 4 inches square when a quart of well-mixed milk is strained through it. Milk on arrival in the city must not contain more than 1,000,000 bacteria per cubic centimeter from May 1 to September 30, and not over 500,000 bacteria per cubic centimeter between October 1 to April 30. Milk for delivery to the consumer shall not contain an excessive number of bacteria. The sale of milk containing over 3,000,000 bacteria per cubic centimeter is prohibited and the dealer selling or offering for sale such milk shall, after three examinations of his milk on successive days by the bacteriologist and showing bacterial counts above 3,000,000, is prohibited from selling milk until the method of production and handling of his milk supply has been properly regulated by the department. The sale of milk containing tubercle, typhoid, diphtheria, or other pathogenic bacteria is prohibited. The sale of milk containing excessive numbers of putrefying and gas-producing micro-organisms is prohibited.

#### MILK DELIVERY AND MILK VEHICLES.

Rule 23. *Transported in closed receptacles and in covered wagons.*—Milk shall not be transported in open or improperly closed cans and receptacles. It shall be properly protected from the dust and the sun's rays with adequate covering. This covering shall be clean, nonodorous, and free from dust. Wagons used for the delivery of milk to consumers shall be covered with material that will allow of washing and shall always be kept clean. The interior of the wagon shall be kept clean, free from milk crusts, and odor of any kind. Drivers' seats shall be divided off from the compartment or compartments where the milk and cream are kept. The compartments where milk and cream are kept shall be tight and opened only when necessary for the removal of their contents.

Rule 24. *Preparing and bottling of milk on street prohibited.*—Milk and cream shall not be prepared or bottled in the street or in a vehicle. The distribution of milk and cream into specially constructed pouring cans shall be done in the milk depot, and is prohibited upon the street. Milk for delivery in bulk shall be carried in covered pouring cans, provided with a spout or faucet. Milk shall not be dipped from farmers' or stock cans for delivery to the consumer.

Rule 25. *Temperature of milk.*—The milk for delivery to the consumer on the wagons shall not be above 70° F.

Rule 26. *Utensils.*—Here the same rules shall apply as for utensils used in the milk depot. (See Rule 10.)

Rule 27. *Attendants and communicable diseases.*—Same rule shall apply as for milk depots. (See Rules 13 and 14.)

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#### RULES REGULATING THE HANDLING AND SALE OF MILK FOR STORES.

[Approved by the city council Apr. 13, 1908.]

#### LICENSE.

Rule 1. *Application for license.*—Application for a milk license shall be made in writing to the commissioner of health. Such application shall set forth the name and residence of the applicant, if an individual, and the names and residences of the principal officers if the applicant is a corporation, together with the location of the place for which such license is desired. Such application shall also state whether the milk is to be sold in a store, depot, or also from a delivery wagon. It shall further state whether the milk and cream is to be sold in bottles exclusively or in bulk and bottles. It shall also state if cows are to be kept, and if so shall state the number.

Rule 2. *Inspection and investigation of previous record.*—No application for license shall be approved by the commissioner of health after May 1, 1908, if the records of the milk division show that the depot, store, or any part of the establishment in which the business is to be conducted is in an insanitary condition.

If the applicant's record is not on file in the office, or if he is newly engaging

in the milk business, an inspection of his place shall be made within five days after making the application, to determine the sanitary conditions. No application for license shall be approved if applicant has a bad record.

The applicant, if refused a license on account of bad sanitary conditions, or for repeated adulterations of milk and cream, may make application to the commissioner of health for a hearing. The commissioner of health may then recommend the applicant for a license if he is satisfied that the regulations of the department will be complied with in the future.

Rule 3. *Revoking of license.*—If at any time after the granting of such license the holder fails to comply with the sanitary regulations of the department, or repeatedly sells or offers for sale, or has in his possession for the purpose of selling, milk and cream below the grade prescribed by the ordinances or rules of the department of health, the chief food inspector shall recommend to the commissioner of health that his license be revoked with or without further notice. Said commissioner of health may grant the defendant a hearing, if he deems this necessary.

Rule 4. *Reissuing of revoked license.*—If all the regulations of the department have been complied with the commissioner of health may recommend that the license be reissued.

Rule 5. *License exhibited.*—Every milk dealer shall post his license in a conspicuous place on the premises for which it has been issued.

#### STORES.

Rule 28. *Definition.*—These shall include all places and rooms where milk is sold, together with other foodstuffs, such as groceries, meats, bakery goods, delicatessen articles, and confectionery.

Rule 29. *Location.*—Such stores must be separated by tight-fitting doors and a complete partition from living rooms, kitchen, laundries, sanitary closet, sleeping rooms, and from places where horses, cattle, fowl, and other animals are kept or slaughtered.

Rule 30. *Construction.*—Stores where milk is sold must be properly lighted and ventilated. Between May 1 and November 1 the windows must be fitted with fly screens and the doors with self-closing door screens.

Rule 31. *Appliances.*—Vats shall be the same as those required for milk depots. (See rule 10.) The cover of the vat shall be so constructed that the dust does not fall into the box when the lid is raised.

Ice boxes and refrigerators: The compartment where milk and cream is kept shall be separated by an impervious water and odor proof partition from all other compartments and by a nonleaking partition from the ice chamber. The inner surface of this compartment, where milk and cream is kept, shall be smooth and preferably metal or porcelain lined. The floor shall be similarly constructed. Free and adequate drainage shall be provided; the drain connecting indirectly with the sewer shall be trapped and ventilated. The ice box shall be kept scrupulously clean at all times and entirely free from any odor. Milk and cream shall not be kept in ice boxes with any other foodstuffs except butter. Milk shall not be kept in the ice box for the purpose of souring or making cheese. All milk and cream kept in such ice boxes shall be considered as milk and cream for sale, and hence must be up to the standard required by the city ordinance. Unclean utensils, cans, and bottles shall not be kept in the ice box. The doors and covers of such ice boxes shall be dust proof and so constructed that upon opening the dust on the outer surface does not fall into the milk compartment.

Rule 10. *Appliances.*—Vats shall be constructed preferably of impervious material and should have a smooth inner surface. They shall be provided with dust-proof covers and be drained indirectly into the sewer. The water in the vats shall be kept clean, sweet, and free from sediment and odor. The vats shall always be kept clean, free from dust, slime, sediment, or milk crusts. The temperature of the water shall not be above 50° F.

Rule 32. *Utensils.*—Utensils shall be kept in the manner as required for milk depots. (See rule 10.)

Rule 11. *Utensils.*—All shipping cans, bottles, dippers, skimmers, measures, strainers, stirrers, and other utensils must be so constructed that all parts are absolutely free from spaces where milk can accumulate or soak in, so that it can not be removed by simple washing. The surface coming in contact with milk and cream must be smooth and free from excessive rust. All utensils must be kept scrupulously clean, inside and outside, at all times. Utensils must be kept

in good repair and free from rough surfaces of any kind. When not in use they should be kept dry, inverted, and on specially provided racks or hooks, when possible. Bottle caps must be kept in clean, covered, dry, and dust-proof receptacles.

Rule 33. *Maintenance and care.*—The entire place shall be kept in a good sanitary condition and free from unnecessary articles, garbage, and rubbish. The air shall be kept pure and free from deleterious odor. In the immediate vicinity of the vat and ice box, to a distance of at least 5 feet, no fermenting or putrefying substances or things with deleterious odors shall be kept, such as cheese, pickles, sauerkraut, fresh, salted, and smoked fish, soap, aromatic oils. Kerosene and kerosene cans shall be kept 15 feet distant from the milk boxes.

Rule 34. *Communicable diseases.*—Same rules as for milk depots. (See rule 14.)

Rule 14. *Communicable diseases.*—No person with consumption, venereal diseases, or communicable skin disease shall work in a milk depot or engage in the handling of milk. When typhoid, scarlet fever, diphtheria, smallpox, measles, or chicken pox occur in the house or families of anyone engaged in the handling of milk, it shall be the duty of the milk dealer to notify the division of food inspection at once of this fact, so that the necessary regulations can be enforced in cooperation with the bureau of contagious diseases to prevent the spread of disease. No one afflicted with or convalescent from typhoid, scarlet fever, diphtheria, smallpox, measles, chicken pox, or any other communicable disease shall engage in the handling of milk or cream, nor enter a milk depot. When typhoid fever, scarlet fever, diphtheria, or smallpox exists in the house or families of anyone engaged in the handling of milk, he shall at once discontinue his work in the milk depot and vehicles. The depot and wagon shall be declared infected if anyone with or convalescent from typhoid, scarlet fever, diphtheria, or smallpox, or residing in a house or apartment where these diseases exist, has worked therein, together with all milk and cream therein, except such cans as are still properly sealed and closed and have not been opened since they were closed and sealed in the country. No person convalescent from contagious disease or living in houses or premises in which contagious disease exists shall reengage in the handling of milk until the bureau of contagious diseases has enforced suitable quarantine regulations and the necessary disinfection has been done by the department. No individuals residing in a quarantined house or place shall be permitted to enter a milk depot.

Rule 35. *Operation.*—All milk shall be stored at a temperature not above 50° F. No can or bottle of milk shall be completely submerged in impure water or water from impure or insanitary ice. Sour milk must not be permitted to stand in the farmers' cans. Empty cans and bottles must be cleaned and washed with hot water before returning to the wholesale dealer or farmer. In selling bulk milk stir up the contents of the can thoroughly and thus prevent unintentional skimming.

Rule 57. *Sanitary standard for milk.*—All milk sold, offered for sale, kept with the intention of selling, or sent to the city for the purpose of selling, must be free from dirt, foreign material, and sediment. Not more than a perceptible sediment shall be left on a piece of white linen cloth 4 inches square when a quart of well-mixed milk is strained through it. Milk on arrival in the city must not contain more than 1,000,000 bacteria per cubic centimeter from May 1 to September 30 and not over 500,000 bacteria per cubic centimeter between October 1 to April 30. Milk for delivery to the consumer shall not contain an excessive number of bacteria. The sale of milk containing over 3,000,000 bacteria per cubic centimeter is prohibited, and the dealer selling or offering for sale such milk shall, after three examinations of his milk on successive days by the bacteriologist and showing bacterial counts above 3,000,000, be prohibited from selling milk until the method of production and handling of his milk supply has been properly regulated by the department. The sale of milk containing tubercle, typhoid, diphtheria, or other pathogenic bacteria is prohibited. The sale of milk containing excessive numbers of putrefying and gas-producing microorganisms is prohibited.

#### AN ORDINANCE PROHIBITING THE SALE OF BULK MILK IN STORES.

[Passed by the city council June 22, 1908.]

SECTION 1. No person, firm, or corporation shall sell, offer for sale, expose for sale, or keep with the intention of selling, any milk or cream in stores or in other places where other merchandise than milk or cream is sold, unless the milk or

cream is kept, offered for sale, exposed for sale, or sold in tightly closed and capped bottles or receptacles of a similar character, such as shall be approved by the commissioner of health of the city of Chicago.

Sec. 2. Any person, firm, or corporation who shall violate any of the provisions of section 1 shall be fined not less than \$5 nor more than \$100 for each offense.

Sec. 3. This ordinance shall be in full force and effect from and after its passage and due publication.

#### RULES REGULATING THE HANDLING AND SALE OF MILK FOR STORES IN BOTTLES ONLY.

[Approved by the city council June 22, 1908.]

Section 1. No person, firm, or corporation shall sell, offer for sale, expose for sale, or keep with the intention of selling any milk or cream in stores or in other places where other merchandise than milk or cream is sold unless the milk or cream is kept, offered for sale, exposed for sale, or sold in tightly closed and capped bottles or receptacles of a similar character, such as shall be approved by the commissioner of health of the city of Chicago.

Sec. 2. Any person, firm, or corporation who shall violate any of the provisions of section 1 shall be fined not less than \$5 nor more than \$100 for each offense.

Sec. 3. This ordinance shall be in full force and effect from and after its passage and due publication.

#### RULES REGULATING THE PASTEURIZING OF MILK AND MILK PRODUCTS.

The following rules shall regulate the pasteurizing of milk and milk products offered for sale, exposed for sale, or kept with the intention of selling within the city of Chicago after January 1, A. D. 1909:

Rule 1. *Milk and skimmed milk.*—Milk and skimmed milk shall not contain more than 100,000 bacteria per cubic centimeter from May 1 to September 30 and not over 50,000 bacteria per cubic centimeter between October 1 and April 30.

Rule 2. *Cream and ice cream.*—Cream and ice cream shall not contain more than 200,000 bacteria per cubic centimeter from May 1 to September 30 and not over 100,000 bacteria per cubic centimeter between October 1 and April 30.

Rule 3. *Milk, skimmed milk, butter milk, cream, and ice cream.*—An original package of pasteurized milk, skimmed milk, butter milk, cream, or ice cream exposed to the temperature of the room for 48 hours and stoppered with a sterile cotton plug shall not show evidences of putrefaction after being so exposed.

Rule 4. *Skimmed milk and ice cream.*—Skimmed milk and ice cream shall give a negative test when treated in the following manner:

To 5 cubic centimeters of the pasteurized product add 2 drops of a 2 per cent solution of paraphenylenediamin and 1 drop of a 2 per cent solution of hydrogen peroxide and agitate.

Not more than a tinge of blue shall be obtained by this test within 30 seconds after mixing.

Rule 5. *Butter.*—Butter shall respond to the following test:

Twenty-five grams of pasteurized butter placed in a small beaker and heated by being placed in water at 60° C., the clear butter fat then poured off, and the remaining liquid then diluted with an equal volume of water. The mixture thus obtained is now treated with 2 drops of a 2 per cent solution of paraphenylenediamin and 1 drop of a solution of 2 per cent hydrogen peroxide.

When thus treated not more than a perceptible blue color shall be obtained within 30 second after mixing.

Rule 6. *Pasteurizing temperatures.*—All pasteurized milk, cream, skimmed milk, milk products, and milk and cream used in the production of milk products shall be pasteurized in accordance with the following regulations:

(A) Continuous pasteurization. In all continuous pasteurization the milk and cream shall be heated to a temperature which shall be determined and fixed by the department of health for each machine at a point corresponding to the temperature required to kill 99 per cent of the bacteria and all pathogenic bacteria contained in the raw product. For this determination ordinary raw milk

containing in the neighborhood of 3,000,000 bacteria shall be used, and the pasteurized product shall be collected as it flows from the cooling apparatus.

All continuous pasteurizers shall be equipped with a feeding pipe which is so constructed that the pasteurizer can not be fed in excess of its normal working capacity; that is, in excess of the working capacity of the machine at which 99 per cent of the bacteria are killed when the required amount of heat is applied.

All continuous pasteurizers operated outside of the city limits for the production of pasteurized milk and milk products to be sold in the city of Chicago shall be equipped with an apparatus regulating automatically the supply of steam and heat, so as to correspond with and produce the required temperature of the outflow of the pasteurized product. These automatic thermo regulators shall be accurate and must be approved by the commissioner of health before being installed.

A recording apparatus shall be installed upon all continuous pasteurizers operated within the city limits so as to record during operation the temperature of the pasteurized product as it flows from the heater. The thermometer of this recording apparatus must be accurate and kept immersed in the milk in such a way that it is not exposed to escaping steam or other heat except the heated milk.

The records made by this recording thermometer must be accurate and made in a chamber which is kept under lock and key in the control of the department of health.

The automatic thermo regulating and recording apparatus may be combined into one instrument, and it is recommended that all pasteurizers be equipped with both appliances or combination apparatus.

(B) Held pasteurization. Whenever milk is held during pasteurization in such a manner that the process of pasteurizing is not a continuous one, namely, a continuous flow of milk through the heating or heat-retaining chamber, the process shall be designated as "held pasteurization." Such methods of pasteurization and pasteurization appliances or systems installed and used shall be examined and approved by the commissioner of health, or his duly appointed representatives, when all of the following requirements are fulfilled:

1. When the pasteurized product shows that over 99 per cent of the bacteria and all pathogenic bacteria contained in the raw product have been destroyed.

2. When the mechanism of the pasteurizer or pasteurizing system is such that the three important elements, namely, the temperature, time of exposure, and the quantity of milk exposed at one time, can be readily kept under control and observation by the department of health.

3. When the following conditions are complied with:

A uniform heating of 140° F. maintained for 20 minutes, 150° F. maintained for 15 minutes, 155° F. maintained for 5 minutes, 160° F. maintained for 1½ minutes, and 165° F. maintained for 1 minute.

The time shall be calculated from the period that the entire quantity reaches the required temperature.

Rule 7. *Cooling temperatures.*—The pasteurized product shall be cooled at once to a temperature of 45° F. or less. This cooling shall be so conducted that the pasteurized product is not exposed to the air or other contamination. This cooling apparatus shall be so constructed that it can be readily cleansed and sterilized.

#### ORDINANCES REQUIRING TUBERCULIN TEST OF ALL COWS SUPPLYING MILK AND MILK PRODUCTS.

[Passed by the city council, July 13, 1908.]

##### MILK.

*Be it ordained by the city council of the city of Chicago:*

Section 1. No milk, cream, buttermilk, or ice cream shall be sold, offered for sale, exposed for sale, or kept with the intention of selling within the city of Chicago after January 1, A. D. 1909, unless such milk or cream or the milk or cream contained in buttermilk and ice cream, be obtained from cows that have given a satisfactory negative tuberculin test within one year; the cows having been satisfactorily tested shall be marked "tuberculin tested" and shall be numbered and a certificate shall be filed with the division of milk inspection of

the department of health of the city of Chicago upon forms furnished by the commissioner of health, giving the number, a brief description of the animal, the date of the taking of said test and the name of the owner. Said certificate shall be signed by the person making such test: *Provided, however*, That from January 1, 1909, for a period of five years, to wit, until January 1, 1914, milk or cream or buttermilk and ice cream made from milk or cream, obtained from cows not tuberculin tested or not free from tuberculosis, may be sold within the city of Chicago if the milk or cream from said cows is pasteurized according to the rules and regulations of the department of health of the city of Chicago.

Sec. 2. Any milk, cream, buttermilk, or ice cream offered for sale, exposed for sale, or kept with the intention of selling within the city of Chicago which shall be found within the city in violation of section 1, shall be forthwith seized, condemned, and destroyed by the milk and food inspectors or other duly authorized agents or employees of the department of health of the city of Chicago.

Sec. 3. This ordinance shall be in full force and effect from and after January 1, 1909.

#### BUTTER.

*Be it ordained by the city council of the city of Chicago:*

Section 1. No butter shall be sold or offered for sale or kept with the intention of selling in the city of Chicago after January 1, 1909, unless such butter be made from milk or cream obtained from cows that have given a satisfactory negative tuberculin test within one year: *Provided, however*, That from January 1, 1909, for a period of five years, to wit, until January 1, 1914, butter made of milk obtained from cows not tuberculin tested or not free from tuberculosis may be sold in the city of Chicago if the milk or cream from which such butter was made was pasteurized according to the rules and regulations of the department of health of the city of Chicago.

Sec. 2. It shall be unlawful to sell any butter in the city of Chicago, unless there be stamped on the package in plainly legible letters of not less than one-eighth inch type: "Made of milk (or cream) from cows free from tuberculosis, as shown by tuberculin test," or, "Made from milk (or cream) pasteurized according to the rules and regulations of the department of health of the city of Chicago."

Sec. 3. Any butter offered for sale, exposed for sale, or kept with the intention of selling in the city of Chicago, which shall be found within the city in violation of this ordinance, shall be forthwith seized, condemned, and destroyed by the milk and food inspectors or other duly authorized agents or employees of the department of health of the city of Chicago.

Sec. 4. This ordinance shall be in full force and effect from and after January 1, 1909.

#### CHEESE.

*Be it ordained by the city council of the city of Chicago:*

Section 1. No domestic cheese shall be sold or offered for sale or kept with the intention of selling in the city of Chicago after January 1, 1909, unless such cheese be made from milk or cream obtained from cows that have given a satisfactory negative tuberculin test within one year: *Provided, however*, That from January 1, 1909, for a period of five years, to wit, until January 1, 1914, domestic cheese made of milk obtained from cows not tuberculin tested or not free from tuberculosis, may be sold in the city of Chicago if the milk or cream from which such cheese was made was pasteurized according to the rules and regulations of the department of health of the city of Chicago.

Sec. 2. It shall be unlawful to sell any such cheese in the city of Chicago unless there be stamped on the package in plainly legible letters of not less than one-eighth inch type: "Made of milk (or cream) from cows free from tuberculosis, as shown by tuberculin test," or "Made from milk (or cream) pasteurized according to the rules and regulations of the department of health of the city of Chicago."

Sec. 3. Any cheese offered for sale, exposed for sale, or kept with the intention of selling in the city of Chicago, which shall be found within the city in violation of this ordinance, shall be forthwith seized, condemned, and destroyed by the milk and food inspectors or other duly authorized agents or employees of the department of health of the city of Chicago.

Sec. 4. This ordinance shall be in full force and effect from and after January 1, 1909.

## RULES REGULATING THE TUBERCULIN TESTING OF COWS.

Rule 1. *Who may make the test.*—Tuberculin tests made on animals supplying the city of Chicago with milk or milk products may be made by licensed graduate veterinarians, Federal or State veterinarians, Federal, State, or city dairy and milk inspectors, and by persons regularly employed by the Chicago department of health for that purpose.

Rule 2. *The test to be employed.*—The regular injection method of tuberculin testing shall be employed. The temperature shall be taken at least four times on the day preceding the inoculation and at least six times on the day following the inoculation, at not less than two-hour intervals. A rise of 2° over the average temperature on the day preceding the inoculation shall be considered a positive test. If a rise of from 1½ to 2° is obtained, the results shall be considered doubtful and the animal subjected to a later retest. Animals that have been added to the herds within the last six weeks shall be tested by the ordinary injection test supplemented by Calmette's ophthalmic test, and a positive result with either one or the other shall condemn the animal. The department of health shall have the power to require the retesting of all animals submitted for milk supply by the Calmette ophthalmic method or any other method to be decided on in the future.

Rule 3. *The numbering and tagging of animals.*—All tested animals shall bear an indestructible tag indicating the series, and also the number assigned to the animal. Tags placed by Federal, State, and municipal inspectors will designate by abbreviations or otherwise the series represented. Veterinarians supplying the numbered tags must have their initials or some other distinctive mark appear on the tag with the number to indicate the series.

Rule 4. *Statement to be submitted.*—A statement must be filed with the division of milk inspection for every tuberculin-tested animal supplying the city of Chicago with milk or milk products. This statement must indicate the number and series given to the animal, which number and series must correspond with the tag or mark worn by the animal. This statement must also state the age and color of the animal and any other distinctive marks shown by the animal. In addition the statement must show the temperature record of the animal on the days preceding and following the test, the date and the exact time of taking these temperatures, and the date and time of making the injection and amount and kind of tuberculin used; the name of the owner and the signature of the person making the test, together with the official capacity of said person or persons making the test and their address. The statement submitted shall also indicate the date of the last tuberculin test made upon the animal and the method of making this test, and the length of time that the animal has been in the herd.

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 CLEVELAND, OHIO.

## REGULATIONS BOARD OF HEALTH, 1908—MILK.

## PART TWO.

*Title V—Dairy inspectors.*

Section 1. Dairy inspectors shall under the direction of the chief veterinarian inspect dairies, milk houses, and other places and conditions relative to the production, transportation, and sale of milk, and shall perform all duties and carry out all orders and regulations as hereinafter set forth, or as otherwise directed by the board of health or the superintendent of sanitation.

Sec. 2. The chief veterinarian upon receiving notification from the health office of any dairyman, milk dealer, or other person who has made application for a permit for the sale of milk, shall have the premises and place of business of said dairyman, milk dealer, or other person inspected and shall report to the health office the extent to which the provisions of Part Five, Title III and Title IV of this code are complied with.

Sec. 3. The chief veterinarian upon receiving notification from the health office of any person supplying milk which is brought into the city for sale, shall have the premises of such person inspected according to the provisions of Part Five, Title IV of this code, and shall report to the health officer his findings with regard to same.

Sec. 4. On and after the — day of —, 1906, no milk will be allowed to be sold or offered for sale or brought into the city from any cow or cows unless the owner of said cow or cows holds a certificate of the chief veterinarian or other veterinarian acceptable to the board of health that said cow or cows are free from tuberculosis, as shown by the tuberculin test.

Sec. 5. Any person selling or offering for sale any milk from uninspected cows shall have his license revoked upon the recommendation of the chief veterinarian.

## PART FIVE.

*Title III—Milk.*

Section 1. No person shall bring into the city for sale, or shall sell or offer for sale, any milk, without a permit from the superintendent of sanitation.

Sec. 2. No person shall bring into the city for sale, or shall sell or offer for sale, any milk which has been obtained from any milk dealer, dairyman, or other person not having a permit or the official license based on the approval of the chief veterinarian.

Sec. 3. Any dairyman, milk dealer, or other person, upon application to the health office for a permit to sell or deliver milk, shall file a sworn statement giving his name and address, the number of cows he owns or has charge of, the average amount of milk (estimated) which he sells each day, the names, addresses, and license numbers of all persons from whom he buys milk, the average amount of milk (estimated) which he buys from them each day, the average amount of milk (estimated) sold by each of them each day, and the number of cows owned by or in charge of each.

Sec. 4. No person shall bring into the city for sale, or shall sell or offer for sale, any milk—

- (a) Containing more than 88 per cent of water or fluids.
- (b) Containing less than 12 per cent of milk solids.
- (c) Containing less than 3 per cent of fats.
- (d) From which any part of the cream has been removed.
- (e) Having a specific gravity of less than 10.29.
- (f) Containing any boracic or salicylic acid, formaldehyde, or other foreign chemical.
- (g) Containing any pathogenic bacteria.
- (h) Containing bacteria of any kind, more than 500,000 per cubic centimeter.
- (i) Drawn from any cow having a communicable disease, or from a herd which contains any diseased cattle, or from a herd the attendants of which are afflicted with or have been exposed to any communicable disease.
- (j) Drawn from any cow within 15 days before or after parturition.
- (k) Drawn from any cow which has been fed on garbage, refuse, swill, moist distillery waste, or other improper food.
- (l) Having a temperature or which has been kept at a temperature higher than 55° F.
- (m) Which has existed or has been kept under conditions contrary to the provisions of this code.

*Provided*, That the first five subdivisions of this section shall not apply to milk sold under the name of "skimmed milk," as provided in section 5 of this title.

SEC. 5. No person shall bring into the city for sale, or sell or offer for sale, milk from which the cream has been removed, either in part or in whole, unless sold as skimmed milk, and unless on both sides of the vehicle from which such milk is sold, in letters not less than 1 inch in height, the words "skimmed milk," or if not sold from a vehicle, upon each and every vessel from which such milk is sold, there be painted a bright red band in width at least one-tenth the height of said vessel, or displayed in plain and legible manner, the words "skimmed milk."

SEC. 6. No person shall bring into the city for sale, or sell or offer for sale, any so-called skimmed milk containing less than 9% per cent of milk solids.

SEC. 7. No person shall ship or store any milk in any basement, cellar, refrigerator, milk house, dairy, or other place unless such place have 1 square foot of window space to each 4 square feet of floor space. Such place shall be provided with a cement floor, properly drained, and shall contain a vat made of nonabsorbent material large enough to store all milk. Windows and doors shall be provided, from May 1 to September 30, inclusive, with sound screens of mesh sufficiently fine to keep out flies and other insects.

SEC. 8. No person shall store any milk in any basement, cellar, refrigerator, milk house, dairy, or other place which is within 15 feet of any closet or privy vault or cesspool, or any horse or cow stable, or any chicken or poultry yard or coop.

SEC. 9. Every person using in the sale or distribution of milk a delivery wagon or other vehicle shall keep the same at all times in a cleanly condition and free from any substance liable to contaminate or injure the purity of the milk.

SEC. 10. Every person using in the sale or distribution of milk a delivery wagon or other vehicle shall keep the name of the owner thereof and the number of the wagon license, in letters not less than 2 inches in height, upon the side of said delivery wagon or other vehicle.

SEC. 11. Every person using in the sale or distribution of milk a delivery wagon or other vehicle shall, from May 1 to September 30, inclusive, have and keep over said delivery wagon or other vehicle a covering of canvas or other material, so arranged as adequately to protect the contents thereof from the rays and the heat of the sun.

SEC. 12. No person shall bottle any milk upon any delivery wagon or vehicle, or in any other place than a milk house, dairy, or other building where milk is regularly stored and sold.

SEC. 13. No person or dealer shall give, furnish, sell, or offer for sale, or deliver any milk, buttermilk, whey, sour milk, skimmed milk, or cream in quantities less than 1 gallon, except in sanitary bottles, sealed with a suitable cap or stopper, and except where the milk is sold at the milk house or dairy, when the same may be dipped (and the dipped milk shall not be carried on the street in any other than a covered vessel), but the milk house, dairy, or other place in which milk is handled or stored shall be located no less than 15 feet from any water-closet or privy vault or cesspool, or any horse or cow stable, or any chicken or poultry yard or coop, and the milk house, dairy, or other place shall be a room which is not used for any other purpose than the handling and storing of milk.

SEC. 14. No person shall transfer any milk intended for sale from one can, bottle, or receptacle into another can, bottle, or receptacle on any street, alley, or thoroughfare, or upon a delivery wagon or other vehicle, or in any exposed place in the city of Cleveland, except in a creamery, milk depot, or in the inclosed premises of the customer of the dealer in milk.

SEC. 15. No person shall remove from any dwelling in which exists any case of communicable disease any bottles or other receptacles which have been or which are to be used for containing or storing milk except with permission of the health officer.

SEC. 16. No person shall use any milk ticket more than once.

SEC. 17. No person shall keep any cow without a permit from the health office.

SEC. 18. No person or dealer shall sell, offer for sale, or deliver any milk, buttermilk, whey, sour milk, skimmed milk, cream, Dutch cheese, or other milk product in quantities exceeding 1 gallon unless the can or receptacle containing the same is securely sealed by lock and chain, wire, or other contrivance equally efficient: *Provided, however*, That the persons or dealers engaged exclusively in the wholesale delivery or sale of milk, buttermilk, whey, sour milk, cream, skimmed milk, Dutch cheese, or other milk product from wagons not carrying milk in bottles may deliver the same from unsealed cans or receptacles: *And provided further*, That said wagon or wagons shall have inscribed conspicuously thereon in plain letters, not less than 3 inches in height, the words "Wholesale delivery."

#### *Title IV.—Rules governing the inspection of milk by the dairy inspectors.*

SECTION 1. The dairies of all persons shipping milk for sale in Cleveland will be inspected and rated according to the following provisions:

(a) *Cows*.—Condition and healthfulness—Perfect score 10.

(Two points will be deducted if cows are in poor flesh and 8 points if not tuberculin tested.)

Cleanliness—Perfect score 5.

(All cows clean, 5; good, 4; fair, 3; medium, 2; poor, 1; bad, 0.)

(b) *Stables*.—Construction of floors—Perfect score 5.

(If the floor is of cement or stone flag in good repair, 5; brick or matched board in good repair, 4; ordinary wooden floor in good repair, 3; one-half wood and one-half cement, 3; half wood, cement, or other material and half dirt, 2; any material in poor repair, 1; if no floor, allow 0.)

**Cleanliness—Perfect score 5.**

(If stables are thoroughly clean, including windows, walls, and ceiling, 5; deduction will be in proportion to dirt, cobwebs, etc.)

**Light—Perfect score 5.**

(For 4 square feet per cow, 5 points will be given; 3 square feet per cow, 4; 2 square feet per cow, 3; 1 square foot per cow, 2; 6 square inches per cow, 1; less than 6 square inches per cow, 0.)

**Ventilation—Perfect score 4.**

(If ventilation is good, 4 points will be given; deductions will be made in proportion for lack of ventilation; if all windows are closed and no attempt at ventilation is made, 0 will be allowed.)

**Cubic space per cow—Perfect score 3.**

(If 500 cubic feet per cow, 3 points will be allowed; less than 500 and over 400 cubic feet per cow, 2; less than 400 and over 300 cubic feet per cow, 1; less than 300 cubic feet per cow, 0 will be allowed.)

**Removal of manure—Perfect score 2.**

(If manure is hauled to the fields daily, 2 points will be allowed; removed 30 feet from stable, 1; otherwise, 0.)

**Stable yard—Perfect score 1.**

(If stable yard is in good condition and well drained, 1 point will be allowed; otherwise, 0.)

**(c) Water supply.—For cows—Perfect score 5.**

(If cows are supplied with pure running water, 5 points will be allowed; running well water from windmill or otherwise, 4; ordinary well water, 3; pond or other muddy water, 0.)

**For milk house—Perfect score 5.**

(If milk house is supplied with pure, clean running water, 5 points will be allowed; pure well water, 3; otherwise, 0.)

**(d) Milk house.—Construction—Perfect score 5.**

(If the floor is of cement or tight boards well drained, if the walls and ceiling are sound, and the milk house is well lighted and ventilated and not attached by doorway to any other building, 5 points will be given; if the milk house is in a barn or house, 2 points will be deducted, and deductions will be made in proportion to deficiency in construction, light, and repair. If there is no milk house, 0 will be allowed.)

**Equipment—Perfect score 5.**

(If hot water is installed for cleaning utensils, 1 point will be given; proper pails used for no other purpose, 1; proper strainers, 1; aerator, 1; soda or washing powder for utensils, 1; 1 point will be deducted for absence of any.)

**Cleanliness of interior—Perfect score 5.**

(If the interior is absolutely clean, including windows, 5 points will be allowed; good condition, 4; medium, 3; fair, 2; poor, 1; bad, 0.)

**Care and cleanliness of utensils—Perfect score 5.**

(If all utensils are thoroughly clean and kept on suitable racks, 5 points will be allowed; 2 points will be deducted for absence of rack; deductions will be made for rusty utensils or careless washing. The lighting and ventilation of the milk house, together with its location in regard to other buildings, will be taken into consideration.)

**(e) Milkers and milking.—Health of attendants—Perfect score 5.**

(If the attendants are all in a healthy condition, 5 points will be allowed; if any of the attendants are sick or a contagious disease exists in the family, 0 will be allowed.)

**Cleanliness of milking—Perfect score 10.**

(If milking is done in special suits for milking, with clean, dry hands and with attention to cleanliness of udders and teats before milking, 10 points will be given; all of the above except special suits, 7; in addition 4 points will be deducted for unclean teats or udder and 3 points for dirty hands; if wet milking is done, 0 will be allowed.)

**(f) Handling the milk.—Prompt cooling—Perfect score 5.**

(If milk is poured from pail into cool receptacle as soon as milked, 5 points will be given; if poured into can and can is put into cold water as soon as filled, 2; otherwise, 0.)

**Efficient cooling—Perfect score 5.**

(If the milk reaches a temperature of 60° before being shipped, 5 points will be given; a temperature of 65°, 3; a temperature of 70°, 1; above 70°, 0 will be allowed.)

Storing at low temperature—Perfect score 5.

(If milk is stored at a temperature of 60°, 5 points will be given; a temperature of 65°, 3; a temperature of 70°, 1; above 70°, 0 will be allowed.)

SEC. 2. All dairies will be scored by the inspector upon a card in the following form:

Owner or lessee of farm _____.	Town, _____, State _____.	
Number of cows, _____.	Quarts of milk produced daily, _____.	
Is product sold at wholesale or retail? _____.		
If shipped to dealer, give name and address: _____.		
Permit No. _____.	Date of inspection, _____, 190—.	
		Perfect score.
<b>Cows:</b>		
Condition (2), health (8)_____		10
Cleanliness _____		5
<b>Stables:</b>		
Construction of floors_____		5
Cleanliness _____		5
Light _____		5
Ventilation _____		4
Cubic space per cow_____		3
Removal of manure (2), cleanliness and drainage, stable yard (1)_____		3
<b>Water supply:</b>		
For cows_____		5
For milk house_____		5
<b>Milk house:</b>		
Construction_____		5
Equipment_____		5
Cleanliness _____		5
Care and cleanliness of utensils_____		5
Is house detached? _____, lighted? _____, ventilated?_____.		
<b>Milkers and milking:</b>		
Health of attendants_____		5
Cleanliness of milking_____		10
<b>Handling the milk:</b>		
Prompt cooling _____		5
Efficient cooling _____		5
Storing at low temperature_____		5
<b>Total score_____</b>		<b>100</b>

Sanitary conditions are—Excellent \_\_\_\_\_; good \_\_\_\_\_; medium \_\_\_\_\_; poor \_\_\_\_\_.

Suggestions by inspector \_\_\_\_\_.

Milk or cream from dairies falling below 45 in the rating as indicated above will be excluded from sale in Cleveland during 1908; milk or cream from dairies falling below 50 will be excluded from sale in Cleveland during 1909.

### COLUMBUS, OHIO.

[Board of Health.]

#### SANITARY CODE OF THE CITY OF COLUMBUS, OHIO.

##### PART II.—ADMINISTRATIVE.

##### *Title IX.—Milk inspectors.*

Section 1. The milk inspectors shall enforce all rules and orders of the board as relate to dairies and dairy supplies. They shall visit dairies supplying milk to the city and milk venders within the city and make careful inspections of dairy herds, stables, milk houses, receptacles, containers, methods of milking and of handling milk, and all matters pertaining to the sanitary condition of all dairy products at all times, as provided in this code.

Sec. 2. Their time shall be fully devoted to the inspection of dairies and dairy products in stores and markets. They shall gather samples from distributors of milk for laboratory examinations. They shall report daily to the health

office a detailed account of their inspections. They shall report to the health officer any evidence of violations of law, order, or rule. They shall work independently of each other and under the general supervision of the health officer.

\* \* \* \* \*

PART III.—FOOD.

*Title I.—Milk.*

*Resolved by the board of health*, That the first three paragraphs of the rules governing milk, adopted by the board July 29, 1903, be amended so as to read as follows:

Section 1. *Permits.*—No one shall engage in the sale of milk or cream in the city of Columbus, Ohio, ship same into the city for sale, or supply to others for use in the city unless he shall first obtain a permit from the board of health so to do.

A fee of \$1 will be charged for each permit, and the same shall be credited to the sanitary fund. Permits shall be renewed annually in January. Permits issued after July 1 shall be charged at the rate of 50 cents for each permit for use only during the second half of the year. On or before the 1st day of January permits will be issued by the board of health for the ensuing year to all applicants who comply with the provisions of these rules and regulations regulating the sale of milk or cream in the city of Columbus, but before the issuance of any permit every vender or shipper of milk or cream shall make application therefor upon a printed form, provided by the board for that purpose, on which shall be stated:

1. The name, residence, post-office address, and location of the business place or places of the applicant.

2. The number of cows from which milk is obtained for sale and the kind of food which the cows are given.

3. If the applicant buys part or all his milk supply, the names and addresses of all persons from whom he obtains milk or cream.

4. If the applicant be a shipper of milk or cream into the city, he shall, in addition to the above, state the route of his shipments.

Sec. 2. *Inspections for permits.*—The board will not issue any permit unless it is satisfied, after inspection, with the cleanly and sanitary condition of the stables, cows, wagons, store, or place of business of the applicant therefor and with all the utensils used by him from which his milk or cream is obtained; and that the food given the cows is pure and wholesome; and that all persons engaged in the care and handling of the milk are free from any contagious diseases and that said persons use due cleanliness in their work.

Sec. 3. *Applications for permits.*—All applications for permits shall be signed by the applicant, and when received by the milk and dairy inspector shall be placed on file, and the name of such applicant shall be entered in a book of registration kept for such purpose. As soon as possible after an application is received at the health office for a permit to sell milk, the milk and dairy inspector shall visit the dairy or place of business of such applicant and make such observation and gather such information as will enable the board to properly consider such application. Should the applicant live at such distance from the city of Columbus as to make it impracticable for the milk and dairy inspector to visit such dairy premises, such applicant shall furnish evidence, satisfactory to the board, of the sanitary condition of his dairy before he will be given a permit to ship milk or cream to the city.

Sec. 4. *Revoking permits.*—(a) If, after issuing a permit to sell milk or cream, the board of health shall become satisfied that the provisions of this subdivision of the sanitary code are being violated, it will at once revoke the permit issued to such person or persons, and no new permit will be issued until all insanitary conditions have been rectified and all other provisions of this subdivision of the sanitary code are complied with.

(b) Anyone doing business under a permit from the board of health who shall change the location of such business without notifying the health office of such change shall have such permit revoked without further notice.

Sec. 5. *Milk tickets.*—If dairymen or other persons offering milk for sale use tickets as representatives of value, these tickets must be in coupon form and must be destroyed after once using.

Sec. 6. *The stable and surroundings.*—The surroundings to the stable must be kept in a sanitary condition. Cows must not be allowed to stand in manure and filth.

Sec. 6a. All parts of stable except floors and windows must be painted in some light color, or whitewashed at least twice a year. Stables must be kept free from dirt, dust, cobwebs, and odor. Manure and urine must be removed from stable at least twice daily, and if not taken to field daily, must be moved at least 30 feet from stable and placed where cows can not get into it. Manure must not be thrown out through stable windows. If horses are kept in same stable, a tight partition should separate them from cattle. No other animals or fowls will be allowed in cow stable. Floors must not be laid less than 1 foot higher than outside surface level, so that good drainage can be procured; floors must be constructed of asphalt, concrete brick with surface flushed with cement, or of wood, water-tight. They must be kept in good repair at all times, and also constructed with a gutter not less than 12 inches wide and 6 inches deep; a 4-foot walk back of cows and not less than a 20-inch manger in front. (Front half of cow stall may be made of clay.)

Ceiling must be dust tight and kept free from cobwebs.

Light. At least 3 square feet of unobstructed window glass must be provided per cow and equally distributed; at least 500 cubic feet of space must be provided for per cow; windows must be left partially open, if no other method of ventilation is provided for. Stable yard must be well drained and kept clean.

Sec. 7. *Cows* must be kept clean; manure litter, etc., must not be allowed to become caked and dried on them. They must not be allowed to stand in nor wade through filth and manure. The bedding must be kept sweet and clean at all times and of sufficient quantity to protect the animals from lying in filth.

Sec. 8. *Feed and water*.—Cows must be fed on clean, dry feed, neither decayed, moldy, dusty, distillery waste, nor starch waste. If malt is fed it must not be fed when sour.

Pure running spring water or ordinary well water, free from contamination, pumped in clean tanks, must be provided.

Sec. 9. *Milkers*.—The milkers must thoroughly wash and wipe their hands and the cows' udders before they begin milking. They must not use pails, cans, strainers, etc., unless they have been thoroughly washed in hot water and soap, or hot water and soda, and afterwards sterilized with boiling water or steam. Care must be taken that the seams of the vessels are thoroughly cleaned with a brush. They must refrain from milking or handling milk, in any way, when in themselves or their families there is even a suspicion of any contagious or infectious disease, such as smallpox, scarlet fever, diphtheria, typhoid fever, tuberculosis, or the like.

Sec. 10. *Handling the milk*.—Immediately after milking, the milk shall be removed from the stable into a milk room screened from flies and other insects, aerated and cooled to at least 60° temperature, and put into perfectly clean bottles or cans. Dairymen who use both bottles and cans in delivering milk shall not fill bottles while on their delivery route.

Sec. 10a. The milk house or milk room must be located at least 25 feet from any other building and provided with a tight floor, either concrete or wood, laid so as to provide drainage. It must be kept clean at all times and free from any odor.

Sec. 11. *Care of cans or bottles*.—(a) All cans or bottles used in the distribution of milk must be thoroughly cleaned, either by hot water and soap or hot water and soda, or other alkalies, rinsed and sterilized by boiling water or steam before they are again used as receptacles for milk. Extreme care must be exercised in cleaning the faucets to cans by use of a brush.

(b) Milk cans must be washed and cleansed immediately after the milk or cream is emptied therefrom, and in no case shall the washing be later than 24 hours after the receipt of the can.

(c) No person shall use a milk bottle for other than milk purposes.

Sec. 12. *Quality of milk*.—No person shall bring into the city for sale, or shall sell or offer for sale, any milk—

(a) Containing more than 88 per cent of water or fluids.

(b) Containing less than 12 per cent of milk solids.

(c) Containing less than 3 per cent of milk fats.

(d) From which any part of the cream has been removed.

(e) Having a specific gravity of less than 1.029.

(f) Containing any dirt, foreign matter, or sediment.

(g) Containing any boracic or salicylic acid, formaldehyde, or other foreign chemicals.

(h) Containing any pathogenic bacteria.

(i) Containing bacteria of any kind, more than 500,000 per cubic centimeter.

(j) Drawn from any cow having a communicable disease or showing clinical symptoms of tuberculosis, or from a herd which contains any diseased cattle, or are afflicted with or have been exposed to any communicable disease.

(k) Drawn from any cow within 15 days before or 12 days after parturition.

(l) Drawn from any cow which has been fed on garbage, refuse, swill, moist distillery waste, or other improper food.

(m) Having a temperature, or which has been kept at a temperature higher than 65° F.

(n) Which has existed or has been kept under conditions contrary to the provisions of this code.

(o) No milk shall be kept, sold, or offered for sale drawn from cows suffering with sore and inflamed udders and teats, or from cows diseased.

Provided that the subdivisions (a), (b), (c), and (d) of this section shall not apply to milk sold under the name of "skimmed milk."

Sec. 13. *Retailers*.—All grocers, bakers, or other persons having or offering for sale milk or cream, shall at all times keep the names and addresses of the dairymen from whom the milk on sale was obtained posted up in a conspicuous place wherever such milk may be sold or offered for sale. If skimmed milk is kept or offered for sale, each and every container of such milk shall be plainly marked with the words "skimmed milk" in letters not less than 1 inch in height.

Sec. 14. *Skimmed milk*.—(a) No person shall bring into the city for sale or sell, or offer for sale, milk from which the cream has been removed, either in part or in whole, unless on two sides of the container from which such milk is sold there appears in red letters, not less than 1 inch in height, the words "skimmed milk."

(b) No person shall bring into the city for sale or sell or offer for sale any so-called skimmed milk containing less than 9.3 per cent of milk solids.

Sec. 15. *Storage*.—(a) No person shall ship or store any milk in any basement, cellar, refrigerator, milk house, dairy or other place unless such place have 1 square foot of window space to each 4 square feet of floor, with a cement floor, properly drained, and shall contain a vat made of nonabsorbent material large enough to store all milk. Windows and doors shall be provided from May 1 to October 1, inclusive, with sound screens of mesh sufficiently fine to keep out flies and other insects.

(b) No person shall store any milk in any basement, cellar, refrigerator, milk house, dairy, or other place which is within 15 feet of any water-closet or privy vault or cesspool, or any horse or cow stable, or any chicken or poultry yard or coop.

Sec. 16. *Milk delivery wagons*.—(a) No one shall use any vehicle for the delivery of milk in the city of Columbus which has not painted thereon in legible Roman letters not less than 3 inches in height, and on both sides of the vehicle in a conspicuous place, the name and location of his dairy and the number of his permit, and if such vender sells skimmed milk, each and every container of skimmed milk shall have the words "skimmed milk" thereon in plain letters not less than 1 inch in height.

Sec. 16b. Every person using in the sale or distribution of milk a delivery wagon or other vehicle shall keep the same at all times in a cleanly condition and free from any substance liable to contaminate or injure the purity of the milk, and from May 1 to October 1 shall have and keep over such delivery wagon or other vehicle a covering of canvas or other material so arranged as to thoroughly protect the contents thereof from the rays and heat of the sun.

Sec. 17. *Sealed container. Wholesale delivery*.—No person or dealer shall sell, offer for sale, or deliver any milk, buttermilk, whey, sour milk, skimmed milk, cream, Dutch cheese, or other milk product in quantities exceeding 1 gallon unless the can or receptacle containing the same is securely sealed by lock and chain, wire, or other contrivance equally efficient: *Provided, however*, That the persons or dealer engaged exclusively in the wholesale delivery or sale of milk, buttermilk, whey, sour milk, cream, skimmed milk, Dutch cheese, or other milk products from wagons not carrying milk for retail customers, may deliver the same from unsealed cans or receptacles: *And provided further*, That said wagon or wagons shall have inscribed conspicuously thereon in plain letters, not less than 3 inches in height, the words "wholesale delivery."

Sec. 18. *Original container*.—No person or milk dealer shall sell, deliver, sell or offer to sell, or keep for sale in stores, milk or cream, in quantities less than 1 gallon unless delivered and kept in the original package or container. (Exception: Original packages of not greater capacity than 1 quart may be broken for sale if the unsold portion is kept in the original package, properly closed.)

The compartment where milk or cream is kept shall be separated by an impervious water and odor proof partition from all other compartments of any ice box or refrigerator; neither milk nor cream shall be kept in the same compartment with any other foodstuffs except butter and cheese.

Sec. 19. *Milk plants.*—(a) Construction: Floors must be made of asphalt, cement, or other smooth vitrified substance, laid so as to allow ready drainage; walls and ceiling shall be smooth, tight, and kept painted in some light color; window space shall be equivalent to 10 per cent floor space.

(b) Equipment: Must be arranged and constructed so it can be easily and efficiently cleaned; all piping used to convey milk must be of the sanitary taken down form. Windows and doors, from May 1 to October 1, must be provided with sound screens of mesh sufficiently fine to keep out flies and other insects. Building and equipment must be kept clean at all times and free from odors.

(c) Handling milk: Milk shall be pasteurized at the following temperatures: 140° F., uniform heating, 20 minutes; 150° F., uniform heating, 15 minutes, 155° F., uniform heating, 5 minutes; 160° F., uniform heating, 1.5 minutes; 165° F., uniform heating, 1 minute.

The time shall be calculated from the time that the entire quantity reaches the required temperature. The milk shall be promptly cooled after pasteurization to a temperature of 50° F., or less, and stored at a similar temperature.

Sec. 20. *Contagious diseases.*—(a) Should scarlet fever, smallpox, diphtheria, typhoid fever, tuberculosis or other dangerous or infectious disease occur in the family of any dairyman or among any of his employees, or in any house in which milk is kept for sale, or in the family or among the employees of any person who ships milk into the city for sale, such dairyman, such vendors or shippers of milk shall immediately notify the health officer of the facts of the case, and the health officer shall at once investigate and order the sale of such milk stopped, or sold under such regulations as he thinks proper.

(b) Should dairymen, vendors, or shippers of milk fail to notify the health officer when contagious diseases exist in their families or in the families of their employees, or who, after such information is given the health officer, fail to obey his directions, the milk and dairy inspector shall seize and destroy all milk sent into the city by such persons, and he shall, when acting in good faith, be held harmless in damages therefor in any suit or demands made.

(c) In delivering milk to families in which there exists any of the above-named contagious or infectious diseases, the dairyman shall not enter, neither shall he permit any of his milk bottles or vessels to be taken into such houses, but shall pour such milk as each family wishes into vessels furnished by such family.

Sec. 21. *Milk inspectors.*—The milk or dairy inspector, the health officer, or any person authorized by the board of health, may examine all dairy herds, utensils for handling milk, of all dairymen or other persons engaged in selling or shipping for sale milk or cream to the city of Columbus. These inspectors shall have power to open any can, vessel, or package containing milk or cream, whether sealed (locked) or otherwise, or whether in transit or otherwise, and take samples of the milk or cream for testing or analysis; and if, upon inspection, the milk or cream is found to be filthy, or the cans or other containers are in an unclean condition, the said inspector may then and there condemn the milk or cream as deemed by him to be filthy and pour the contents of such bottles, vessels, or packages upon the ground forthwith, and he shall, if done in good faith, be held harmless in damages therefor in any suit or demand made.

Sec. 22. *Penalty for violation.*—Whoever violates any provisions of this subdivision of the sanitary code of the city of Columbus shall be fined in any sum not exceeding \$100, or imprisoned for any time not exceeding 90 days, or both; but no person shall be imprisoned under this section for the first offense, and the prosecution shall always be for such first offense, unless the affidavit upon which the prosecution is instituted contains the allegation that the offense is a second or repeated offense. (Sec. 2119, O. L., vol. 95, p. 424.)

These rules and regulations shall take effect and be in force 10 days from first publication.

“(1536-756.) R. S. Sec. 2139. Inspectors; appointment and duties; record of meat and milk dealers; permit; examination of cows; certificate; contagious disease in family of dairyman, etc.; may make and enforce orders: The board of health may appoint such number of inspectors of dairies, slaughterhouses, shops, wagons, appliances, food and water supplies for animals, milk, meat, butter, cheese, and substances purporting to be butter or cheese, or having the semblance of butter or cheese, and such other persons as may be necessary to carry out the provisions of this chapter, define their duties, and fix their com-

pensation, and the health officer may be appointed and authorized by said board to perform all the duties of such inspectors; and such inspectors may, for such purpose, enter any house, vehicle, or yard; and the board of health shall keep for public inspection a record of the names, residences, and places of business of all persons engaged in the sale of milk or meat, and may require permits, to be renewed semiannually and for which a charge of not more than 50 cents may be made, after inspection, to vend either milk or meat, and the board may refuse to grant such permit or revoke one already given if, upon inspection, the cows or milk are found to be kept in an unsanitary condition; and the board may require a certificate from a licensed veterinarian showing the cows furnishing milk brought for sale within its jurisdiction are free from tuberculosis or other dangerous disease, and should scarlet fever, typhoid, or other dangerous contagious or infectious disease occur in the family of any dairyman or among his employees, or in any house in which milk is kept for sale, it shall be the duty of such dairyman or vender of such milk to immediately notify the health officer of the city, village, or hamlet in which such milk is sold, or is offered for sale, of the facts of the case, and the health officer may order the sale of such milk stopped, pending an investigation to be made without delay, and for such time thereafter as the board of health may require; and the board of health may make and enforce such orders as it may deem necessary to prevent the sale of impure, adulterated, and unwholesome milk, or milk liable to carry disease. (O. L., vol. 95, p. 433.)"

"(1536-757.) R. S. Sec. 2140. Places where meat, butter, cheese, etc., are made, subject to inspection; analysis of milk, butter, etc.: All dairies, including the cows, cow stables, milk houses, and milk vessels, the owners of which offer for sale within the limits of the corporation milk or butter manufactured by such owners, shall be subject to inspection by the inspectors, and also any manufactory of butter or cheese, or place where such substance or either of them are sold, shall be subject to inspection by the inspectors; the inspector may enter any place where milk is sold or kept for sale, and all carriages used for the conveyance of milk within the corporate limits; and also any manufactory or place where butter or cheese, or substances having the semblance of butter or cheese, are manufactured, or any place where such substances are sold or kept for sale within the corporate limits; and whenever he has any reason to believe milk found therein is impure or adulterated, or any butter or cheese, or substances having the semblance of butter or cheese found therein contain any impure, unwholesome, or deleterious substances, or is being sold or offered for sale under any false or deceptive name or designation; that any butter or cheese not made from pure cream or milk, or any substance having the semblance of butter or cheese, is being sold or offered for sale, without being branded or stamped, as required by section 7090, he shall take specimens thereof and subject them to satisfactory tests; or, if the board of health so direct, to chemical analysis, the result of which he shall record and preserve as evidence, and a certificate of such result, sworn to by the analyst shall be admissible in evidence in all prosecutions under this chapter or any law of this State. (O. L., vol. 95, p. 434.)"

"SEC. 2. Refilling milk bottles: It shall be unlawful to fill or refill, with milk, cream, or other milk product, any glass jar or bottle, with intent to sell or vend such milk, cream, or other milk product, unless such glass jar or bottle be first thoroughly cleansed and sterilized. (O. L., v. 99, p. 454.)"

DIRECTIONS FOR SCORING DAIRIES BY DAIRY DIVISION SCORE CARD.

[Adopted Mar. 19, 1908.]

	<i>Cows.</i>	No. points.
<b>Healthfulness:</b>		
If tuberculin tested and in good condition.....		170
In good condition, but not tuberculin tested.....		40
In poor condition and not tuberculin tested.....		0
<b>Comfort:</b>		
If well bedded.....		10
If stable temperature is 50° to 60° F.....		10
Otherwise.....		0
<b>Cleanliness:</b>		
Clean cows having no litter on them, hair on tail braid, quarter and flank clipped, tail brushed and cleaned, hair on udder singed, skin soft and pliable, free from eruptions, scab, grubs, and running sores. Cows must look well groomed.....		60

	No. points.
Cleanliness—Continued.	
Cows having no litter on them, free from skin eruptions, scab, grub, and running sores-----	50
Cows fairly clean, free from skin eruption, scab, grub, and running sores-----	30
Cows free from skin eruptions, scabs, grub, and running sores-----	20
Cows dirty, with or without running sores-----	0
Total number points for cows-----	250

	No. points.
Cleanliness:	
<i>Stables.</i>	
If all parts of the stable, except floor and windows, are painted in some light color, or whitewashed within the last six months, and thoroughly cleaned, including windows, mangers, gutters, stable drains, etc-----	50
Deduct in proportion as many points as is necessary, if stable is not whitewashed, not free from dust, dirt, cobwebs, etc-----	
Stables not whitewashed, full of cobwebs, dirty, or dusty, with odors strong enough to injure milk-----	0

Location of dairy stable:	
If located on an elevation with floor laid not less than 1 foot higher than outside surface level and located so that good drainage can be secured, and 600 feet away from any marshy ground, stagnant water, cesspools, privies, hogpens, henneries, and horse stable, or other buildings in which other animals are kept, with the surroundings free from accumulation of rubbish or decomposing matter-----	20
All points same as above, with the exception of permitting horses in the same barn as cows, with a tight partition between the cows' stable and horse stable-----	10
All points as above, horses in the same barn, with a tight partition, and other buildings close by, with the exception of outhouses and privies-----	5
Otherwise-----	0

Construction of stable floors:	
Asphalt or concrete floor, kept in good repair, with gutters not less than 14 inches wide, and not less than 8 inches deep, and made of the same material, with 4 feet of space for walk back of the cows, and with a manger not less than 20 inches wide in front of the cows, also made of the same material-----	50
Wood laid on cement floor with space between cement and wood, flushed with pitch or tar, with gutter and walk made in the same manner, and with the same size and dimensions for gutter and walk as given above-----	40
Brick laid edgewise in concrete, sand, or on sand and boards, with the surface slushed with cement, so that there are no crevices.---	40
Matched wood floor in good repair, smooth, and made water-tight---	30
Ordinary wood floor, thoroughly covered with pitch or tar and made water-tight, and kept in good repair-----	30
Ordinary wood floor, in good repair, with not less than a 2-foot walk back of cows-----	20
Floor with front half of cow-stall platform made of dirt, with back half of platform and gutter made of cement, with a walk not less than 2 feet back of cows-----	10
If no floor is provided, or floors with no gutters, or floors that are not tight and have no drainage-----	0

Sides of cow stable:	
If the asphalt or concrete floor is continued up on the side to a height not less than 2 feet from the floor level, with round corners, and plastered smooth, and kept in good repair, to form a side base-board. Side, continued above side baseboard, constructed of concrete wood pulp plaster, or any other material that forms a hard, smooth, nonabsorbent surface, and kept in good repair-----	20
Baseboard on side not less than 2 feet high from floor level, made of concrete or plaster, with round corners, but sides continued above this, made of wood, well painted or whitewashed, and kept in good repair-----	20

	No. points.
<b>Sides of cow stable—Continued.</b>	
Sides made of wood throughout, rough or open construction, in good repair-----	10
Sides roughly constructed, or of open construction, out of repair, with corners that will allow accumulation of filth-----	0
<b>Ceiling of stable:</b>	
Smooth, dust-tight ceiling, in good repair, made of plaster, smooth metal, or matched boards, and thoroughly insulated above so that no moisture will collect on ceiling-----	20
Open construction with matched lumber laid on joist must be dust tight and well insulated-----	10
Ceiling made of unmatched lumber, smooth or rough boards in good repair-----	5
Ceiling made of rails or litter, including straw or roughage-----	0
<b>Light:</b>	
4 square feet of unobstructed window glass per cow, distributed in that part of the stable where the cows stand-----	50
3 square feet of unobstructed window glass per cow, distributed as above-----	40
2 square feet of unobstructed window glass per cow, distributed as above-----	30
1 square foot of unobstructed window glass per cow, distributed as above-----	20
6 inches or less than 6 inches of unobstructed window glass per cow-----	0
<b>Cubic feet of space per cow in stable:</b>	
600 to 1,000 cubic feet of space per cow-----	50
500 cubic feet of space per cow-----	40
400 cubic feet of space per cow-----	30
300 cubic feet of space per cow-----	20
Less than 300 cubic feet of space per cow-----	0
<b>Ventilation: Two methods of ventilation may be used: First, the flue system; second, the canvas system:</b>	
Flue system should be constructed in the following manner—	
<b>Exhaust flue—</b>	
First. Size, 30 square inches per cow.	
Second. Distribution. Flues may be built one or more in number.	
Third. Construction. May be made of wood or other airtight material that is a good nonconductor.	
Fourth. Inlet. Must not be more than 18 inches above the floor.	
Fifth. Outlet. Flue must extend through roof and above the highest point of the building.	
Flue should be made as straight as possible, without any obstructions, to allow for free circulation of air.	
<b>Intake or fresh-air flue.—</b> If air is taken from the stables through the exhaust flue, arrangements must be made to allow fresh air to come into the stable. This flue should allow 20 square inches per cow. If more than one flue, they should be uniformly distributed throughout the stable.	
<b>Inlet.—</b> Fresh air must be taken from some point below the outlet of this flue in the stable. Flue must not be less than 1 foot perpendicularly. Outlet must be near or in the ceiling of the stable-----	20
<b>The canvas system consists in placing muslin and wire screens in open or unobstructed air spaces.</b>	
If 3 square feet of muslin is provided per cow, and uniformly distributed from the highest to the lowest convenient point, but not higher than from 2 feet of the floor to within 18 inches of the ceiling-----	20
If 2 square feet of muslin is provided per cow, and uniformly distributed from the highest to the lowest convenient point, but not higher than 2 feet of the floor to within 18 inches of the ceiling-----	15
If 1 square foot of muslin is provided per cow, and uniformly distributed from the highest to the lowest convenient point, but not higher than 2 feet of the floor to within 18 inches of the ceiling-----	10
Ventilation caused by open windows, etc-----	10
If no attempt is made to ventilate at all-----	0

	No. points.
<b>Removal of manure:</b>	
If manure is immediately disposed of by hauling it into the fields or away from the barns daily and none allowed to accumulate around the stable	40
If manure is removed from the stable daily, to a distance of 30 feet from stable, and placed in a manure bin, or any other tight inclosure	30
If manure is removed 10 feet from the stable daily and kept in a place where cows can not walk into same	20
Otherwise	0
<b>Stable yard:</b>	
If yard for turning out cows is a covered yard and the shed containing not less than 4 feet of light per cow, properly ventilated as above, and 150 square feet of space per cow, elevated so that it will drain readily, and kept bedded with straw or other roughage at all times, so that it is dry	30
Yard not covered, but well drained and kept clean	20
Yard well bedded with straw or roughage, so as to keep cattle out of the mud and manure	10
Otherwise	0
<b>Total number of points for stable</b>	<b>350</b>

*Water supply.*

First. Pure running water from a spring that is protected from the entrance of flow to outlet, or artesian wells, or artificially forced water, free from oils, sulphur, or other offensive and distasteful material, free from contamination and supplied from a source not less than 250 feet from a barnyard, privy, cesspool, etc., temperature not more than 70° and less than 45°	50
Second. Ordinary well water, free from contamination, and stored in clean tanks	40
Third. Ordinary well water pumped in ordinary troughs that are kept clean	30
Fourth. Water from ponds, dirty troughs, muddy, or otherwise contaminated	0
<b>Total number points for water supply</b>	<b>50</b>

	<i>Milk house.</i>
<b>Location:</b>	
If built on relatively high or elevated ground, floor level not less than 1 foot above ground surface, and including otherwise the same conditions as described under "location of dairy stable," with the addition that it should be located at least 100 feet away from the dairy stables and 250 feet away from any other stable	5
All conditions same as above, except location, 25 feet away from stable and 100 feet away from any other stable	3
All conditions, same as above except it is placed 10 feet away from dairy stable and 50 feet from any other part of stable where animals are kept	1
If connected with stable with tight partition	½
Otherwise	0

**Purpose:**  
The place where the milk is to be taken immediately after milking each cow, where it is to be cooled, aerated, separated, or pasteurized, and stored in tanks of water, with temperature not exceeding 50° F., and is supposed to remain there until time of delivery. In this milk house there must be a tight partition, and the second room should be a wash room used only for the purpose of washing and sterilizing dairy utensils.

<b>Outside construction:</b>	
May be of asphalt, brick, stone, or a combination of the same, in good repair, with shingle, slate, or tile roof, and if not attached by door to any other building	5
Tight wood construction, plainly sided, well painted, and in good repair	3
Ordinary wood construction	2
Wood construction of plain, unpainted, or stained rough boards	1
Old and partially decayed boards and dirty	0

	No. points.
<b>Floors:</b>	
Asphalt, cement, or other smooth, vitrified floor, laid so as to allow ready drainage with a slope of 1 inch to the foot, provided with a drain, and the drain provided with a standard metal trap-----	10
Cement floor, with no slope-----	5
Wood floor, water-tight, in good repair-----	2
Ordinary wood floor, in good repair-----	1
Otherwise-----	0
<b>Walls and ceiling:</b>	
Sides provided with a baseboard made of concrete or other hard, nonabsorbent, and nondecayed material, with sides and ceiling plastered smoothly, and kept in good repair-----	10
With baseboard concrete or other hard, nonabsorbing, undecayable material, sealed smoothly with boards and painted, and kept in good repair-----	5
Smooth wood walls and ceiling in good repair-----	2
Otherwise-----	0
<b>Light:</b>	
40 square feet of glass to 1,000 cubic feet of air space-----	10
30 square feet of glass to 1,000 cubic feet of air space-----	5
20 square feet of glass to 1,000 cubic feet of air space-----	3
10 square feet of glass to 1,000 cubic feet of air space-----	2
Less than 5 square feet of glass to 1,000 cubic feet of air space-----	0
<b>Ventilation:</b>	
A ventilator placed in the ceiling of the milk room and wash room---	10
Provisions to open the top half of the windows to provide ventilation--	5
No attempt to ventilate at all-----	0
Total number points for milk house-----	50

*Equipment for milk house.*

<b>Milk room:</b>	
Provided with concrete insulated tanks built with overflow outlets and ice chambers and with good, well-painted covers. Everything kept in good repair-----	10
Provided with wood tanks with overflow outlets and ice chambers---	5
Wood tanks without ice chambers-----	2
Otherwise-----	0
<b>Wash room:</b>	
Equipped with hot water (temperature not less than 205° F.) for cleansing and sterilizing utensils; a sterilizing vat and place to lay or hang utensils after being boiled. This place must be free from dust, clean, well ventilated, and located where the sun's direct rays have access to it at least three hours each day-----	10
If nothing is prepared to take care of the dairy utensils, such as racks and hooks-----	5
If the building is so located that the sun does not have access to utensils at least a part of the day-----	2
Otherwise-----	0
<b>Milk pails:</b>	
Use for no other purpose except for milking, and if thoroughly flushed with solder so that there are no sharp corners or crevices on the inside, plainly constructed with an opening not larger than 6 inches through which the milk passes-----	10
Pails same as above with larger opening-----	5
Otherwise-----	0
<b>Strainers:</b>	
Plainly constructed, all points and crevices flushed and smoothly soldered, with wire gauze having 100 meshes to the inch. And in connection with this, provisions should be made so that the milk passes through two thicknesses of cheesecloth with absorbent cotton between. Both of the latter must be sterile, and a new piece must be used before each milking-----	10
Strainers same as above, without cloth and cotton strainers-----	5
Otherwise-----	0

	No. points.
<b>Aerator and cooler:</b>	
Aerator and cooler plainly constructed, with all points flushed with solder so that it can be easily cleansed, and having no crevices, and effective to cool to 50° F.....	10
Cooler without aerator but made as described above.....	5
Milk cooled in milk can and stirred with a metal stirrer made so that it can be kept clean.....	0
<b>Transportation cans:</b>	
Transportation cans plainly constructed, well tinned, with all corners and joints smoothly flushed with solder, with lid so constructed that it can be hermetically sealed to prevent the removal or leaking of milk or cream while in transit.....	10
Can constructed as above, having a common loose lid with lead seal.....	5
Can not well tinned, with common lid and lead seal.....	2
Otherwise.....	0
<b>Cleanliness of interior:</b>	
Ceiling, walls, and walks free from flyspecks, cobwebs, dust, or other filth; well painted or surfaced with any other hard material and of uniform light color. Floor kept free from milk and other foreign materials not belonging to a milk house.....	20
Ceiling and walls slightly flyspecked, but other conditions same as above.....	10
Milk room slightly specked; used as a storeroom for utensils, with other conditions as above.....	5
Milk room dirty; used as a storeroom for utensils, for implements, clothes, or other material not belonging to a milk house.....	0
<b>Cleanliness of utensils:</b>	
All utensils that come in direct contact with milk should be first rinsed with warm water, then washed in a hot solution of sal soda or some washing powder, then rinsed and sterilized by subjecting them to high pressure steam in a steam sterilizer. They should then be removed and kept on clean, suitable racks exposed to plenty of sunlight as prescribed under heading "Equipment in wash room".....	20
Same as above except utensils are subjected to hot water not less than 200° temperature, containing at least 5 per cent of borax and subjected to this for not less than 20 minutes. They should then be removed and kept in a clean, suitable rack, with plenty of sunlight, as prescribed under heading "Equipment in wash room".....	10
If utensils are rusty, not well cleaned and not sterilized.....	0
<b>Total number points for equipment.....</b>	<b>100</b>
<i>Health of attendants.</i>	
<b>Attendants free from disease.....</b>	<b>50</b>
If attendants are healthy but room or board with a family in which some disease exists.....	20
If any attendant or attendants are sick or suffering from some infectious disease.....	0
<b>Total number points for health of attendants.....</b>	<b>50</b>
<i>Cleanliness in milking.</i>	
<b>Udders and teats:</b>	
Clean and thoroughly wash with clean water and dry with clean cloths before milking. A cloth should be provided for each individual cow.....	20
Udder and teats washed as above but no separate cloths provided for each cow.....	10
Udder unwashed and otherwise dirty.....	0
<b>Milking with clean hands:</b>	
Hands should be washed in soap and water after milking each cow.....	20
Hands should be thoroughly cleaned and washed before each milking.....	10
Hands not washed previous to milking and otherwise dirty.....	0

	No. points.
<b>Clothing:</b>	
White suits laundered freshly every day and used only during the milking time-----	10
Suits laundered every day, but not white-----	5
White suits laundered twice a week-----	5
White suits laundered once a week-----	2
If milking is done in the same clothes that are used for daily dress or otherwise filthy-----	0
<b>Dry milking:</b>	
Milking should be done without allowing any milk to come in contact with the outside of the teat—in other words, it should be done with a dry hand. If teats are chafed or inflamed, a small amount of vaseline may be used during milking; this must then be carefully wiped off and care should be taken that none of this drops into the milk-----	20
Where wet milking is practiced-----	0
<b>Filthy habits of attendants:</b>	
If attendant has a clean appearance, does not smoke while milking, nor use tobacco or liquor or is not saturated with any other strong-smelling materials, and free from chafed hands-----	10
Attendants otherwise-----	0
<b>First milk:</b>	
If the first few streams of milk from each teat are rejected before each milking-----	10
Otherwise-----	0
<b>Feeding:</b>	
If cows are fed on clean, dry feed, neither decayed, moldy, nor dusty, and if not fed on any wet malt or distillery feeds-----	20
Otherwise-----	0
<b>Handling milk after milking:</b>	
Immediately after milk is drawn from the cow if aerated and cooled to not less than 50°-----	20
Immediately after it is drawn from the cow if aerated and cooled to 62°-----	10
Immediately after it is drawn from the cow, removed to the milk house and poured into a can which is placed in water cooled to 55°-----	5
If poured into cans in stables and cans placed in cold water-----	3
Otherwise-----	0
<b>Storing at low temperature of can and bottled milk:</b>	
If milk is stored in the milk house at a temperature of 50°-----	20
If milk is stored in the milk house at a temperature of 60°-----	10
Milk to be bottled must be aerated and cooled to 50° before bottling. Immediately after bottling bottles should be tightly capped and placed in a crate and packed in crushed ice. Bottles must be kept packed in crushed ice until delivery is made-----	20
Milk bottled if cooled and aerated to 50° and immediately delivered without being placed in crushed ice-----	10
Otherwise-----	0
It is understood that bottles and caps must be sterile and crates must be thoroughly cleaned.	
Total number points for cleanliness of milking-----	150
Grand total-----	1,000

Milking may be done in the open air on clean sod, but not during windy or rainy weather, and full credit will be given.

If bad conditions are found in addition to those indicated under these groups further deduction will be made.

#### *Title II.—Cream.*

**SECTION 1. Cream.**—No person shall bring into the city for sale, or shall sell or offer for sale, any cream unless such cream is produced from milk which must conform to all the rules and regulations of this code relating to milk, nor unless such cream be kept at or below 65° F., free from foreign substances, and shall not contain more than 1,000,000 bacteria per cubic centimeter, and shall not contain less than 16 per cent of milk fat.

*Title III.—Ice cream.*

SECTION 1. *Ice cream.*—No person, firm, or corporation shall manufacture, sell, or offer for sale in the city, or bring into the city, any ice cream, nut ice cream, fruit ice cream, or French ice cream, unless such ice cream, nut ice cream, fruit ice cream, or French ice cream shall conform strictly to the standards, requirements, and provisions prescribed in the following sections:

SEC. 2. *Constituents of ice cream.*—That ice cream shall be made from wholesome milk products, sugar, with or without natural flavoring, and with or without not to exceed in the aggregate seven-tenths of 1 per cent of starch, gelatin, gum arabic or tragacanth, and shall contain not less than the per cent of milk fat as hereinafter designated.

SEC. 3. *Fruit ice cream.*—That fruit ice cream shall be made from materials used in making ice cream as designated in section 2 of this article, together with sound, clean, mature fruits.

SEC. 4. *Nut ice cream.*—That nut ice cream shall be made from material used in making ice cream as designated by section 2 of this article, together with sound, nonrancid nuts.

SEC. 5. *French ice cream.*—That French ice cream shall be made from materials used in making ice cream as designated by section 2 of this article, together with fresh eggs.

SEC. 6. *Per cent of milk fat.*—That ice cream, nut ice cream, fruit ice cream, and French ice cream shall contain at least 10 per cent of milk fat, unless the per cent of milk fat is stated as provided in section 7 of this article, but no substance containing less than 8 per cent of milk fat shall be designated as or called ice cream, nut ice cream, fruit ice cream, or French ice cream.

SEC. 7. *Labels and placards.*—That no person by himself or by his servant or agent, or as servant or agent of any other person, shall manufacture, offer or expose for sale, sell or deliver any ice cream, nut ice cream, fruit ice cream, or French ice cream containing less than 10 per cent milk fat, unless the per cent of milk fat is conspicuously stamped, labeled, or marked in plain letters at least three-eighths of an inch square, so that the words can not be easily defaced, upon two sides of each and every bucket, box, can, wrapper, or other package containing said ice cream, nut ice cream, fruit ice cream, or French ice cream. When any ice cream, nut ice cream, fruit ice cream, or French ice cream containing less than 10 per cent milk fat is sold at retail, a white placard not less in size than 10 by 14 inches shall be kept so as not to be concealed in any manner, but to be easily seen and read, if desired, by the purchaser at the time of the purchase, on which placard shall be printed, in black letters not less in size than 1½ inches square, the per cent of milk fat contained in each and every grade of ice cream, nut ice cream, fruit ice cream, or French ice cream being offered for sale, and said placard shall not contain other words than the name of the manufacturer of said ice cream, nut ice cream, fruit ice cream, or French ice cream.

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*Title VIII.—Ice cream parlors and soda fountains.*

SECTION 1. *Sanitary conditions.*—Sanitary conditions in ice cream parlors and places where soda fountains are in operation, for the enforcement by the health office, are declared to exist only when the floors are clean and free from litter and accumulated dirt; when the side walls and ceilings are free from cobwebs, dust, and accumulated dirt, when the counters, shelves, drawers, and bins are clean, when refrigerators and soda fountains are free from foul and unpleasant odors, mold, and slime. Glassware, spoons, etc., used at a soda fountain shall be thoroughly washed and rinsed in clean water after each using. Soda fountains, sirup cans, and bottles shall be thoroughly washed before refilling. Draft tubes shall be kept clean. Drainage boards, sinks, shelves, etc., on which glasses are placed must be kept clean. Beverages drawn from a fountain or faucet must be free from the danger of chemical action while in contact with lead, copper, or other metals.

## PART VI. INSANITARY CONDITIONS AND PUBLIC NUISANCES.

*Title V.—Miscellaneous nuisances.*

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SEC. 8. Every owner, lessee, tenant, or occupant of any stall, stable, or apartment in the city in which any horse, cattle, or other animal shall be kept, or any place in which manure, stable refuse, or any liquid discharge of such ani-

imals shall collect or accumulate, shall cause such manure, stable refuse, or liquid to be promptly and properly removed therefrom, and shall at all times keep, or cause to be kept, such stall, stables, or apartments, and the drains, yards, and appurtenances thereof, in a clean and sanitary condition, so that no offensive odor shall be allowed to escape therefrom. Every such stable and the yards and appurtenances thereof shall be connected with the city sewer.

SEC. 9. Every person owning, leasing, or occupying any stall, stable, or compartment where any horse or any cattle or mule shall be kept, and every owner of any horse, mule, or head of cattle shall maintain a durably made receptacle or bin, which, if located outside the building, must be so constructed and kept as to preserve the contents at all times dry and free from rain; or other structures, as vault or cellar, in which receptacles shall be placed all manure or refuse from such horse, mule, or cattle. In no event or circumstance shall such manure or refuse be thrown or deposited in alley, street, or public place, or suffered to remain therein.

SEC. 10. Every stable or building which may be constructed or reconstructed within the city in which any horse, mule, or cow is to be provided for or kept shall be so constructed and drained that no fluid excrement or refuse liquid shall flow upon or into the natural ground or earth.

SEC. 11. All of the surface of the ground beneath every stall in every such building and for a distance of at least 4 feet in the rear of every such stall shall be covered and protected from pollution by a water-tight floor or covering made impervious to said fluid excrement or refuse liquid, which shall be conducted into the city sewer.

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SEC. 23. No person shall burn or suffer to be burned within the city any leaves, garbage, refuse woolen, silk, leather or India rubber goods, or other substances so that the same shall give rise to offensive odors or gases.

SEC. 24. No person shall use the sidewalks or the streets of the city, or the gutters between them, as a drainage to carry off any water that has been used, or other fluids, or soap suds or dye stuffs, or liquid manures, or any other liquids, whether from privies or otherwise.

SEC. 25. No person shall clean, scale or wash any fish, meat, clothes, carriage or buggy, or anything tending to create a nuisance on any of the streets, alleys, public grounds, or markets of the city.

SEC. 26. No person shall deposit on any street, alley, private or public place in the limits of the city, any dirt, brick, or other material in such a manner as to obstruct the free flow of water along any gutter.

SEC. 27. No person owning, occupying or having charge of any building, stable or other premises shall keep or allow to be kept thereon any fowl, dog, or other animal which shall by barking or other noise, or by offensive kennel or other place of keeping, disturb the quiet or repose, or the purity of the air in the living rooms of those thereon or in the vicinity thereof to the detriment of the life, health, or comfort of any person or persons.

SEC. 28. No person shall water any horse or other animal that is affected with glanders, nasal catarrh, or any other disease of a contagious character, at any public drinking fountain or public well within the city.

SEC. 29. No person shall keep or maintain a dairy within the city and no person shall keep more than two cows within the city limits, nor feed or milk any cow on any sidewalk within the city, nor feed any cow or swine on any street or sidewalk or alley within the city.

CARE OF MILK IN THE HOME.

[Issued by the Board of Health of Detroit, Mich.]

DETROIT, MICH.

THE BOARD OF HEALTH,  
 Detroit, Mich., May 1, 1908.

The quality of the milk supply of a city has a great deal to do with the health of the people. Milk is the most valuable single article of diet known to man, and is the only proper food for babies under 1 year of age, when they can not get the nourishment which nature intended for them—their mother's milk. But, while good milk is such an excellent food, bad milk is one of the

most dangerous foods possible, being responsible for a large part of the bowel troubles of babies and for the death of very many of them. The chief means by which milk is made dangerous are (1) dirty methods of keeping and milking the cows, dirty milkers, and dirty milk vessels; (2) failure to cool the milk promptly and keep it cool until used; and (3) keeping the milk too long before it is used.

Bad milk, therefore, so far as danger to health is concerned, is dirty milk or warm, stale milk.

The Board of Health of Detroit is doing everything in its power to make the milk supply of this city all that it should be from a sanitary and chemical standpoint, and the dairymen are actively responding to our efforts. Nearly all of the undesirable dealers have been forced out of business.

But it is not sufficient that the milk be clean and pure when delivered to you. Unless the proper care is taken in your own home after the milk is received you will not have good milk in spite of our efforts and the work of the dairymen. It is therefore important that you should carefully follow the instructions given in this circular—not just to-day, but every day, the whole year round. In the home, as on the farm and in the city dairy, cleanliness and cold are the two essentials in the securing of wholesome milk. All vessels used for milk should be thoroughly cleansed as soon as empty, using first clean, cold water for rinsing, and then scalding them with hot water containing a small amount of washing soda or borax. After thorough washing, the vessels should be rinsed with clean water and then well aired and sunned in some place where they will be protected from dust.

If your milkman delivers his milk in sealed bottles, see that he does not leave these in a place where they will be exposed to the heat of the sun before being brought into the house. They should be taken in as soon as possible and placed at once in the refrigerator until used. As soon as you have emptied a bottle, wash it out carefully. Do not return to your milkman bottles containing stale milk. Milk quickly absorbs odors from surrounding substances. After using part of the milk, always replace the cap before returning the bottle to the ice box.

If you are getting bottled milk, and a case of typhoid fever or other "catching" disease breaks out in your house, you should tell your milkman at once, and he should not take away any milk bottles from your house until after the case has gotten well, as one of these bottles might otherwise be the means of carrying the disease to other houses. We will instruct the milkmen what to do in such cases.

If you are getting milk in bulk and not in bottles, it is best to have the milkman deliver it directly to you or your servant, and you should see that it is put on ice immediately and kept cold. The practice of putting out an uncovered pitcher or other vessel for milk the night before can not be too strongly condemned. Such a pitcher or vessel, exposed to the dust and dirt of the street, will collect thousands of germs before the milk is put into it. Many of these may be dangerous to life and health, besides which they will certainly cause the milk to sour in a short time and become unfit for use. The purest milk received in such a vessel may become as bad in a few hours as the worst milk from a dirty farm.

If you wish to stand out a vessel to receive your milk, provide yourself with several glass preserve jars, which should be used for this purpose only. They should be kept well washed and aired as above described. Get jars with clamp tops. Those with screw tops are hard to keep properly cleansed. Do not use the rubber ring which comes with most jars, as it is difficult to keep clean and the jar will be sufficiently tight without it. Instead of a preserve jar, a bowl covered by a plate may be used. A pitcher can not be tightly covered on account of the projecting spout.

Give your own personal attention to your milk vessels.

The milkmen of Detroit state that many persons have the idea that if milk is delivered to them warm, this is proof of its being fresh from the cow and hence better. So far from this being true, only by cooling the milk as soon as it is gotten from the cow is it possible to prevent rapid decomposition of the milk in warm weather. The regulations of the board of health (which have been adopted for your benefit) require that all milk sold in Detroit shall be cooled immediately after milking and kept cooled until delivered to you.

While bad milk is the chief cause of bowel troubles among young infants, it is by no means the only cause. Improper feeding is another cause. Never give anything but milk to a child under 1 year unless advised to do so by your family physician.

If your baby has any bowel trouble, call in your doctor at once, so that the case may be treated before it has gone too far.

Never buy milk for the baby from a grocery store. Store milk has often been kept over from the day before. Such milk is dangerous as a food for babies. Never buy bulk milk from a grocery store. Storekeepers are prohibited by a regulation of the board of health from selling bulk milk, which formerly only too often stood around on the floor gathering sweepings or in an open picher or can in a refrigerator, perhaps without ice, in which meats or vegetables were also kept.

By paying careful attention to the above instructions you will do much toward keeping your family well during the summer, and especially the little ones who live on milk. You will also find that your milk will keep longer and taste better.

Keep this circular and read it from time to time until thoroughly familiar with its contents. If you change servants, be sure to give instructions to the new ones in the care of milk in your home.

### LOS ANGELES, CAL.

#### AN ORDINANCE REGULATING THE PRODUCTION AND SALE OF MILK AND THE PRODUCTS THEREOF.

[Ordinance No. 20587, new series.]

The mayor and council of the city of Los Angeles do ordain as follows:

SECTION 1. It shall be unlawful for any person, firm, or corporation to bring or receive, or to cause or permit to be brought or received, into the city of Los Angeles for sale, or to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery therein any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed, or evaporated milk, or condensed or evaporated skimmed milk, without first applying for and receiving a permit from the board of health of the city of Los Angeles so to do in the manner hereinafter provided: *Provided, however,* That the provisions of this section shall not apply to condensed or evaporated milk, or condensed or evaporated skimmed milk that is sterilized and contained in hermetically sealed packages, labeled with the name of the article and with the name of the person, firm, or corporation by whom the same is prepared.

Sec. 2. Every applicant for any such permit shall file with the said board of health a written application which shall set forth the name and address of the applicant, the number of cows owned by such applicant, if any, the name and address of any and all persons, firm, or corporations from whom he is purchasing or obtaining, or from whom he is intending to purchase or obtain milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, and the number of gallons of each thereof sold by him daily as nearly as he can estimate the same. Such application shall also contain a description of the property by street and number wherein or whereon the applicant conducts or proposes to conduct his place of business, and if the same has no street number, then such description as will enable the same easily to be found.

If such permit be granted, it shall be the duty of the holder thereof to give written notice to the said board of health stating the name and address of any person, firm, or corporation from whom he obtains his supply of milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, within twenty-four hours after beginning to obtain any such milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk from any such person, firm, or corporation other than those named in his application: *Provided, however,* That if such holder of a permit intends to obtain any such milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, from any person, firm, or corporation to whom a permit shall not have been granted by the board of health pursuant to the provisions of this ordinance, then written notice of such intention shall be given to the board of health at least five days before beginning to obtain such milk, cream, buttermilk, skimmed milk, pas-

teurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk from such person, firm, or corporation.

If such permit be granted, it shall be the duty of the person, firm, or corporation to whom the same is granted to secure the same from the office of the board of health within 30 days after the date on which the same is granted by the said board, and it shall also be the duty of such person, firm, or corporation to post such permit and to keep the same posted at all times in a conspicuous place in the milk house of such person, firm, or corporation, or in the room or place in which milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk is kept for sale.

It shall be unlawful for any person, firm, or corporation to fail, refuse, or neglect to comply with any of the provisions of this section.

Sec. 3. If it shall appear to the said board of health upon considering such application that the statements therein made are true, and that the applicant does not propose selling or offering for sale any adulterated milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, or any thereof, that does not conform to the standard as hereinafter defined and prescribed, and that the dairies, cows, cow stables, houses, vessels, and vehicles from which such milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk is sold or offered for sale, or is supplied for the purpose of being sold, conform to the provisions of this ordinance and to the rules of the board of health, it shall be the duty of the said board of health to issue, without cost to such applicant, a permit to bring and receive into the said city for sale, and therein to sell, or offer for sale, milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk: *Provided, however,* That such permit shall be granted only on the express condition that the same shall be subject to suspension for a period not exceeding six months by the said board of health, in its discretion, upon proof to the satisfaction of said board of a violation by the holder thereof, or his servant, employee, or agent, of any of the provisions of this ordinance, or of any rule of the board of health relating to the inspection and sanitary condition of dairies, or upon proof of violation by such holder of any law of the State of California providing against the adulteration of milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk.

No such permit shall be suspended until after a hearing shall have been had by the board of health, notice of which hearing shall be given in writing and served at least three days prior to the date of hearing upon the holder of such permit or upon his or its manager or agent. Such notice shall state the ground of complaint against the holder of such permit and shall also state the time when and place where such hearing will be had. Such notice shall be served upon the holder of such permit by delivering the same to such person, firm, or corporation, or to his or its manager or agent, or to any person of suitable age and discretion in charge of or employed in the place of business of such person, firm, or corporation; or if such person has no place of business, then at his place of residence, or by leaving such notice at the place of residence of such person with some person of suitable age and discretion. If the holder of such permit can not be found and service of such notice can not be made upon him or it in the manner herein provided, then a copy of such notice shall be mailed, postage fully prepaid, addressed to such holder of such permit at such place of business or residence at least three days prior to the date of such hearing: *Provided, however,* That the health officer shall have power and he is hereby authorized to suspend any such permit at any time when he shall ascertain that any provision of this ordinance or any such rule of the board of health is being violated by the holder of such permit, or his servant, employee, or agent, and such suspension shall be effective until the next meeting of the board of health after the date of such suspension.

If any such permit shall be suspended by the board of health or by the health officer, it shall be unlawful during the period of such suspension for the holder of such permit to bring or receive, or to cause or permit to be brought or received, into the city of Los Angeles, for sale, or to sell, exchange or deliver, or to offer for sale, exchange or delivery, or to cause or permit to be sold, exchanged or delivered, or to be offered for sale, exchange or delivery, or to have in possession for sale, exchange or delivery therein, any milk, cream, butter-

milk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk.

SEC. 4. Such permit shall be good until the same is suspended as provided by this ordinance, or until the holder of such permit changes the location of his place of business, or conveys or otherwise disposes of the business of selling milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk: *Provided, however*, That any person, firm, or corporation who shall purchase any such business, for which a permit shall have been obtained and shall be in force at the time of such sale, may conduct and operate such business under such permit for a period of not more than 30 days from and after the date of such sale, unless such permit is suspended as herein provided, and such purchaser shall, during the said period of 30 days, apply for and obtain a permit in the manner provided by this ordinance: *And provided further*, That if any holder of any such permit shall change or remove the location of his place of business, such holder may continue to conduct and operate such business under such permit for a period of not more than 30 days from and after the date of such change or removal, unless such permit is suspended as herein provided, and such holder shall, during the said period of 30 days, apply for and obtain a permit in the manner provided by this ordinance.

If such new permit is not applied for and obtained in the manner and within the time herein prescribed, such person, firm, or corporation shall be deemed to be conducting and operating such business without a permit from and after the expiration of such period of 30 days.

SEC. 5. All dairies, cows, cow stables, houses, vessels, and vehicles, whether within the city of Los Angeles or not, from which milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk is sold or offered for sale, or is supplied for the purpose of being sold, within the limits of the said city, and all places and vehicles within the said city in which milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk is sold, kept, carried, or conveyed, shall be subject at all times to inspection by the health officer or by some one deputed by him, or by members of the board of health, or by the inspectors in the health department, and it shall be the duty of all persons owning or having charge of such dairies, cows, cow stables, houses, vessels, or vehicles to allow such inspection, and to allow such dairies, cow stables, houses, vessels, or vehicles to be entered by the health officer or by some one deputed by him, or by members of the board of health, or by the inspectors in the health department for the purpose of such inspection; and in case the owner or person in charge of a dairy, cow, cow stable, house, vessel, or vehicle without said city, from which milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk is sold, or is supplied to the holder of a permit for the purpose of being sold within the limits of said city, refuses to allow such entry or inspection, then such holder shall, upon notification by the health officer, or some one deputed by him, or an inspector in the health department, immediately discontinue selling or offering for sale any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk furnished or supplied by such owner or person so refusing.

All persons selling or offering for sale milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk within said city or furnishing or supplying milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk to be sold therein shall allow samples thereof to be taken by the health officer, or by any person deputed by him, or by the members of the board of health, or by the inspectors in the health department at any time when demanded.

SEC. 6. It shall be unlawful for any person, firm, or corporation to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, except in sealed bottles or other sealed receptacles: *Provided, however*, That the provisions of this section shall not apply to any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk sold, ex-

changed, or delivered, or offered for sale, exchange, or delivery, or had in possession for sale, exchange, or delivery in any place devoted exclusively to the sale or storage for sale of milk and the products thereof, or devoted exclusively to the sale or storage for sale of eggs, milk, and the products of milk and shall not apply to milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk sold to be consumed upon the premises wherein or whereon the same is sold.

SEC. 7. It shall be unlawful for any person, firm, or corporation keeping for sale any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk in any store, restaurant, bakery, or other establishment to fail, refuse, or neglect to keep the same at all times before the sale thereof in a clean and well-drained cooler or refrigerator. Such cooler or refrigerator shall be kept tightly closed at all times, except when articles are being placed into or taken from the same, and shall be kept in such location and under such conditions as shall be approved by the board of health.

SEC. 8. All wagons or vehicles used in carrying or transporting milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk shall have the name of the owner, the name of the dairy, the number of the wagon license, and the word "milk," or the word "cream," or the words "milk and cream," or the word "buttermilk," or the words "condensed (or evaporated) milk," painted thereon in plain and legible English, in letters or figures not less than 2 inches high; the word or words so painted shall indicate the article or articles carried in such wagon or other vehicle.

SEC. 9. It shall be unlawful for any person, firm, or corporation who uses in his or its business a wagon, cart, or other vehicle to fail, refuse, or neglect to have and keep upon such wagon, cart, or other vehicle a covering of canvas or other material so arranged as to protect securely the contents of such wagon, cart, or other vehicle from dust and the rays of the sun.

SEC. 10. It shall be unlawful for any person, firm, or corporation selling or offering for sale any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, in the city of Los Angeles, or for use or to be used therein, to feed, or to cause or permit to be fed, to his milch cows, or to have in possession with intent to feed to such cows, any garbage, swill, refuse, or other improper, unclean, or unwholesome food.

It shall be unlawful for any person, firm, or corporation to bring or receive, or to cause or permit to be brought or received, into the city of Los Angeles, for sale, or to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery therein, any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, from any cow or cows to which any garbage, swill, refuse, or other improper, unclean, or unwholesome food shall have been fed.

SEC. 11. It shall be unlawful for any person, firm, or corporation to bring or receive, or to cause or permit to be brought or received, into the city of Los Angeles, for sale, or to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery therein, any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk produced from cows that are kept in any place where the water, ventilation, food, or surroundings are not wholesome and sufficient for the preservation of the health and safe condition of such cows, and the preservation of the wholesomeness of the milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk produced therefrom.

SEC. 12. It shall be the duty of every person, firm, or corporation producing or dealing in milk or cream to cool or reduce the heat thereof to a temperature of not exceeding 70° F., immediately after the same is milked, and to maintain such milk or cream at or below such temperature at all times prior to the delivery thereof to a consumer or consumers, except during such time as such milk or cream is undergoing the process of pasteurization, condensation, sterilization, or evaporation, and it shall be unlawful for any such person, firm, or corporation to fail, refuse, or neglect so to do.

**SEC. 13.** The standard of milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, and condensed or evaporated skimmed milk in and for the city of Los Angeles, is hereby defined and prescribed as follows:

Milk is the fresh, clean lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding such secretion obtained for a period of 20 days before calving and for a period of 8 days after calving, and containing, by weight, not less than 8.5 per cent of milk solids, not fat, and not less than 3.5 per cent of milk fat, and a total of milk solids of not less than 12.5 per cent.

Cream is that portion of milk, rich in milk fat, that rises to the surface of milk on standing, or is separated from milk by centrifugal force. is fresh and clean, and contains, by weight, not less than 20 per cent of milk fat, and in the nonfatty portion thereof not less than 8.8 per cent nor more than 9.8 per cent of milk solids.

Buttermilk is the product which remains when butter is removed from milk or cream in the process of churning and contains, by weight, not less than 8 per cent of milk solids.

Skimmed milk is milk from which all or a portion of the milk fat has been removed, and which contains, by weight, in the nonfatty portion thereof, not less than 8.8 per cent of milk solids.

Pasteurized milk is milk that has been heated above 105° F., and maintained at or above such temperature for not less than 20 minutes, and immediately cooled to 70° F., or lower, and maintained at or below 70° F. at all times prior to delivery thereof to a consumer or consumers.

Condensed or evaporated milk shall contain, by weight, not less than 7.7 per cent of milk fat, and a total of milk solids of not less than 28 per cent.

Condensed or evaporated skimmed milk shall contain, by weight, not less than 18 per cent of milk solids.

It shall be unlawful for any person, firm, or corporation to bring or receive, or to cause or permit to be brought or received, into the city of Los Angeles, for sale, or to sell, exchange or deliver, or to offer for sale, exchange or delivery, or to cause or permit to be sold, exchanged or delivered, or to be offered for sale, exchange or delivery, or to have in possession for sale, exchange or delivery therein, any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, that does not conform to the standard hereinbefore defined and prescribed therefor.

**SEC. 14.** It shall be unlawful for any person, firm, or corporation to place, or to cause or permit to be placed, any water or any foreign substance of any kind in any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk.

It shall be unlawful for any person, firm, or corporation to bring or receive, to cause or permit to be brought or received, into the city of Los Angeles, for sale, or to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery therein, any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, into which any water or any foreign substance of any kind shall have been placed.

For the purposes of this section condensed or evaporated milk and condensed or evaporated skimmed milk shall be deemed to be foreign substances if the same or either thereof shall be placed in milk or cream.

That any person, firm, or corporation violating any of the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punishable as follows:

For the first offense, by a fine of not less than \$10 nor more than \$200, or by imprisonment in the city jail for a period of not more than 50 days, or by both such fine and imprisonment.

For the second offense, by a fine of not less than \$50 nor more than \$400, or by imprisonment in the city jail for a period of not less than 5 days nor more than 100 days, or by both such fine and imprisonment.

For the third or any subsequent offense, by a fine of not less than \$100 nor more than \$500, or by imprisonment in the city jail for a period of not less than 25 days nor more than 6 months, or by both such fine and imprisonment.

**SEC. 15.** It shall be unlawful for any person, firm, or corporation to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery, any skimmed

milk, unless there shall be attached to the outside of every vessel, can, or package from or in which such skimmed milk is sold or held for exchange or delivery a tag upon which shall be printed in black letters at least 1 inch in height the word "skim" or the words "skimmed milk."

SEC. 16. It shall be unlawful for any person to bottle or to place in a jar, can, or other receptacle, or to cause to be bottled or placed in a jar, can, or other receptacle, any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, while such person is upon, at, or near the delivery wagon, or at any other place than the milk house.

SEC. 17. It shall be unlawful for any person to whom any milk or cream is delivered to fail or neglect, immediately after emptying the receptacle in which such milk or cream shall have been delivered, to rinse or cause to be rinsed thoroughly, such receptacle, so as to free the same from all remnants of milk or cream.

SEC. 18. It shall be unlawful for any person to place, or to cause or permit to be placed, into any receptacle that is commonly used for the reception, storage, or delivery of milk or cream for sale, any filthy or offensive substance or any refuse matter of any kind, or to use, or to cause or permit to be used, any such receptacle for cooking or heating milk or cream or any other substance.

SEC. 19. It shall be unlawful for any person, firm, or corporation to bring or receive, or to cause or permit to be brought or received, into the city of Los Angeles, for sale, or to sell, exchange, or deliver, or to offer for sale, exchange, or delivery, or to cause or permit to be sold, exchanged, or delivered, or to be offered for sale, exchange, or delivery, or to have in possession for sale, exchange, or delivery therein, any condensed, evaporated, pasteurized, sterilized, or heated milk or cream or any milk or cream that shall have been subjected to heat in any manner, unless the receptacle in which the same is contained bears a label stating that the same has been condensed, evaporated, pasteurized, sterilized, or heated, as the case may be.

SEC. 20. The existence in the city of Los Angeles of any adulterated, foul, or unclean milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, or of any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk that does not conform to the standard hereinbefore defined and prescribed therefor, or that is above the temperature hereinbefore prescribed, is hereby declared to be a nuisance, and the same is ordered to be abated accordingly. The health officer, the inspectors employed in the health department, and all other officers or employees of the city of Los Angeles charged with the inspection of milk, are hereby authorized and required to condemn such milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk immediately upon discovering that the same does not conform to the standard or that the same is above the temperature prescribed in this ordinance, and to destroy the same, or, instead of destroying the same, to introduce thereinto a substance that will make it evident that the same has been condemned and that will prevent the sale or use of the same as milk, cream, buttermilk, skimmed milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, as the case may be: *Provided, however,* That the provisions of this section shall not apply to skimmed milk when labeled as such as required by the provisions of this ordinance if the same is not below the standard herein prescribed therefor.

SEC. 21. It shall be unlawful for any person, firm, or corporation to use, or to cause or permit to be used, any bottle, can, or other vessel or utensil for the purpose of handling, storing, selling, delivering, or distributing milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk therein, unless, immediately prior to such use, such bottle, can, or vessel shall have been washed clean in warm water, with soda or soap, and thoroughly sterilized by boiling or steaming by means of an appliance or plant used exclusively for that purpose. Such appliance or plant shall be open at all times to the inspection of the health officer, or any inspector employed in the health department, and it shall be unlawful for any person, firm, or corporation to prevent, or to attempt to prevent, the health officer or any such inspector from inspecting any such appliance or plant or any portion thereof or to interfere in any manner with such inspection.

Sec. 22. It shall be unlawful for any person to serve any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk in bottles, to any dwelling in which any person is ill with any contagious, infectious, or communicable disease, or to any dwelling on which there is a placard or notice stating or indicating that any person therein is ill with any contagious, infectious, or communicable disease until after such placard shall have been removed by the proper officer.

It shall be unlawful for any person to remove from any such dwelling any bottle or receptacle which shall have been or is to be used for the purpose of receiving, storing, or delivering milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, or into which any milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk shall have been or is to be placed, or which is commonly used for the reception, storage, or delivery of milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk.

Sec. 23. It shall be unlawful for any person affected with any contagious, infectious, or communicable disease, or who shall have been knowingly exposed to any such disease within a period of 10 days, to handle, transport, deliver, mix, work over, or distribute milk, cream, buttermilk, skimmed milk, pasteurized milk, condensed or evaporated milk, or condensed or evaporated skimmed milk, or to serve as a milker or milkman.

Sec. 24. It shall be unlawful for any person, firm, or corporation to use, or to cause or permit to be used, any bottle, can, or other vessel in the sale, distribution, or delivery of milk or cream which shall have been handled by any person affected with any contagious, infectious, or communicable disease, unless such bottle, can, or other vessel shall have been cleaned and sterilized as hereinbefore provided.

Sec. 25. It shall be the duty of every person, firm, or corporation owning, conducting, carrying on, or operating any dairy or milk house, or any place where milk is stored or is kept for sale, to post and to keep posted therein at all times a copy of this ordinance.

Sec. 26. That any person, firm, or corporation violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punishable, unless otherwise provided by this ordinance, by a fine of not less than \$5 nor more than \$500, or by imprisonment in the city jail for a period of not more than six months, or by both such fine and imprisonment.

Each such person, firm, or corporation shall be deemed guilty of a separate offense for every day during any portion of which any violation of any provision of this ordinance is committed, continued, or permitted by such person, firm, or corporation, and shall be punishable therefor as provided by this ordinance.

Sec. 27. That ordinance No. 17193 (new series), entitled "An ordinance regulating the sale of milk, cream, buttermilk, condensed or evaporated milk or cream, in the city of Los Angeles, and providing for the inspection of milk, cream, buttermilk, condensed or evaporated milk or cream, dairies, cows, cow stables, milk houses, milk vessels, and vehicles," approved September 30, 1908, and all ordinances amendatory thereto or thereof, and all other ordinances in conflict with this ordinance, be, and the same are hereby, repealed: *Provided*, That any such repeal shall not affect or prevent the prosecution and punishment of any person, firm, or corporation for any act done or permitted in violation of any ordinance which may be repealed by this ordinance, and shall not affect any prosecution or action which may be pending in any court for the violation of any ordinance repealed by this ordinance.

Sec. 28. The city clerk shall certify to the passage of this ordinance, and shall cause the same to be published once in the Los Angeles Daily Journal.

I hereby certify that the foregoing ordinance was adopted by the council of the city of Los Angeles at its meeting of July 12, 1910.

H. J. LELANDE, *City Clerk*.

Approved July 13, 1910.

GEO. ALEXANDER, *Mayor*.

**RULES OF THE BOARD OF HEALTH OF THE CITY OF LOS ANGELES, CAL., GOVERNING THE INSPECTION AND REGULATING THE SANITARY CONDITION OF DAIRIES AND MILK DEPOTS.**

**SECTION 1.** Milk from cows suffering from tuberculosis, actinomycosis, Texas fever, abscess, mammitis, or any infectious or contagious disease, especially abortion or other trouble associated with parturition; and the milk from cows 20 days previous to, and 8 days after, calving shall not be marketed in the city of Los Angeles.

All cows during and eight days after calving must be separated from the milch cows and excluded from the stanchions or place where milking is done.

**SEC. 2.** Every person or firm controlling or having in possession any dairy or milch cows supplying milk or cream to the city of Los Angeles shall provide and maintain a suitable milk house for the purpose of cooling, mixing, storing, canning, or bottling the same. Said milk house or room shall not be located in or be part of any residence, or dwelling house, or barn.

Milk or cream shall not be cooled, stored, mixed, or kept in any room or place which is occupied by any person or persons as a sleeping or living apartment, or occupied by horses, cows, or other animals, or fowls of any kind. The cooling, mixing, or storeroom for milk or cream shall be used for no other purpose whatever. All rooms or houses in which milk or cream may be cooled, stored, mixed, or bottled shall be provided with such walls as can be kept clean and will exclude flies and other insects, and the floors of said room shall be made of such material as can be kept constantly clean.

**SEC. 3.** No urinal, privy vault, open cesspool, stagnant water, accumulation of manure or other filth shall be permitted within 100 feet of any room or house where milk or cream is cooled, stored, mixed, or kept.

**SEC. 4.** Every person or firm owning or controlling more than two milch cows supplying milk or cream to the city of Los Angeles shall provide and maintain suitable stanchions where said cows shall be milked.

The stalls or stanchions or place where cows are milked shall be provided with clean, dry floors with adequate gutters behind the cows not less than 12 inches in width and 4 inches in depth and sufficient incline to assure good drainage.

No horse stable, accumulation of manure, urine, stagnant water or other filth shall be permitted in or within 50 feet of said cow stall, stanchions, or place where milking is done.

No privy vault or open cesspool shall exist or be maintained within 100 feet of any such stall, stanchions, or milking place.

**SEC. 5.** Every person keeping cows supplying milk or cream to the citizens of Los Angeles City shall cause the inclosure in which such cows are kept to be graded and drained, so as to keep the surface reasonably dry and prevent the accumulation of water or urine therein.

**SEC. 6.** The accumulation of manure, urine, stagnant water, or other filth shall not be permitted in any corral, stable, or place where milch cows are kept.

Every dairy shall be supplied with pure water and milch cows shall not be allowed to drink from stagnant pools or water contaminated by any barnyard, privy, or sewage of any kind.

**SEC. 7.** Every person or persons using any premises for keeping cows for dairy purposes which supply milk or cream to Los Angeles City shall keep the entire premises clean and in good repair and the buildings shall be well painted or whitewashed once in every 12 months.

The walls, floors, and ceilings of all stalls or places where milking is done shall be kept clean at all times.

**SEC. 8.** No person having any communicable disease or one caring for any person having such disease, shall be allowed to handle the milk or milk utensils. Every person employing one or more milkers or attendants shall provide and maintain clean and suitable housing and bathing facilities for the use of such milkers or attendants.

**SEC. 9.** All milkers or other attendants who handle the milk or cream which is offered for sale or delivered in the city of Los Angeles, shall be personally clean; and all such persons before entering upon their duties connected with the dairy shall thoroughly wash their hands with soap and warm water, and no milker shall be permitted to wash the teats with milk or water in the milk bucket, or to milk cows with wet or moist hands.

**SEC. 10.** No bucket, can, or other receptacle used for the reception of milk, other than the ones used by the milkers for drawing the milk in, shall be

allowed in any stall or place where milking is done, and each bucket of milk shall be immediately taken to the milk house and cooled.

No galvanized vessel shall be used as a receptacle for milk or cream.

Sec. 11. No person shall mix the milk or cream drawn at night with the milk or cream drawn in the morning.

Sec. 12. No beet pulp or other fermenting food, shall be stored or kept within 50 feet of the milk house, or the stanchion, or other place where the milking is done.

Sec. 13. No pig or pigs shall be permitted penned, or running at large, within 50 feet of any corral where milk cows are kept, or within 100 feet of any milk house, or stanchion, or other place where milking is done.

Sec. 14. Any violation of these rules will be considered cause for suspension of permit or exclusion of the milk from this city.

Adopted by Board of Health of the city of Los Angeles, June 7, 1910.

## LYNCHBURG, VA.

### FOOD-INSPECTION ORDINANCE.

[Adopted Oct. 14, 1908.]

*Be it ordained by the council of the city of Lynchburg:*

(1) That it shall not be lawful for any person, firm, or corporation to sell, offer for sale, or deliver, or have in any store, stall, stand, or vehicle, from or in which milk is sold or delivered, any adulterated or unwholesome milk. The term "adulterated" when so used in this ordinance means, first, milk containing more than 88 per cent of water fluids; second, milk containing less than 12 per cent of solids; third, milk containing less than  $3\frac{1}{2}$  per cent of butter fats; fourth, milk drawn from unhealthy cows or from cows kept in a crowded or unclean condition; fifth, milk drawn from cows within 15 days before or 5 days after parturition; sixth, milk from which any part of the cream has been removed, or which has been diluted with water or any other fluid, or to which has been added or into which has been introduced any foreign substance whatever; seventh, milk the temperature of which is higher than  $60^{\circ}$  F.; eighth, milk which at a temperature of  $60^{\circ}$  F. has a specific gravity of less than 1.029. The term "unwholesome" shall be construed to mean deleterious to health, or causing derangement of the functions of the human body by the temporary or continuous use of the unwholesome product. Nothing in this ordinance shall be construed to prevent the sale of skim milk or buttermilk, provided they be sold as such, and that the purchaser be in every instance notified of their true character; and in the case of the former the words "skim milk" be plainly marked on the vessel containing the same when delivered, and the letters being at least half inch high. Cream shall contain not less than 18 per cent butter fats. The word "cream" as used in this ordinance means that portion of milk rich in butter fats which rises to the surface of milk on standing or is separated from it by centrifugal force.

(2) It shall not be lawful for any person, firm, or corporation to sell, offer for sale, or deliver, or have in any store, stall, stand, or vehicle, from or in which food products are sold or offered for sale, any tainted, unsound, rotten, or partly decomposed fish, shellfish, fruit, vegetables, meat, or any other food product, whether or not the same is kept apparently fresh by sulphurous, salicylic or boric acid, borax, formaldehyde, or any other preservative which is deemed injurious to health.

(3) Every person, firm, or corporation owning, leasing, or occupying any rooms, store, or place where milk, cream, fish, shellfish, fruit, vegetables, meat, or any other food product shall be stored and kept or offered for sale shall put and keep such rooms, store, or place and its appurtenances in a clean and wholesome condition; and every person having charge of or engaged in the selling or care or custody of any milk or cream or other articles of food shall put and keep the same in a clean and wholesome condition; nor shall any person suffering from an infectious or contagious disease be allowed to handle or come in contact therewith; nor shall any meats be conveyed through the city except in such manner as may be approved by the food inspector.

(4) It shall be unlawful for any person, firm, or corporation making or offering for sale any food or drink in which milk is the principal ingredient to use therein adulterated milk; and the place wherein such food or drink is manufactured or offered for sale shall be subject to inspection, and the persons manufacturing or offering for sale such products shall be subject to the provisions of this ordinance.

(5) Any person, firm, or corporation conveying milk or cream in vehicles or otherwise for the purpose of selling the same, and all those who sell or offer for sale milk or cream in the city of Lynchburg, shall first be licensed by the food inspector, and shall register at the time of being licensed in the inspector's books. Licenses shall be issued to run until the first day of the following May, and there shall be no tax upon the same, but they shall be subject to revocation by the inspector for any violation of this ordinance.

(6) In order to carry out the provisions of this ordinance the inspector and employees of the board of health and all policemen of the city shall have the right at any time to enter upon and inspect all places where milk, cream, or other articles of food are stored or kept or offered for sale, and to take therefrom samples for analysis; and any person who hinders or obstructs such officials in the discharge of their duties shall be subject to the penalties provided for a violation of this ordinance.

(7) It shall be the duty of the board of health to see that the provisions of this ordinance are carried out; and there shall be elected by the council of the city of Lynchburg, from the qualified voters of said city, a food inspector, who shall be a competent analytical chemist, skilled in the chemical and microscopic examination of milk and other articles of food; he shall not be in any manner interested in the sale of milk or other articles of food within the city of Lynchburg; he shall frequently and at irregular intervals make inspection of all places and of all vehicles in which milk or cream is kept, transported, or sold; he shall also make an inspection, at such times as he thinks proper, of all stores, stalls, or places where fish, shellfish, fruit, vegetables, meat, or any food product is kept or sold; he shall keep in his books the names and addresses of all persons engaged in the sale of milk; he shall carefully examine the vessels in which milk or cream is kept or transported, and at least twice a year shall go through the stables where the cows are kept from which milk is sold in the city of Lynchburg, shall watch the milking and examine the cows, and at least twice a year shall analyze a specimen of the milk of every dairy, vehicle, and stand from which milk or cream is delivered or sold within the city of Lynchburg, and shall analyze other articles of food as in his judgment may be proper. These analyses shall be recorded in a book to be kept by him, and they, together with the notes made by him concerning the sanitary conditions of persons and places where milk or other food products is sold or handled in the city of Lynchburg, shall be transmitted by him to the board of health annually, or more frequently, as the board may direct. The inspector shall receive a salary of \$100 per month and shall be allowed \$10 per month for expenses.

(8) Any person, firm, or corporation violating any of the provisions of this ordinance shall be fined not less than \$5 nor more than \$25 for each offense; and any milk, cream, or other articles of food kept, exposed, or offered for sale, or intended to be sold, within the city of Lynchburg, in violation of any of the provisions of this ordinance, shall be destroyed under the direction of the inspector.

(9) The office of milk inspector shall not be abolished by this act until a food inspector has been elected.

(10) The food inspector shall also have the title of city chemist.

(11) This ordinance shall be in force from its passage.

Amended September 15, 1909, by adding bacteria count of not more than 500,000 per cubic centimeter.

## PROVIDENCE, R. I.

### MILK LAWS.

[Chap. 173.]

SECTION 1. All milk, cream, and skimmed milk shall be sold only by standard wine measure, and by or in measures, cans, jars, bottles, or other vessels or receptacles which shall, prior to being used in such sale, be sealed by the sealer

of weights and measures of the town where the person so using the same shall usually reside in this State or of the town where such milk shall be sold for use; and every person selling any of the same contrary to this section, or delivering any of the same sold contrary hereto, shall be fined for the first offense not less than \$50 and not exceeding \$100, and for any subsequent offense not less than \$100, or imprisonment not to exceed 90 days, or both such fine and imprisonment. Any purchaser of milk, cream, or skimmed milk having reason to believe that any measure, can, jar, bottle, or other vessel or receptacle in which milk, cream, or skimmed milk is sold and delivered to him is not of sufficient size or capacity to contain, by standard wine measure, the amount thereof purchased may apply to the sealer of weights and measures of the town in which such milk, cream, or skimmed milk is delivered to him, which sealer shall, upon the receipt of a fee of 25 cents therefor, test the capacity of the same and issue to such purchaser his certificate stating the capacity thereof; and if such capacity according to such certificate shall be less than the amount purchased, such purchaser may make complaint and deliver such certificate to any officer of such town authorized to make complaints for the violation of this chapter, who thereupon shall duly make complaint against and prosecute the person or persons selling or delivering the same for violation of this section.

SEC. 2. No person, firm, or corporation, as principal, servant, or agent, shall sell, exchange, or deliver, or have in his or its possession, care, custody, or control with intent to sell, exchange, or deliver, in any manner whatsoever, milk, cream, or skimmed milk, within any city, unless such person, firm, or corporation shall have first obtained and have in force a license therefor from the board of aldermen of such city.

SEC. 3. The board of aldermen of such city may grant licenses to any person, firm, or corporation making written application therefor at the office of the inspector of milk of such city on printed form or forms provided for that purpose by such inspector of milk. Such application shall state the name, residence, and location of the business place or places of the applicant, the number and the description of each and every wagon, carriage, or other vehicle used by the applicant in the milk, cream, or skimmed milk business, and the names and residences of all persons from whom such applicant purchases any milk, cream, or skimmed milk. Any licensee hereunder shall at any time, on request of said inspector, give said inspector such information. All applications shall be signed by the applicant, and in case of corporations so applying the application shall be made by the treasurer or other duly authorized officer thereof, and the names of the officers of any corporation so applying, or to which such license is granted, shall be furnished in writing by such corporation to such inspector at any time on his request. The inspector of milk shall promptly present to said board of aldermen each such application, with his recommendations thereon in writing. All licenses issued shall expire on the first Monday of February next following the date of such license.

SEC. 4. The inspector of milk shall keep a record of all such licenses issued, including the name, residence, and place of business of each and every person to whom such license is issued and the date of issue and the date of license, and so much of section 12 of this chapter as requires milk dealers to register their names and places of business in the inspector's book shall not apply to such licensees. No person, firm, or corporation holding such license shall have power to transfer, sell, or assign such license. Such license shall not be required for a person acting as the servant or agent of a person, firm, or corporation having a license, but they shall record the names and residences of such servants and agents in the office of the inspector of milk. Any person, firm, or corporation licensed under the provisions of this chapter shall immediately cause to be and remain posted such license upon some conspicuous part of the room, place, or office in which the business is carried on.

SEC. 5. The board of aldermen of such city shall have the power at any time in their discretion, upon the complaint of the inspector of milk or of any other person, to revoke or suspend any such license for any violation of the provisions of this chapter, or for any other good and sufficient cause, or when the interest of the public health demands it: *Provided, however,* That no such license shall be revoked or suspended until after said board of aldermen shall give the licensee five days' previous notice and an opportunity to be heard in person or by counsel.

SEC. 6. Any person violating any provision of section 2 of this chapter shall, upon conviction, be fined for the first offense not less than \$15 and not exceeding

\$100, and for any subsequent offense not less than \$100 or imprisonment not to exceed 90 days, or both such fine and imprisonment.

SEC. 7. Any town may at any time accept the provisions of sections 2 to 7, inclusive, of this chapter by vote of the town council thereof and by filing in the office of the secretary of state a copy of such vote of acceptance duly certified by the town clerk thereof; whereupon the foregoing provisions of this chapter shall apply to such town for the purpose of granting and issuing such licenses, and at the expiration of 30 days from such filing shall wholly apply to such town for all purposes therein, and the town council thereof shall have all the powers conferred thereby upon the board of aldermen of any such city.

SEC. 8. The mayor and aldermen of any city, and the town council of any town, may annually elect one or more persons to be inspectors of milk therein, who shall be engaged to the faithful discharge of the duties of their office. Every such inspector shall give notice of his election by publishing notice thereof for two weeks in some newspaper published in the city or town for which he shall be elected; or, if no newspaper be published therein, by posting up such notice in two or more public places in such city or town: *Provided*, That the mayor and aldermen of the city of Providence shall annually, in the month of August, elect such person or persons to be inspectors of milk, and may, at any time during the year thereafter, fill by election any vacancy occurring by reason of death, resignation, absence from the city, or inability to act.

SEC. 9. Any inspector of milk of any town or city may appoint, subject to the approval of the town council or the mayor and aldermen, one person as collector of samples, except in the city of Providence, where two may be appointed, who shall have the same powers and be subject to the same duties and liabilities provided by law relative to the taking of specimens or samples, as an inspector of milk. All specimens or samples taken and retained by any such collector shall be delivered to such inspector, who shall have the same powers and duties relative to the same as in case of specimens or samples taken by himself. Such inspector at any time may revoke the appointment of any such collector and, subject to the approval aforesaid, appoint another person in his stead. Such collector upon being appointed shall be duly engaged to the faithful discharge of his duties before the city or town clerk, who shall keep a record thereof; and shall receive such salary as the mayor and aldermen or town council shall determine.

SEC. 10. Every inspector of milk shall have an office and a book for the purpose of recording the names and places of business of all persons engaged in the sale of milk within the limits of his town. He may enter any place where milk is stored or kept for sale and examine all carriages used in the conveyance of milk, and whenever he has reason to believe any milk found by him is adulterated, he shall take specimens thereof and cause the same to be analyzed or otherwise satisfactorily tested, the result of which he shall record and preserve as evidence; and a certificate of such result, sworn to by the analyzer, shall be admissible in evidence in all prosecutions under this chapter. Such inspector shall receive such compensation as the mayor and aldermen or town council shall determine.

SEC. 11. Whenever the inspector of milk shall have reason to believe that adulterated produce or food is being sold or kept for sale contrary to law, he shall take at least two specimens from the same package or bulk as samples thereof, such specimens, if sold, not to exceed in weight 1 pound each, and if liquid, not to exceed in measure 1 pint each. He shall take said samples in the presence of the owner or his agent, and shall seal and label the same in the presence of such owner or agent, said labels to state the kind of provisions or food and the name of the seller, and shall then and there deliver one of said samples to such owner or agent.

SEC. 12. Whoever, engaging in or being engaged in the business of selling milk and conveying the same for sale, neglects to cause his name and place of business to be recorded in the inspector's book and his name to be legibly and conspicuously placed and constantly kept upon all carriages and vehicles used by him in the conveyance of milk or in the sale thereof, and whoever, being engaged in the business of selling milk and conveying the same for sale, shall neglect to renew such record annually between the 1st day of February and the 1st day of March, shall be fined \$20 for the first offense and \$50 for the second and each subsequent offense; and whoever offers for sale milk produced from cows fed upon the refuse of distilleries or any substance deleterious to the quality of the milk, and whoever offers for sale milk produced from sick or diseased cows, shall be fined \$20 for the first offense and \$50 for every subsequent offense; and whoever, in the employment of an-

other, violates any provision of this section shall be held equally guilty with the principal and shall suffer the same penalty.

SEC. 13. No person shall sell or exchange, or have in his possession with intent to sell or exchange, or offer for sale or exchange, adulterated milk or milk to which water or any foreign substance has been added.

SEC. 14. Every person who shall sell, exchange, or deliver, or shall have in his custody or possession with the intent to sell or exchange or deliver, for himself or as the employee of any other person, milk from which the cream or any part thereof has been removed, or which shall not contain  $2\frac{1}{2}$  per cent of milk fats, shall distinctly mark, in letters not less than 1 inch in length, in a conspicuous place above the center, upon the outside of every vessel, can, or package containing such milk, the words "skimmed milk," and such milk shall only be sold in or retailed out of a can, vessel, or package so marked.

SEC. 15. In all prosecutions under sections 13 and 14 of this chapter, if the milk shall be shown upon analysis to contain more than 88 per cent of watery fluids, or to contain less than 12 per cent of milk solids, or less than  $2\frac{1}{2}$  per cent of milk fats, it shall be deemed for the purpose of said sections to be adulterated.

SEC. 16. Every person who shall be found guilty before a district court of violating any of the provisions of the three sections next preceding, upon the first conviction shall be fined \$20, and upon the second and every subsequent conviction shall be fined \$20 and be imprisoned in the county jail for 10 days.

SEC. 17. Whoever, by himself or by his servant or agent, or as the servant or agent of any other person, firm, or corporation having custody of a can, jar, bottle, measure, or other vessel used as a container for milk destined for sale, places or causes or permits to be placed therein any offal, swill, kerosene, vegetable matter, or any article other than milk, skimmed milk, buttermilk, cream, or water or other agent used for cleansing said can, jar, bottle, measure, or other vessel, shall be punished by a fine of \$10 for each vessel so misused.

SEC. 18. Whoever, by himself or by his servant or agent, or as the servant or agent of any other person, firm, or corporation, sends, ships, returns, or delivers, or causes or permits to be sent, shipped, returned, or delivered, to any producer of milk, any can, jar, bottle, measure, or other vessel used as a container for milk containing any offal, swill, kerosene, vegetable matter, rotten or putrid milk, or any other offensive material, shall be punished by a fine of \$10 for each said vessel so misused.

SEC. 19. Whoever, by himself or by his servant or agent, or as the servant or agent of any other person, firm, or corporation, sends, ships, returns, or delivers, or causes or permits to be sent, shipped, returned, or delivered, to any producer, dealer in, or consumer of milk, any can, jar, bottle, measure, or other vessel used as a container for milk without first thoroughly cleaning and cleansing, by the use of boiling water, steam, or other proper agent, such can, jar, bottle, measure, or other vessel used as a container for milk, shall be punished by a fine of \$10 for each said vessel so misused.

SEC. 20. Every inspector of milk shall institute complaints on the information of any person who shall lay before him satisfactory evidence by which to sustain the same.

SEC. 21. Every inspector of milk shall cause the provisions of this chapter to be published in his town at least three times in some newspaper published in said town or some newspaper in the county in which the town is situated.

SEC. 22. Every inspector of milk shall cause the name and place of business of all persons convicted under this chapter to be published in two newspapers published in the town or county where the offense shall have been committed.

SEC. 23. Any chief of police and any inspector of milk, and such special constables as the town council of any town or the board of aldermen of any city may appoint for that purpose, may make complaints and prosecute for all violations, within the city or town wherein they are appointed or elected, of any of the provisions of this chapter, and they each shall be exempt from giving surety for costs on any complaint made as aforesaid.

#### DAIRY RULES.

##### THE OWNER AND HIS HELPERS.

Observe and enforce the utmost cleanliness about the cattle, their attendants, the stable, the dairy, and all utensils.

A person suffering from any disease or who has been exposed to a contagious disease must remain away from the cows and the milk.

## THE STABLE.

Keep dairy cattle in a room or building by themselves. It is preferable to have no cellar below and no storage loft above.

Stables should be well ventilated, lighted, and drained; should have tight floors and walls, and be plainly constructed.

Never use musty or dirty litter.

Allow no strong smelling material in the stable for any length of time. Store the manure under cover outside the cow stable and remove it to a distance as often as practicable.

Whitewash the stable once or twice a year; use land plaster in the manure gutters daily.

Use no dry, dusty feed just previous to milking; if fodder is dusty, sprinkle it before it is fed.

Clean and thoroughly air the stable before milking.

Keep the stable and dairy room in good condition.

## THE COWS.

Have the herd examined at least twice a year by a skilled veterinarian.

Promptly remove from the herd any animal suspected of being in bad health, and reject her milk. Never add an animal to the herd until certain it is free from disease, especially tuberculosis.

Do not move cows faster than a comfortable walk while on the way to place of milking or feeding.

Never allow the cows to be excited by hard driving, abuse, loud talking, or unnecessary disturbance; do not expose them to cold or storms.

Do not change the feed suddenly.

Feed liberally, and use only fresh, palatable food; in no case should decomposed or moldy material be used.

Provide water in abundance, easy of access, and always pure; fresh, but not too cold.

Salt should always be accessible.

Do not allow any strong flavored food, like garlic, cabbage, and turnips, to be eaten, except immediately after milking.

Clean the entire body of the cow daily. If hair in the region of the udder is not easily kept clean it should be clipped.

Do not use the milk within 20 days before calving, nor for 3 to 5 days afterwards.

## MILKING.

The milker should be clean in all respect; he should wash and dry his hands just before milking.

The milker should wear a clean outer garment, used only when milking, and kept in a clean place at other times.

Brush the udder and surrounding parts just before milking, and wipe them with a clean, damp cloth or sponge, then wash the hands thoroughly.

Milk quietly, quickly, cleanly, and thoroughly. Cows do not like unnecessary noise or delay. Commence milking at exactly the same hour every morning and evening, and milk the cows in the same order.

Throw away (but not on the floor—better in the gutter) the first few streams from each teat; this milk is very watery and of little value, but it may injure the rest, as it is high in bacteria.

If in any milking a part of the milk is bloody or stringy, or unnatural in appearance, the whole mess should be rejected.

Milk with dry hands; never allow the hands to come in contact with the milk. A little vaseline may be used on the hands.

If any accident occurs by which a pail full or partly full of milk becomes dirty, do not try to remedy this by straining, but reject all this milk and rinse the pail.

## CARE OF MILK.

Remove the milk of every cow at once from the stable to a clean, dry room, where the air is pure and sweet. Do not allow cans to remain in stables while they are being filled.

Strain the milk through a metal gauze and a flannel cloth or layer of cotton as soon as it is drawn,

Aerate and cool the milk as soon as strained. This must be done in pure air, and it should then be cooled to 45° if the milk is for shipment, or to 60° if for home use.

Never close a can containing warm milk which has not been aerated.

If cover is left off the can, a piece of cloth or mosquito netting should be used to keep out insects.

If milk is stored, it should be held in tanks of fresh cold ice water (renewed daily), in a clean, dry, cold room.

Keep the night milk under shelter, so rain can not get into the cans. In warm weather hold it in a tank of fresh cold ice water.

Never mix fresh warm milk with that which has been cooled.

Do not allow the milk to freeze.

Under no circumstances should anything be added to milk to prevent its souring. Cleanliness and cold are the only preventives needed.

All milk should be in good condition when delivered. This may make it necessary to deliver twice a day during the hottest weather unless the milk is kept iced.

When cans are hauled far, they should be full and carried in a covered spring wagon or blanketed.

In hot weather cover the cans, when moved in a wagon, with a clean, wet blanket or canvas.

#### THE UTENSILS.

Milk utensils for farm use should be made of metal and have all joints smoothly soldered. Never allow them to become rusty or rough inside.

Clean all dairy utensils by first thoroughly rinsing them in warm water; then clean inside and outside with a brush and hot water in which a cleaning material is dissolved; then rinse, and, lastly, sterilize by boiling water or steam. Use pure water only.

After cleaning, keep utensils inverted in pure air, and sun if possible, until wanted for use, unless kept in a steam box.

OFFICE OF INSPECTOR OF MILK,  
*Providence, R. I.*

*To the milk dealers of the city of Providence:*

Your attention is respectfully called to the following sections of the general laws and to the suggestions offered by this department, which must be carefully followed:

Chapter 147, section 6: "No person shall sell or exchange, or have in his possession with intent to sell or exchange, or offer for sale or exchange, adulterated milk or milk to which water or any foreign substance has been added."

Chapter 1342, section 4: "The board of aldermen of such city shall have the power at any time, in their discretion, upon the complaint of the inspector of milk or of any other person, to revoke or suspend any such license for any violation of the provisions of said chapter 147 of the general laws or of any act in amendment thereof or in addition thereto, or for any other good and sufficient cause or when the interest of the public health demands it."

If you have any doubt as to the quality of the milk you are buying, we shall be glad to analyze from time to time any samples you may bring to this office. If you find it profitable to sell milk, you will find it still more profitable to handle a good article. If you can not afford to take time to handle your milk properly and inform yourself as to its quality, you have no right to be in the milk business.

Failure on your part or the part of your dairymen to comply with the provisions of chapter 147 of the general laws, entitled "of milk," or with the inclosed suggestions will lead to the revocation of your license to sell milk.

Very respectfully, yours,

WALTER O. SCOTT, *Inspector of Milk.*

OFFICE OF INSPECTOR OF MILK,  
*Providence, R. I.*

Your attention is respectfully called to the following suggestions, which are offered in the hope that the quality of milk sold in this city may be improved:

Keep the milk clean and cold.

Mix your milk thoroughly before each sale.

Clean all measures and scald them daily with boiling water. In warm weather rinse out your measures and mixing can occasionally with water.

Keep all milk and milk measures in a clean, sweet ice box at all times when you are not selling from the same.

Always keep the milk cans and measures covered to prevent dust, and with it the disease-breeding bacteria, from contaminating the milk you are selling.

Milk cans must not be used for any purpose other than for the sale of milk.

Failure to comply with these suggestions may lead to a revocation of your license to sell milk.

Very respectfully,

WALTER O. SCOTT, *Inspector of Milk.*

OFFICE OF INSPECTOR OF MILK,  
*Providence, R. I.*

*To the milk dealers of the city of Providence:*

Your attention is respectfully called to the following suggestions, which must be carefully followed if the milk which you sell is to contain less than 100,000 bacteria in a cubic centimeter:

The stables must be kept clean and should be whitewashed at least once a year.

The cows must be groomed daily and be free from disease.

The hands of the milkers must be washed immediately before milking, and all milking must be done with dry hands.

The first milk from each teat must be rejected and not collected in the milk pail.

All milk utensils and strainers must be thoroughly cleansed by the use of boiling water, and all cans and bottles must be sterilized before they are again used.

All milk cans must be kept covered to prevent dust and flies from contaminating the milk.

Milk utensils and cans must not be left to air by the dusty roadside, near the sink-drain outlet, the pigsty, or the open privy vault.

All milk must be rapidly cooled and continuously maintained at a temperature below 50° F.

Failure on your part or on the part of your dairymen to comply with these suggestions may lead to a revocation of your license to sell milk.

Very respectfully,

WALTER O. SCOTT, *Inspector of Milk.*

OFFICE OF INSPECTOR OF MILK,  
*Providence, R. I.*

## REASONS FOR THE SUGGESTIONS OFFERED BY THIS DEPARTMENT.

[The facts contained in this circular have been taken from official publications.]

*To the milk dealers of the city of Providence:*

Your attention is respectfully called to the following suggestions offered by this department, intended to improve the quality of the milk offered for sale in this city, to prevent the spread of infectious diseases, and for the protection of the public health. The importance of a clean milk supply is recognized by all intelligent people and should require no argument. It has been my experience that every milk dealer feels that his milk is the best that can be obtained, and to this overconfidence and failure to carefully follow the suggestions offered by this department every complaint against the purity of our milk supply can be traced. With clean, healthy cows, clean hands, properly

sterilized pails, cans, bottles, strainer and milk utensils, absence of flies and dust in the air to which the milk is exposed, rapid cooling, and continuous maintenance thereafter at a temperature below 50° F., clean milk can be produced. It must be evident that it is not difficult to produce clean milk if the suggestions are followed intelligently.

*It is absolutely imperative that the cows producing the milk be free from disease.*—For the protection of the dairy herd diseased cattle should be promptly eliminated. Everyone will agree that the milk from cows suffering from any disease of the udder should be discarded. Careful experiments performed by many trained and eminently responsible investigators have demonstrated beyond reasonable doubt that tubercle bacilli (germs which cause tuberculosis) at certain times may be present in the milk of cows which show no signs of tuberculosis by means of physical examination, yet are proved to be diseased by the tuberculin test. This is explained by reason of the fact that cows which have tuberculosis in the lungs swallow their saliva, together with the organisms responsible for the disease, which pass, together with the food, through the intestinal tract, and in this way are found in the manure and get into the milk. Various foreign commissions have been appointed, and the results of their investigations would seem to show that tuberculosis in animal and man is identical. The department advises all producers, for their own protection and for the protection of the health of their customers, to have their cattle tested with tuberculin by a competent veterinarian at once.

*Cows must be groomed daily.*—Most of the bacteria found in milk comes from the body of the dirty cow and indirectly from the intestinal tract. It is this visible filth which falls into the pail while the cow is being milked. To limit the amount of fine dust, hairs, and scales from the body of the cow which during the process of milking get into the milk, covered pails were invented. Since the bacteria are so small that they can not be filtered, at least by cotton and cheesecloth, once they are in solution, it is absolutely necessary that they be not allowed to fall into the milk. It is only the visible filth, such as straws, hairs, hayseed, scales, and large pieces of manure, etc., which remains on the surface of the cotton or ordinary strainer cloths, while most of the soluble filth and the bacteria which come from the intestinal tract pass into the milk. Many of the so-called sanitary pails containing numerous pieces of cheese-cloth and cotton through which the milk must pass, instead of removing the bacteria are found in fact upon examination to increase the number, since the continuous streams upon the sediment washes all the bacteria and soluble filth into solution.

The amount of dust and dirt which can fall upon the surface of the milk pail will depend upon the cleanliness of the cow first of all, and then upon the area of the collecting surface. Numerous experiments by agents of the Bureau of Animal Industry have shown that milk from tuberculous cows, even when the udders were not diseased, are infected with tubercle bacilli from the manure of the animal. These experiments show that great care is necessary in guarding milk from contamination with particles of dry manure, stable dust, and dirty hairs from the body of the dirty cow. It is, therefore, absolutely necessary that the cows be clean. This cleaning should be done at least one-half hour before the cows are milked, and should be done thoroughly. An old currycomb or a card and an ordinary stable brush will usually serve for the purpose. In some cases the cow's udders and teats must be washed, and if this is found to be necessary the udders and teats should be thoroughly dried before milking is begun. The udder, teats, and parts of the cow which come directly over the milk pail should always be cleansed before the cows are milked with a clean, damp piece of sacking or a towel, and then the hands must be washed thoroughly. The cloths used for this purpose should be washed and kept clean.

*Stables must be kept clean.*—It is certainly necessary to brush down from time to time the cobwebs and dry manure dust which may have accumulated upon the interior of the cow stable, and to sweep up any dry material that may be scattered over the stable floor that the drafts of wind may not dislodge it and blow it into the milk pail. If one will stand where the rays of sunlight pass through the window into a room which is being swept and notice the visible dust particles in the air it will be evident that no sweeping be done in the stable during milking; and that at least one-half hour must elapse after sweeping the floors or cleaning the cows before the milk pails are brought into the stable and milking begun, in order that the dust may settle upon the floor and not fall into the milk pails and thereby contaminate the milk.

*Stables should be whitewashed at least once or twice a year.*—A little lime, water, an old brush, and a pail is all that is necessary. Whitewash is a good disinfectant. It sweetens the air of the stable and makes it lighter. Windows are desirable in stables and dairy buildings because most varieties of bacteria are killed in a few hours by direct sunshine. For this reason the lighter the stable the better.

*The hands of the milkers must be washed immediately before milking, and all milking must be done with dry hands.*—Though this is self-evident, nevertheless many dairy employees take no precaution to keep their hands clean, and the milker who washes his hands just before milking is begun is the exception and not the rule. The word "immediately" is very important. Numerous epidemics of typhoid fever have been traced to infected milk and have had their first start from hand infection. The milker may have a mild attack of typhoid fever, or be in the early stages of a severe attack, or perhaps he may be one of those unfortunates, a typhoid carrier, unfortunate for the community if not for himself. In the act of milking he may wash at least some germs into the milk pail, especially if he squirts the milk upon his palms preliminary to milking. The hands may be soiled by acting as a nurse for some case of typhoid in the family, by emptying or burying the discharges of the patient, or by sharing the family towel with some member of the household who is acting in this capacity. He may be convalescent from scarlet fever or diphtheria, or his hands may come in contact with those who have it. It is easily seen how infective material upon the hands may find its way into the milk and cause sickness for those that drink it.

It would seem to be absolutely necessary that those engaged in the milk business be free from contagious diseases themselves and have no contact with those suffering from them. Milkers should never commence milking without washing their hands. Dealers should not fill bottles and cap them until they have performed this exceedingly important part of their toilet. The department recommends that the hands be cleansed by the liberal use of soap and water, after which they should be thoroughly rinsed, and dried with a clean towel.

*The first milk from each teat must be rejected and not collected in the milk pail.*—Nearly every case of garget is due to bacterial infection of the udder through the teat. The teats, when the cows lay down, come in contact with the stable floor, which can not be always kept perfectly clean. In this way the organisms infect it. By discarding the first stream from each teat any bacteria in the fore milk can be washed into the gutter and not into the milk pail. The first milk is always very poor, and in cases of infection high in bacteria.

*Milk utensils and strainers must be thoroughly cleansed by the use of boiling water and all cans and bottles must be sterilized before they are again used.*—The washing of milk utensils would seem to be a very simple operation. You may perhaps have noticed that a milk can or pail which has been used as a container for milk and left standing around the house or dairy, after it has been supposed to be thoroughly cleansed and scalded, will many times have an offensive smell. This would not be possible if the container had been properly cleansed and sterilized. The reason milk producers have adopted the system of putting their utensils in the yard to air is to allow the bad odor to escape, which is caused by the bacteria decomposing the dirty material and wash water left in most milk cans. When warm milk is put into rusty cans and cans which are not properly constructed and the joints of which are not well soldered, the dirty material left in the rusty pits and unsoldered joints is dissolved and the bacteria liberated and thus enabled to decompose the warm milk.

The way to clean dairy utensils is first to rinse them in luke-warm water, then clean thoroughly inside and outside with a brush and hot water in which the cleansing material is dissolved, then thoroughly rinse with plenty of clean water, and lastly sterilize with boiling water or steam. Milk utensils should always be sterilized by keeping them in water continually boiling for at least 30 minutes. Confined steam under 15 pounds pressure in a steam sterilizer will kill all germs known in 15 minutes.

The general laws of this State, chapter 173, section 19, make it a crime for any person, firm, or corporation to ship, return, or deliver to any producer, dealer in, or consumer of milk, any can, jar, bottle, measure, or other vessel used as a container for milk without first thoroughly cleaning and cleansing by the use of boiling water, steam, or other proper agent. Clean milk in sterile bottles, handled by persons free from disease, is the ideal way to deliver milk, but when cans and bottles are left at homes where there are cases of scarlet fever, typhoid

fever, or diphtheria, and filled by the dealer, contrary to law, without being thoroughly cleansed and properly sterilized, they are a source of danger. The constant presence of many mild cases of disease—so mild that a correct diagnosis is not made by the physician—makes it imperative that no bottles or cans be refilled until they are thoroughly cleansed and sterilized. Every licensed dealer in this city distributing milk in cans and bottles has the proper equipment to do this work, and any epidemic of contagious diseases from improperly sterilized cans and bottles will be due to willful negligence. Milk producers must not be allowed to use sterile cans intended for our city milk supply as pails to bring water for cattle, or for any other purpose on the farm.

*Milk cans must be kept covered to prevent dust and flies from contaminating the milk; milk utensils and cans must not be left to air by the dusty roadside, near the sink-drain outlet, the pigsty, or the open privy vault.*—Milk cans should be covered with a clean canvas or blanket, used only for that purpose, when they are being carted over the road, that the dirt and manure dust in the highway may not settle upon them and get into the milk can and contaminate the milk when the wooden stoppers and covers are removed.

No good reason can be given why milk should remain in the barn unnecessarily exposed to contamination with the foul odors and manure dust of the stable for any material period of time. On nearly every farm there are enough old boards which could be nailed together to make a suitable milk room into which the milk should be carried immediately after it is drawn from the cow. The reason for such a building must be evident.

Insects play a large part as mechanical carriers of disease germs, the greatest menace to our daily life being the common house fly known to scientists as the typhoid fly. It breeds in manure and it feeds on it; it feeds on the sputum of diseased throats and on typhoid dejecta, and by means of its hairy feet and legs it carries about and distributes particles of these vile feasts, which frequently contain living germs capable of producing a new case of disease. In still another way does the fly spread disease—germs taken into its body in food are known to remain alive in the intestines, and also for days after they are ejected in the "specks," i. e. in the fly excrement. Recent experiments with animals have proved this to be true of both tuberculosis and typhoid, the germs in the "speck" having actually given the disease from 9 to 15 days after being voided by the fly.

Flies were the principal carriers of the typhoid fever which attacked 20 per cent of the United States soldiers in the Cuban War and furnished 86 per cent of the deaths. It is not possible to prevent flies from visiting the dairy or farm, but the stable manure need not be allowed to accumulate and furnish breeding places for them. It will be found far more valuable if used to increase the fertility of the soil. It is certainly not necessary to allow flies to infect the milk pail and milk utensils and swim in the milk. There certainly can be no reason why they should be allowed to dine in the open privy vault or drink at the sink drain; the vault can be covered and a covered cesspool can be provided. Would not these precautions deprive them of their vile feasts and help to prevent the spread of disease? They can be easily kept out of the milk utensils by the use of screens for the dairy windows.

*All milk must be rapidly cooled and continuously maintained at a temperature below 50° F.*

Milk is quickly decomposed by bacteria unless it is kept cold. Bacteria, like other forms of plant life, can not grow in cold weather, so these minute germ plants are prevented from multiplication by keeping the milk cold. If everyone had his own cow and used the milk as soon as it was drawn there would be no great need of cooling the milk. Milk for all large cities must be held at the farm, shipped over country roads, transported by train, and kept in the city bottling plant before it is delivered at the home of the consumer. For this reason it is absolutely necessary that the greatest care be taken to quickly cool the milk at the farm immediately after it is drawn from the cow and keep it cold, in order that it may not contain dangerous numbers of bacteria. The law makes it a crime to sell adulterated milk, but it would seem to be a still greater fraud to sell milk which can not be used at all when delivered to the customer, due to the slovenly methods of handling and improper cooling. Few wells and springs are cold enough in the summer to cool milk to 50° F. For this reason ice must be used in hot weather, and a liberal supply should be provided.

The work of Nathan Straus in New York City in dispensing pasteurized milk for infants in general proves that the bacteria which are always found in

excessive numbers in old, improperly cooled, dirty milk are to a great extent responsible for the high death rate and infant mortality in cities. Prior to the beginning of this work in 1893 the death rate of children under 5 years in New York City was 96.2 in every 1,000, and in June, July, and August, when exceptional care must be taken to properly cool the milk, the death rate was 136.4 for each 1,000. With the increased use and distribution of pasteurized milk in 1906 the death rate fell to 55 per 1,000, and in June, July, and August the death rate was 62.7 per 1,000. This means that thousands of lives were saved. The milk supplied was from the same farms, the same kind of herds, and was distributed in the same way, the only difference being that the bottles were sterilized and the bacteria in the old, dirty, warm milk were killed by the heat applied to pasteurize it, and it was then properly cooled. If the suggestions offered by this department were carefully followed by milk producers and dealers pasteurization of milk would not be necessary. These suggestions are based upon fact and experience, and are offered in hope that they may improve the quality of the milk you are selling. It takes but a little more time each day to conduct your business in a decent manner, and you will find that the extra labor has been well expended. If you find it profitable to sell milk you will find it still more profitable to handle a clean, pure article. If you can not take the time to conduct your business in a decent manner and inform yourself as to its quality you have no right to be in the milk business.

Very respectfully,

WALTER O. SCOTT, *Inspector of Milk.*

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OFFICE OF INSPECTOR OF MILK,  
*Providence, R. I.*

*To milk producers:*

The department of milk inspection, with the cooperation of milk producers, offers the inclosed suggestions, which if intelligently followed would improve the sanitary conditions existing at the dairy farms from which our supply is obtained and indirectly improve the quality of the milk offered for sale in this city.

The fact that dirty milk has been held by physicians to be one of the principal causes of the high death rate and infant mortality makes it important that only clean milk be sold. The general laws of this State and the pure-food law of the United States prohibit the sale of milk containing foreign substances. The courts have held that the sale of milk containing sediment—viz, dirt, hairs, putrid matter, and manure—is a violation of the law.

For the education of your employees it is important that the inclosed suggestions be posted conspicuously in the stable or milk room.

In the near future agents of this department will visit all dairy farms from which milk is shipped to Providence, for the purpose of seeing that the suggestions are being carried out. Samples of milk shipped to this city by producers will be examined to determine if the laws of this State are being complied with.

I hope that the inclosed suggestions may be of assistance in enabling producers to ship only clean milk.

Very respectfully, yours,

WALTER O. SCOTT, *Inspector of Milk.*

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[To be posted in all dairies.]

Department of milk inspection of the city of Providence offers the following suggestions which should be carefully followed by farmers and dairymen in the care of cows and handling of milk:

THE BARNYARD.

1. It should be well drained, clean, and dry and should be as much sheltered as possible from the wind and cold. There should be no pools of stagnant water or urine therein.

2. Manure should not be allowed to collect in the barnyard and should not be at any time in contact with the stable or milk house.

## THE STABLE.

1. Cow stables should be well lighted and ventilated. The ventilation should preferably be from the top.
2. There should be at least 400 cubic feet of air space for each cow, otherwise extra ventilation should be provided.
3. Walls and ceilings should be kept clean. The stable should be white-washed twice a year, and more often if necessary.
4. It is desirable that the place where the cows are kept be used for no other purpose. A cow barn should not be used as a storage place for straw, hay, or other feeds, or as a wagon or tool house, as the dust and dirt which accumulates in a place of this character is liable to drop into the milk while it is being drawn from the cow.
5. The ceilings should be so constructed that dust and dirt therefrom shall not readily fall to the floor or into the milk. If the space over the cow is used for storage of hay, the ceiling should be made tight to prevent chaff and dust from falling through.
6. Stable floors should be made tight and smooth and be of some nonabsorbent material. Dirt or earth floors and gutters can not be tolerated.
7. The flooring where the cows stand should be short enough so that all manure will be dropped into the gutter and not upon the floor itself.
8. The floor should be swept every day but not before milking.
9. Cement gutters and mangers are the best, as they can be more easily kept clean than if made of wood.
10. The manure gutter should be from 6 to 8 inches deep, and should be kept at all times fairly free from manure.
11. Manure should be removed from the stalls and gutters before the morning milking and also before the afternoon milking, where the cows remain in the stable all day.
12. The use of land plaster or lime is recommended in the gutters.
13. Allow no strong smelling material in the stable for any length of time. Store the manure under or outside the cow stable and remove it to a distance as often as practicable.
14. If individual drinking basins are used for the cows they should be frequently drained and cleaned.

## THE COWS.

1. The cows should be kept clean and be free from disease.
2. Have the herd examined at least twice a year by a skilled veterinarian. Never add an animal to the herd until certain it is free from disease, especially tuberculosis.
3. Promptly remove from the herd any animal suspected of being in bad health and reject her milk.
4. The cows should be groomed daily and collections of manure, mud, or other filth should not be allowed to remain upon their flanks, sides, udders, or bellies.
5. The clipping of long hairs from the udder and the right side of the cow is of assistance in preventing the collection of filth which may drop into the milk.
6. The hair on the tails should be cut so that the brush will be well above the ground.
7. The cows may be bedded with sawdust, shavings, leaves, straw, or some equally clean material.
8. The use of horse manure for bedding is to be condemned. Sand or loam must never be used as bedding.
9. To prevent the cows from lying down and getting dirty between cleaning and milking, a throat latch of rope or chain should be fastened across the stanchions under the cow's neck.

## THE FOOD.

1. Feed liberally, and use only fresh, palatable feed stuffs. In no case should strong smelling or decomposed or moldy material be used.
2. Do not allow any strong-flavored food, like garlic, cabbage, and turnips, to be eaten by milch cows.
3. Provide water for cattle in abundance, easy of access, always pure and fresh.
4. Salt should always be accessible.

## THE UTENSILS.

1. Milk utensils for farm use should be made of metal and well tinned and have all joints smoothly soldered. Never use them if they become rusty or rough on the inside.

2. Dairy utensils should be cleansed directly after using by first thoroughly rinsing them in water; then clean inside and out with hot water in which a cleaning material is dissolved; then thoroughly rinse with plenty of water; and lastly, sterilize by boiling water or steam. Use pure water only.

3. All milk utensils and strainers should be thoroughly cleansed by the use of boiling water; and all cans, utensils, and strainers must be sterilized before they are used.

4. Milk strainers should be kept exceedingly clean, and scalded a second time just before using. If cloth strainers are used, several of them should be provided in order that they may be frequently changed during the straining of the milk.

5. After cleaning utensils should be inverted in pure air. Milk utensils and cans must not be left in the cow stables, by the dusty roadside, near the sink drain outlet, the pig sty, or the open privy vault.

6. Ice tubs and cooling tanks should be thoroughly cleansed by scrubbing at least once a week.

7. Remember that the milk cans are the property of the city milk dealer, and must not be used to carry water for cattle or for other uses on the farm.

## THE MILKING AND MILKERS.

1. No person having any communicable disease, or one caring for persons having such disease, should be allowed to handle the milk or milk utensils or assist in the milking.

2. The hands of the milkers should be carefully washed immediately before milking. The hands should be thoroughly washed with soap and water and carefully dried on a clean towel.

3. Milk with dry hands. Never allow the hands to come in contact with the milk. The practice of moistening the hands with milk, or to spit on them, is to be condemned.

4. The milker should wear a clean washable jacket, used only when milking, and kept in a clean place at other times.

5. Always brush off and wipe the udder and surrounding parts just before milking. If the cows are very dirty, wash with a cloth or sponge, and then dry the udders and teats with a clean piece of cloth or sacking.

6. Milk quietly, quickly, cleanly, and thoroughly.

7. The first few streams from each teat should be rejected, as this milk contains more bacteria than the rest of the mess.

8. All milk drawn from the cows 30 days before and 10 days after calving should be rejected, and also all milk from diseased cows. If any accident occurs by which a pail full or partly full of milk becomes dirty, do not try to remedy this by straining, because the soluble filth and the bacteria can not be removed by straining, but reject all this milk and rinse the pail.

9. The pails in which the milk is drawn should have as small an opening at the top as can be used in milking. This renders the collection of manure and dust with the milk less likely.

10. Dry fodder should not be fed to the cows during or just before milking, as dust therefrom will fall into the milk.

## THE MILK.

1. Remove the milk of every cow at once from the stable to the milk house or to a clean room where the air is pure and sweet. Do not allow milk cans to remain in stables while they are being filled.

2. A good plan, if modern coolers are not available, is to strain the milk into cans which are standing in ice water which reaches the neck of the can.

3. The more rapidly the milk is cooled and the colder it is kept the safer it is and the longer it will remain sweet. Milk can not be properly cooled at any season of the year if the air alone is expected to do the cooling.

4. Ice should be used in cooling, both in summer and winter, as very few wells or springs are cold enough for the purpose.

5. If aerators or coolers are used, they should stand where the air is free from dust and odor, and on no account should they be used in the cow stable.

6. Milk should always be cooled as soon as strained. If modern apparatus for airing and cooling at the same time is not at hand, the milk should be aired by tipping the covers slightly while cooling the milk to 50° F. in clean ice water. Precautions should always be taken to see that the water is above the milk to be cooled in the cans and that the water can not overflow into the cans and water the milk.

7. Never ship a can containing warm milk which has not been cooled and aerated.

8. If the milk is held at the farm it should be stored in fresh, cold ice water or kept in a running spring.

9. The milk should always be kept under shelter so that the rain can not get into the cans.

10. Never mix fresh warm milk with that which has been cooled.

11. During the transportation of the milk and cans to the car or dairy, covered wagons only should be used. If this is not possible the cans should be protected from heat, cold, dust, and mud by a clean canvas or blanket.

12. All milk must be rapidly cooled and continuously maintained at a temperature below 50° F.

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OFFICE OF INSPECTOR OF MILK,  
Providence, R. I.

*To milk producers:*

The department of milk inspection, with the cooperation of milk producers, hopes to improve the sanitary conditions existing at the dairy farms from which our city supply is obtained. To accomplish this end and to assist milk producers in removing objectionable features, the department has adopted a dairy score card, issued by the United States Department of Agriculture, a copy of which is inclosed. In the near future agents of this department will visit all dairy farms from which milk is shipped to Providence and score them in accordance with the adopted score card. It will be to your advantage to make such changes as will enable you to obtain as high a score as possible.

Very respectfully,

WALTER O. SCOTT, *Inspector of Milk.*

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DEPARTMENT OF MILK INSPECTION,  
Providence, R. I.

*To milk dealers and milk producers:*

The department of milk inspection has adopted regulations intended to prohibit the sale in the city of Providence of milk which contains an unnecessary or dangerous number of bacteria.

The investigations of the department have shown that milk properly collected and handled does not contain a large or dangerous number of bacteria. This circular is issued so that those who are interested in the production and sale of milk may adopt such precautions as are necessary to prevent the milk being condemned, because it has been rendered unfit for use by the growth of large numbers of bacteria in it.

BACTERIA AND THEIR GROWTH IN MILK.

Bacteria are among the smallest and simplest of all living things. They much resemble the cells of which plants are composed, and, like plants, require moisture, warmth, and food to grow. When these conditions are present they multiply very rapidly, so that from one germ a few hundred may be produced in an hour, millions in 12 hours, and billions in a day.

As bacteria increase in numbers, they gather nourishment from the milk or other substances in which they develop, and, like other higher forms of life, transform what they take into their bodies into useless or poisonous products. They thus both rob the food of its nutritious substances and add others to it which are more or less poisonous. Thus, milk becomes sour through the change of its milk sugar into acid, produced by bacteria. But long before milk becomes sour to the taste it may contain enormous numbers of bacteria and has already become unwholesome and dangerous when employed for food, especially for young children.

The bacteria or germs which cause the various infectious diseases, such as typhoid fever, scarlet fever, diphtheria, consumption, etc., readily live and multiply in milk, and outbreaks of these diseases have been frequently traced to contamination of milk by careless farmers or milkmen, who have infected the milk with disease germs from their hands, from improperly sterilized bottles or cans, from polluted water, or from other sources, either while themselves sick or recovering from some one of these diseases, or while nursing others who were suffering from them. Many thousands of cases of illness and death have thus been produced from such causes. This is, of course, entirely unnecessary, and can easily be prevented. It is most important, therefore, for all persons who handle milk to know from what portion of the body these minute germs are given off, so that they may adopt the necessary precautions to prevent infection of the milk.

The germs which cause scarlet fever are thrown off in the discharges from the nose and throat and in the scaling from the skin. Those which cause typhoid fever are found in the urine and feces, and thus often reach the spring or well water with drainage which has leaked into it. Those which cause consumption and diphtheria are contained in the expectoration. The germs from cows which are diseased, especially when affected with consumption and tuberculosis of the udder, may also infect the milk and produce sickness in those who drink it. The bacteria which cause milk to sour and ferment and so become unwholesome are derived from manure and dirt which drop into the milk pail from the cow's belly or udder or tail, or from the dust of the barn, or from the dirt off the milker's hands, or they are contained in the pails and dirty strainers and cans, which have not been thoroughly cleaned and sterilized after having been previously used for milk.

The pails into which the milk is drawn should not be of the large, open-top variety, but should be covered with as small an opening at the top as can be used in milking. If everyone would use covered milk pails much of the dust and dirt which falls into the milk during the process of milking would be prevented and fewer bacteria would be found in the milk.

When milk is collected under cleanly conditions, the number of bacteria which fall into it is much less than when the conditions are dirty.

Milk affords one of the best foods for the growth of bacteria. When fresh, however, it contains substances which retard somewhat the development of bacteria for a few hours, if they are not too numerous, but we depend upon low temperatures to further limit changes in it. Just as large forms of plant life can not grow in cold weather, so also these minute germ plants are prevented from multiplication by cold. For this reason all milk should be rapidly cooled and kept cold until used.

Bacteria found in milk generally multiply most rapidly at blood heat, and cease to multiply at all at the freezing temperature. Any reduction of the temperature below 95° F. limits the rapidity of growth, but it is not until the temperature is reduced to 45° or 50° F. that the growth is nearly arrested. At 32° F. milk remains unchanged for an indefinite period. In fresh milk, properly collected and quickly cooled at 50° F. and kept at this temperature, during the first 24 hours there is no increase in the number of bacteria; after 24 hours the peculiar properties of fresh milk to resist the growth of bacteria become exhausted, and the bacteria also become gradually accustomed to the cold, so that even at this temperature they may rapidly increase and in a few days cause the milk to become sour.

It is impossible to obtain cow's milk under the ordinary conditions which exist in most milk barns without allowing some bacteria (which always abound in the dirt and dust of the barn and on the cattle) to drop into it, but the number may be limited. It is wholly unnecessary and inexcusable to permit the germs of the diseases of human beings or cattle to contaminate the milk. The fewer bacteria found in milk the more wholesome it is, and when the number becomes very large, the milk becomes not only unwholesome but dangerous, and the use of such milk is the commonest cause of the diarrheal diseases of children, particularly prevalent in summer. The importance of this may be appreciated when it is known that 1,188 deaths occurred from the diarrheal diseases in the city of Providence among children under the age of 2 years during the last five years (1902 to 1906, inclusive).

Under present conditions considerable time must elapse before the milk reaches the consumer, and before it is used, and if it is not very carefully handled and kept cold the number of germs contained in it when used becomes very large and sometimes almost incredible. There may be at the end of a

day or two millions of bacteria in a teaspoonful of milk not properly collected and cooled. As the milk must often be kept in the house for 12 hours or more after it is delivered and before it is consumed, it naturally becomes still more unwholesome before being used, and it therefore becomes important that all of the milk sold in the city should reach the consumer in good condition and be kept cold after it is delivered.

The number of bacteria in milk should be as low as is possible under the conditions under which practical dairy farming must at present be carried on. All milk dealers can easily produce and sell milk which has less than 500,000 bacteria in a cubic centimeter, or about one-fifth of a teaspoonful, which is the limit set by this department for clean milk. To keep within this limit the cattle, stables, and the milker's hands should be kept clean, and the pails and cans should be always scrupulously clean and properly sterilized. The milk should be immediately cooled at the farm and transported to the city with the least possible delay. So far as practicable, each day's milk supply should reach the city on the same day or not later than the following morning, and the temperature of the milk should be continuously maintained at 50° F. or less.

The department of milk inspection, with the cooperation of farmers and all milk dealers, hope to improve the character of the milk sold in this city, so far as the number of bacteria in it is concerned. It is a matter of great importance to the health of everyone that our milk supply be clean and pure. This department will test samples of milk for the number of bacteria which they contain; and where the number is found to be so great as to show that the milk has not been properly produced and handled, the dealers to whom such milk is shipped will be cautioned to notify the farmers who supply them to improve their methods. If then the milk is still found to contain dangerous numbers of organisms, the sale of the milk will be prohibited, and the board of aldermen will be requested to revoke the license of the dealer if necessary.

Very respectfully,

WALTER O. SCOTT, *Inspector of Milk.*

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#### HOW TYPHOID FEVER IS CAUSED.

[This circular is based on one prepared by Dr. H. W. Hill, for the Minnesota State Board of Health.]

Typhoid fever is an infectious disease. The infection is in the excrement and urine of the patient, and sometimes in the saliva. The patient after recovery often remains infectious for some weeks or months.

No one ever catches typhoid fever except by getting into his mouth some of the excrement, urine, or saliva of one who already has, or has recently recovered from typhoid fever or is infected with the germs of the disease. At first sight it might seem that this can not be true, for no one would ever take willingly or knowingly any of these things into the mouth. But, as a matter of fact, people are continually catching typhoid fever from others, always in just this way—never in any other way.

If one will stop and think carefully about it, he will see that this disgusting way of "catching" typhoid fever is not only possible, but can and must happen all the time; and is in fact the only way the disease is carried. For instance, the discharges of a patient thrown out or buried in gravelly soil near a well may soak through the soil into the well, or the discharges may be thrown or washed into a stream. The persons who drink water from such a well or stream drink the discharges also, much diluted it is true, and of those who drink such water some become infected.

But the water route is only one of the many ways in which excrement, urine, and saliva pass from the patient into other people's mouths. The most common of the routes other than water is by way of the hands, and a few of the ways that infection travels by the hands are given here in detail. One may never have thought of these, but once thought of they can never be forgotten again because the whole thing is so plain, and so disgusting. There is nothing mysterious about the transmission of typhoid fever.

*The patient.*—To begin at the beginning. A typhoid patient is usually helpless, and everything must be done for him—he must be washed, his nose and mouth wiped, and his bedclothes changed by some one else. He must be fed and given medicines by an attendant; he must have a bedpan or urinal placed

in position and removed as necessary. Often he requires injection into the bowel; sometimes he has involuntary discharges before a bedpan can be placed in position. Sometimes his temperature must be taken in the bowel. After the use of the bedpan or urinal it is difficult to clean his body thoroughly, and even after an amount of washing which removes all visible dirt, the infection remains as numerous particles of matter on the skin or sheet or night clothes. As the patient tosses about in bed these particles are spread from skin to sheet and back again, until the whole lower part of the patient's body and legs become infected with more or less particles of excrement and urine—very small particles and very thin, no doubt, leaving not even a stain to show their presence, but present all the same. A particle of excrement, spread out upon the skin so thin as to be invisible, may contain millions of the bacteria which produce the disease.

*Dangers to the attendant.*—It must be perfectly clear to everyone who considers these facts for a moment that no attendant can touch the body or bedclothes or urinal or bedpan or injecting syringe or thermometer or anything else which comes into contact with the patient's body or legs or sheets, without great chance of transferring at least a few of these bacteria to the hands. Now, everyone's hands go often to the lips and mouth every day, consciously or unconsciously. Watch anyone and see, or notice how often you do this yourself. If there be on your hands any of the discharges of a typhoid patient, consider how extremely likely it is that you will transfer them to your mouth.

*Dangers to visitors.*—The patient's own hands also touch his own body, his own sheets, etc., as much or more than the attendant's hands do, and the patient's hands therefore become infected likewise. The patient touches his own face, pillow, books, medicine glass, spoons, plates, etc., with his infected hands, and these, in turn, become infected. If the patient shakes hands with a visitor, or if the visitor touches only the patient's forehead with the fingers, infection is likely to be transferred to the visitor's hands. Merely shaking up a pillow or settling the sheets to make the patient more comfortable is likely to infect the hands of the one who does it.

*Dangers from the nurse to others.*—But the persons who come into contact with the typhoid patient directly are not the only ones who are in danger. Anyone who eats food handled by a person who has been in contact with the typhoid patient is likely to take into the mouth the infected material from that person's hands; for instance, it has happened over and over again that a hotel or restaurant waitress, nursing a sick relative and also waiting on table, has transferred typhoid fever from the patient to the boarder by handling the boarder's food just after she has emptied the sick person's bedpan. In private families the mother often acts as nurse for the sick person and at the same time prepares meals for the rest of the family.

*Food.*—The hands of the house nurse, infected with discharges from the patient, transfer some of it to the bread as she slices it for the table, to the spoons, forks, plates, etc., as she lays the table; so, too, as she breaks up ice for the ice-water jug, or washes greens, or opens a can of fish or tongue, to be served cold. In 50 ways her hands touch utensils or go into food continually while preparing the meal. The handling of the food does no great harm, if the food is afterwards cooked and is not again handled before it is served, because the heat of cooking kills the infection, but the handling of cold foods or drinks which are not to be cooked is very dangerous to those who eat or drink them, while the handling of plates, cups, spoons, etc., is also dangerous because they go to the mouths of different members of the family. In fact, it is almost always true that if secondary cases develop in the family of a typhoid patient, these later cases get it from the first through the hands of the mother or whoever else is nursing the patient. With a properly trained nurse, however, no such spread should occur, and it is not necessary that it should occur with anyone if the proper precautions are carefully followed.

*Direct handling.*—Besides giving the disease to others through the food, the mother often directly puts her fingers into her children's mouths, perhaps to prevent them from swallowing a marble, perhaps to extract a piece of gum stuck to the teeth, perhaps to feel an aching tooth, or for other purposes. She, of course, is likely to wash their faces and hands, brush their hair, dress and undress them, and the infection on her hands, even if it does not go directly into their mouths, goes onto their hands, etc., and they, in turn, put their hands into their own mouths. These illustrations are sufficient to call attention to the dangers of hand infection from the nurse to the rest of the family.

*Dangers from helping the nurse.*—Often, even when a trained nurse is in charge of a typhoid case and almost always when the mother or some other

relative is acting as nurse, members of the family, not regularly engaged in the nursing, "help out" by sitting with the patient at times, carrying out the soiled dishes, bedclothes, etc, or emptying the bedpans or urinals. The latter, especially, is often done by the father or older brother. Those persons who thus assist, perhaps only by receiving a tray of dishes at the door and conveying it to the kitchen, run some risk; those who handle the bedclothes or empty the discharges, if careless, run great risk, even though they handle them for but a moment.

*Dangers from infected articles.*—Another danger from a typhoid patient lies in the washing of the dishes, bedclothes, bedpans, urinals, etc. Often these are carried to the kitchen and allowed to remain piled upon the table or floor, perhaps mixed with the dishes, bedclothes, etc., of the rest of the family and washed with them. It is true that the usual process of washing clothes with soap and water, the clothes being boiled, will kill the infection, so that the clothing is free from danger after it is clean; but there is also a real danger, first, to the person who does the washing, handling the clothes, etc.; next, during the washing, the one who does it may, with her hands wet with the infected wash water, take up kitchen utensils, receive food from the delivery man at the door; possibly after a hurried drying on the kitchen towel (which she infects in the process so that the next person who uses it becomes infected also) she prepares some article of food or drink, wipes the dishes, lays the table, or otherwise spreads the infection about the place. (The writer has seen the common kitchen hand towel, after being used to dry the family hands, used also to dry the family dishes.)

*Flies.*—Another possible danger to the family and neighbors consists in admitting flies to the sickroom or to dishes, bedclothes, or discharges in the sickroom or after removal from it. Flies may easily carry discharges upon their feet from the bedpan or bedclothes to the family food or drink. A fly's feet and legs are covered with small hairs, and particles of feces easily stick to these. If the fly with typhoid feces on his feet falls into the milk or walks over the cake, he leaves a trail of typhoid infection behind him. Hence the room and the whole house should, if possible, be well screened. If the slops or wash water are thrown upon the ground, the chances of infection are increased. So also if the privy vault is open or if the contents overflow. Not only may human beings get excrement on their feet, but hens may carry it to the doorstep, and the cat or dog may bring it into the house. The man who buries the discharges may carelessly get his feet soiled and carry infection into the house in this way. If he washes the bedpan or urinal at the pump, the washings may go through the curb or run in under it from the side, thus infecting the well.

*Precautions.*—The trained nurse and the physician should know how to protect themselves and should go through typhoid outbreaks without contracting the disease. This is done simply by always regarding everything in a patient's room as infectious and never handling anything that is in or comes from the patient's room unless it has first been disinfected. If it is impossible to avoid handling the material before disinfection—and, of course, it must be handled during disinfection—then always immediately disinfect the hands. These rules faithfully lived up to day by day, hour by hour, minute by minute, always and in every case will entirely prevent infection from spreading by way of the hands.

Most important of all, it must be remembered that persons are infectious even before the disease is developed, and that many cases are up and about and are so mild that no doctor is called, or he fails to recognize it. Also remember that the germs may remain in the body long after recovery and are sometimes found in people who have never been sick. Perhaps the new hired man or a visitor or the summer boarder is such a "carrier" of germs. Therefore, as one can never tell when he will come in contact with typhoid germs, he should always be on his guard. Is it not worth while to try to not let any other person's excrement, no matter how tiny a speck, get into one's mouth, and to also try to not let one's own excrement get into another's mouth? It is not such a hardship, after all, to be clean.

It may be asked how, if there are so many ways of infection, does anyone manage to escape. As a matter of fact, the excrement is not always so teeming with bacteria; they may be few at times, and they may not be evenly distributed, so that many particles contain none at all. Often even hurried washing removes practically all from the hands. The germs often die rapidly when exposed to light and air. People are not always and continuously so careless as has been described. They generally do wash their hands and do not always put the fingers in the mouth. Then, again, probably sometimes when only a few germs

get into the mouth, they are killed by the fluids of the body and can not gain a foothold. So, if all these points are considered, it is easy to understand how typhoid spreads as it does, and also why so many persons escape, though more or less exposed to the disease.

*About milk infection.*—It very often happens that the father or brother who helps the nurse by emptying or burying the discharges also milks the cows. He is then very apt to transfer infection to the milk in the process of milking, for whatever he has on his hands is likely to go into the milk. If he strains the milk as he puts it into cans or bottles or helps to care for it in any way, he is equally likely to infect it. So, too, if he peddles the milk from cans. If the pails, cans, and straining cloths are washed in the house in the same sink or tub with other things or by any member of the family, infection may result. Many an outbreak of disease with scores of cases and many deaths has been traced to milk thus infected by a farmer's or dealer's lack of cleanliness. Many a farmer's business has been ruined and death has entered his own family in this way. A separate room should be provided for the care of milk and the washing of vessels. These should be sterilized by steam, if possible, and certainly by boiling water. Always thoroughly wash the hands before milking or handling milk. If typhoid fever occurs in the family of a milk producer or dealer, the patient should be at once removed from the premises or those who handle the milk should live away from the premises.

PROVIDENCE, May, 1908.

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[Health Department Circular.]

BEWARE OF FLIES.

Flies are filthy insects. They drink from the cesspool and dine in the privy vault. They eat the sputum on the sidewalk and revel in the garbage pail.

Perhaps you think it is disgusting to read about such things, and so it is. But is it not more disgusting to have these same flies after their repast of filth, drown in the milk pitcher, drop their specks on the frosted cake, or clean their feet on the bread? Is it pleasant to see the flies that very likely have just come from a neighboring privy crawl over the lips of the sleeping baby or gather on the nipple of its nursing bottle? Suppose the fly that was fished out of the milk pitcher had just been eating the excrement of a typhoid fever patient, would you like to drink the milk? Perhaps the flies that were walking on the fruit which you purchased at the street corner had just been feeding on the sputum of a consumptive. Does it not seem likely that flies may spread disease? That is what many physicians and health officers think.

Perhaps hereafter you will screen the house and protect the food from flies. The young of flies are maggots. They seem to prefer to breed in stable manure. But they also breed in excrement of all kinds, in garbage, and in all sorts of wet and filthy refuse.

Do you want to raise these filthy insects, these germ carriers, to be a pest in your own house, and perhaps carry disease to your neighbors? Of course you do not.

Then keep the stable manure closely covered and have it removed often—once a week in summer if possible. Keep the back yard and the alley clean. Allow no refuse to accumulate anywhere. After your own premises are in order talk over the matter with your neighbors, and get them also to read this circular.

PROVIDENCE, 1909.

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RICHMOND, VA.

AN ORDINANCE TO create the office of inspector of milk and food supplies, and to provide for the inspection of milk, meat, and other food supplies brought or offered for sale in the city of Richmond, and to prohibit the sale of adulterated or impure milk, meat, and other food supplies within the city of Richmond.

[Approved June 9, 1904.—Sections 8 and 9 as amended Mar. 19, 1910.]

*Be it ordained by the council of the city of Richmond* (1) That it shall be the duty of the board of health, as soon as practicable after the passage of this ordinance, and biennially thereafter between the 1st day of October and the

1st day of November of such year to appoint an inspector of milk and food supplies to serve for the term of two years, unless sooner removed by the board of health, and thereafter until his successor is appointed and qualified according to law, who shall within 30 days thereafter qualify before the city clerk by entering into a bond in the penalty of \$1,000 for the faithful discharge of his duties, and by taking and subscribing the usual oaths for the faithful performance of his duties. It shall be the duty of said inspector to report to and be subject to the control of the board of health, except in so far as any requirement of said board may conflict with this ordinance or other ordinances of the city of Richmond.

(2) The board of health shall be authorized in their discretion to employ from time to time, and for such time as they may designate, one or two assistants to the inspector of milk and food supplies, one of whom shall be an analytical chemist, to whom said board may assign such duties as they may deem expedient, and who, when acting in the place of said inspector, shall have all of the powers and authority vested in him under this ordinance, and at all times shall have the powers and discharge the duties prescribed by regulations, to be adopted by the board of health as hereinbefore provided.

(3) The salary of the inspector of milk and food supplies shall be \$900 per annum, payable monthly, and the compensation to the assistants shall be at the rate of \$50 each per month, to be ascertained and certified by the board of health to the committee on health, who shall issue a warrant therefor on the treasurer.

(4) That from and after 30 days from the passage of this ordinance no person shall, within or without the city of Richmond, maintain or keep a stable or stables or a dairy farm for the purpose of producing milk to be sold or exposed to sale within the limits of the city of Richmond, nor shall any person within the limits of the police jurisdiction of the city of Richmond, outside of the three public markets of said city, keep a room, stall, store, or other place where any meat, butter, fish, fruit, or vegetable, intended for human food, are sold or exposed to sale without first obtaining a permit so to do from the inspector of milk and food supplies of the city of Richmond. Application for said permit shall be made in writing, upon a form to be prescribed by said health officer, in which application it shall be stipulated that the said inspector or other health officer of the city of Richmond may from time to time inspect such place and premises and the milk produced or food supplies exposed to sale thereat, and also that such applicant will conform to the requirements of this ordinance, and such reasonable rules and regulations as may be established by the board of health for the government of such place or places. Every person to whom such permit is granted, before he shall be entitled to carry on business, for which he desires such permit, shall pay to the auditor of the city of Richmond a fee of \$2 to cover the expenses incident to the inspection of milk and other food supplies in the mode prescribed by this ordinance. Before granting such permit it shall be the duty of said inspector to make, or cause to be made, an examination of the place and premises, which are intended to be used in the maintenance of said dairy farm or stable, and of such place, stall, or store, where is proposed to sell milk, meat, butter, fish, fruit, vegetables, or other food supplies and thereafter, from time to time, inspect the same, and if found in an unsanitary condition, such permit may be refused, or if granted, may at any time be revoked or suspended, without notice, by said inspector, if, in his judgment, such dairy, dairy farm, or place is found to be in an unsanitary condition.

(5) It shall not be lawful for any person, by himself or by his servant or agent, nor for any such servant or agent of any person, to sell, exchange, or deliver, or to have in his or their custody or possession, with intent to sell, exchange, or deliver, or to expose or offer for sale as pure milk, any milk from which the cream or any part thereof has been removed, or which has been watered, adulterated, or changed in any respect by the addition of water or other substance.

(6) No dealer in milk, and no servant or agent of such a dealer, shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver milk from which the cream, or any part thereof, has been removed, unless, in a conspicuous place above the center, upon the outside of the vessel, can, or package from or in which such milk is sold, the words "skimmed milk" are marked in distinct letters not less than 2 inches in length.

(7) No person shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver, skimmed milk containing less than 9 per cent of the milk solids exclusive of butter fats.

(8) No person shall sell, or offer for sale, or otherwise dispose of, or shall transport, or carry for the purpose of sale, or shall have in his or their custody or possession with intent to sell or offer for sale or otherwise dispose of any impure, adulterated, or unwholesome milk, and no person shall sell adulterated milk, nor shall any person sell or offer for sale or otherwise dispose of any milk which is produced in whole or in part from cows kept in a crowded or unhealthy condition or fed on food that produces, or is likely to produce, impure, diseased, or unwholesome milk, nor from cows fed on any substance in a state of putrefaction or rottenness, or upon any other substance of an unwholesome nature.

(9) That the addition of water or any other substance or thing is hereby declared an adulteration, and milk that is obtained from animals that are fed upon any substance in a state of putrefaction or rottenness, or upon any substance of an unwholesome nature, or milk that has been exposed to or contaminated by the emanations, discharges, or excrements from persons sick with any contagious disease by which the health or life of any person may be endangered, or milk from tubercular cows, is hereby declared to be impure and unwholesome.

(10) That all prosecutions under this ordinance, if the milk shall be shown, upon analysis by the inspector of milk and food supplies, chemist, or board of health, or by any chemist or chemists appointed or designated by the board of health to contain more than 88 per cent of watery fluids, or to contain less than 12 per cent of milk solids, or to contain less than 9 per cent of milk solids exclusive of butter fat, such milk shall be deemed, for the purposes of this ordinance, to be adulterated.

(11) That if said inspector of milk and food supplies shall have reason to believe the provisions of this ordinance are being violated, he shall have power to open any can, vessel, or package containing milk, whether sealed, locked, or otherwise, or whether in transit or otherwise; and if, upon inspection, he shall find such can, vessel, or package to contain any milk which has been adulterated, or from which the cream or any part thereof has been removed, or which is sold, offered or exposed for sale, in violation of any section of this ordinance, said inspector of milk and food supplies is empowered and directed to take a sample of the same for analysis and put it into a can, vessel, or package, to be sealed in the presence of one or more witnesses, and sent to the chemist of the board of health or any chemist or chemists appointed or designated by the committee on health; and also to condemn the same and pour the contents of such can, vessel, or package upon the ground, or return the same to the consignor, and if, upon analysis, such milk shall prove to be adulterated, shall report the offender to the police justice.

(12) That the board of health shall cause the name and place of business of every person convicted of selling adulterated milk, or of having the same in his possession, to be published in two daily newspapers of the city for five times consecutively.

(13) That no meats, butter, fish, birds or fowl, fruit or vegetables, nor any milk, not being then healthy, fresh, sound, wholesome, and safe for human food, nor any meat or fish that died by disease or accident, shall be brought within said city, or offered or held for sale in any public or private market, as such food, anywhere in said city.

(14) That no cattle shall be killed for human food while in an overheated, feverish, or diseased condition; and all such diseased cattle in the city of Richmond, and the place where found, and their disease, shall be at once reported to the inspector of milk and food supplies by the owner or custodian thereof, that the proper order may be made relative thereto, or for the removal thereof from said city.

(15) That no meat or dead animal above the size of a rabbit shall be taken to any public or private market for food until the same shall have fully cooled after killing, nor until the entrails, heads, and feet (except of game and poultry<sup>1</sup> and the heads and feet of swine) shall have been removed.

(16) That no decayed or unwholesome fruit or vegetables, no impure or unhealthy or unwholesome meat, butter, fish, birds, or fowl shall be brought into said city, to be consumed or offered for sale for human food, nor shall any such article be kept or stored therein.

(17) That no meat, butter, fish, fruit, vegetables, or unwholesome liquid shall knowingly be bought, sold, held, offered for sale, labeled, or any representations

<sup>1</sup> "And poultry" added by amendment of Nov. 18, 1904.

made in respect thereof, under a false name or quality, or as being what the same is not, as represents wholesomeness, soundness, or safety for food or drink.

(18) That every person, being the owner, lessee, or occupant of any room, stall, or place where any meat, butter, fish, fruit, or vegetables, designed or held for human food, shall put and keep such room, stall, and place, and its appurtenances in a clean and wholesome condition; and every person having charge, or interested or engaged, whether as principal or agent, in the care or in respect to the custody or sale of any meat, butter, fish, fruit, birds, fowl, vegetables, or milk designed for human food, shall put and preserve the same in a clean and wholesome condition, and shall not allow the same, or any part thereof, to be poisoned, infected, or rendered unsafe or unwholesome for human food.

(19) It is earnestly desired that every person knowing of any fish, butter, meat, fowl, birds, fruit, vegetables, or milk being bought, sold, or offered or held for sale as food for human beings, or being in any market, public or private, in said city, and not being sound, healthy, or wholesome for such food, to forthwith report such facts, and the particulars relating thereto, to the inspector of milk and food supplies.

(20) That upon any cattle, milk, meat, butter, birds, fowl, fish, or vegetables being found by the inspector of milk and food supplies in a condition which is, in his opinion, unwholesome and unfit for use as human food, or in a condition or of a weight or quality in this ordinance condemned or forbidden, he is empowered, authorized, and directed to immediately condemn the same and cause it to be removed to the crematory for destruction, and report his action to the board of health without delay.

(21) That any person who shall violate any of the provisions of this ordinance shall be liable to a fine of not less than \$5 nor more than \$50 for the first offense, and for the second offense a fine of \$100 and revocation of the license, said fine to be recoverable before the police justice of the city of Richmond.

(22) The board of health are hereby authorized and empowered to prescribe rules and regulations particularly defining the duties of the inspector of milk and food supplies and of any assistants to such inspector, not inconsistent with the provisions of this ordinance, and said board shall likewise be authorized to prescribe rules and regulations for the management of stables or dairy farms where cows are kept for the purpose of producing milk to be exposed to sale or sold within the city of Richmond, not inconsistent with the provisions of this ordinance.

(23) The inspector of milk and food supplies and his assistants when in discharge of official duties are hereby invested with the same police powers which are vested in the health officers under the ordinances of the city of Richmond.

(24) This ordinance shall be in force from and after 30 days from its passage.

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**RULES AND REGULATIONS OF THE BOARD OF HEALTH GOVERNING THE PRODUCTION AND HANDLING OF MILK TO BE SOLD OR OFFERED FOR SALE IN THE CITY OF RICHMOND.**

[Revised by the board of health Apr. 29, 1910.]

It shall be the duty of all persons engaged in the production or handling of milk or cream which is to be sold or offered for sale or which is to be otherwise disposed of in the city of Richmond, to notify the chief health officer of the city of Richmond immediately if any case of contagious or infectious disease is present among any members of their household or among any of their employees or their employees' families. The chief health officer shall, upon receipt of such notification, investigate, or cause to be investigated, the circumstances surrounding the case, after which he may, in his discretion, order either that the sale of milk from such farm or dairy be temporarily discontinued, or that it may be continued under such regulations and restrictions as he may direct.

The sale of milk from cows suffering from garget or other disease of the udders is hereby prohibited, and the dairy inspector shall condemn all milk produced in whole or in part from cows so affected. If milk from a cow so affected shall have been mixed with the general supply, either at the farm or

in any central distributing plant, the entire supply so contaminated shall be condemned.

The dairy inspector shall order to be excluded from the rest of the herd all cows whose milk is, in his opinion, for any reason unfit or dangerous for human consumption, whether on account of disease of the udder, general appearance of other disease, or generally bad condition. Exclusion from the rest of the herd under such conditions is the only sure means of preventing the milk from such cows from being occasionally mixed with the general supply by irresponsible help. If any dairyman refuses or neglects to separate any cow from the rest of his herd when instructed so to do, the dairy inspector shall prohibit the sale of milk from such dairy until his instructions have been complied with.

The dairy inspector shall enter on his records all actions taken under the last preceding paragraph, together with his reasons for the same. He shall also record a full description of all cows thus ordered excluded. Any dairyman who desires to appeal from the decision of the dairy inspector shall file with the chief health officer of the city of Richmond the certificate of a competent and reputable veterinary surgeon, which certificate shall also contain a full description of the cow, or cows, for which said certificate is given, and the chief health officer shall decide from all the evidence whether the orders of the dairy inspector shall be sustained, but, pending such decision, the cow, or cows, in question shall be excluded from the herd. Failure to do so shall constitute sufficient ground for revocation of the permit to sell milk in the city of Richmond.

The chief health officer shall consider the certificate of the veterinary only in so far as it relates to the physical condition of cows examined, but not as to whether said condition renders the milk from such cows unwholesome or dangerous for human consumption.

All cow stables shall be kept clean at all times. Horses or other animals (than cows) shall not be kept in cow stables.

Manure shall be removed from the stable at least twice a day, to a distance of at least 75 feet from the stable and from the source of the water supply used for washing milk vessels and for other purposes about the milk house. The place or places at which manure is deposited shall be approved by the dairy inspector. The best disposition, both from the standpoint of sanitation and that of securing the full fertilizing value of the manure, is to spread the manure daily on the field.

Privies on dairy farms shall not be located within 100 feet of the cow barn or milk house. A greater distance than this is strongly recommended. All privies on dairy farms shall, when located within 500 feet of cow barn or milk house, conform in their construction to the rules and regulations of the Richmond Board of Health governing the construction of privies within the city of Richmond, and the night soil from such privies shall be removed not less than once a week and buried at a point approved by the dairy inspector.

The water supply used about the dairy shall be clean and pure. No well shall be located within less than 100 feet of any privy, hogpen, or manure heap or pit. The top of all wells shall be watertight, and the drainage for at least 10 feet in every direction shall be away from the well. All wells shall be equipped with pumps. The use of buckets, operated by hand, windlass, or well-sweep, is positively prohibited.

All utensils used for milk shall be kept thoroughly cleansed. They must be washed as soon as possible after being used, after which they shall be inverted and aired in a place free from dust and flies. The sterilization of all milk vessels with live steam is strongly recommended.

Before milking, all manure and other dirt shall be removed from the side, belly, and tail of each cow, but this shall not be done so as to produce an excess of floating material in the air, which will settle into the milk pail. It is advised that long hairs on the udder and tail of the cows be kept clipped. Immediately before milking, the udders shall be thoroughly cleansed, by first washing with clean water and then drying thoroughly. The water used for this purpose shall be changed with sufficient frequency to insure cleanliness. The use of narrow-top milk pails is strongly urged.

The milker shall wash his hands thoroughly before milking, after which they must be well dried. Hands should be washed after milking every two or three cows before going to the next. The clothing of milkers shall be clean. The use of special milking suits, of washable material is recommended.

The board of health regards the prompt cooling of milk to as low a temperature as possible as second in importance only to cleanliness. It is desirable to reduce the temperature of the milk at once to not over 50° F. Owing, however, to the fact that there are many winters in the climate of Richmond during which ice can not be made on the farm, and to the further fact that but few of the dairy farms which produce milk for the Richmond market have ice ponds available, it is not practicable at the present time to insist on so low a temperature as this under all conditions. Moreover, the bacterial tests of Richmond milk made during the past three years have shown that (owing to the nearness of the producers to our market) milk of very low bacterial content can be regularly placed in our city without insisting on so low a temperature. The following temperature regulations have been adopted as a result of the observations of the past three years:

(a) Producers who retail their product in the city of Richmond shall immediately cool their milk to a temperature not over 60° F. and shall keep it at or below that temperature until delivered to the consumer.

(b) Producers who sell their product at wholesale to a central distributing plant at which it is promptly and efficiently cooled before delivery to the consumer (see sec. c) shall immediately cool their milk to a temperature not exceeding 5° F. above the temperature of the well or spring water used for cooling. During transportation to the central plant the milk shall be so protected that its temperature shall at no time be more than 10° F. above the temperature of the well or spring water used for cooling, but the temperature of the milk shall in no case be above 70° F. The provisions of this section (b) shall apply only to milk regularly delivered at a central distributing plant within three hours after milking, and shall further apply only if the milk is, immediately upon its receipt, cooled to 40° F., or lower. (See sec. c.) Producers making only one delivery a day to a central plant shall cool promptly to not over 50° F. and shall maintain at not over that temperature until delivered at the central plant all milk sent from the milking not immediately preceding delivery at the central plant, unless the milk from this milking is to be used for butter making only, in which case its temperature shall not exceed 70° F.

(c) Dairies (or creameries) which distribute milk obtained from a number of producers, thus subjecting the milk to a second handling and exposure, shall cool all milk, immediately upon its receipt, to a temperature not exceeding 40° F. and shall maintain it at a temperature of not over 50° until delivered to the consumer.

(d) Producers furnishing milk to creameries which supply only cream or butter to the Richmond market, the milk being separated at the creamery for this purpose, shall not be required to cool their milk on the farm, provided such milk is regularly delivered at the creamery within three hours after milking, but if only one delivery is made at the creamery each day, the milk from the milking not immediately preceding delivery at the creamery shall be cooled to at least 70° F. and kept at or below that temperature until delivered at the creamery.

The inspectors of the Richmond Health Department shall prohibit the sale of any milk found by them in the city of Richmond at a temperature of 70° F. or over, but they may allow such milk to be used for butter making, provided they are confident that the privilege so granted will not be abused.

In all cases in which cooling at the farm is required under the above regulations, the milk from each cow shall be immediately taken from the stable and cooled by running it over a cooler (or "aerator") of a form approved by the dairy inspector.

All cooling, straining, and other handling of the milk until it is placed in cans or bottles for delivery shall be conducted in a milk house, which shall be separate from the stable or any living room and which shall not open directly into the stable. The milk house shall have a nonabsorbent floor and smooth, tight side walls and ceiling. It shall be provided with screens at all windows and doors for protection from flies. It shall be free from dust and objectionable odors, and shall be kept clean at all times.

The presence of as many as 250,000 bacteria per cubic centimeter in milk as it arrives on the Richmond market is hereby declared by the board of health to be evidence of improper methods in the production and handling of the milk, and all producers whose milk is found to contain 250,000 bacteria per cubic centimeter, but less than 500,000, shall be warned that they must locate and correct the existing difficulties.

Milk containing 500,000 bacteria or over per cubic centimeter is hereby declared to be unfit for human consumption. Owing to the fact that bacterial counts can not be determined until the day after the samples are collected for examination, it is impossible to condemn any special lot of milk on account of its high bacterial content. A single sample of this kind, however, shows that something is radically wrong. When, therefore, a sample of milk, as delivered on the Richmond market, is found to contain 500,000 bacteria or over per cubic centimeter, the fact shall be at once reported to the chief health officer, who shall order further shipments from the farm at which said milk was produced stopped until the cause for this unjustifiably high bacterial content has been found and corrected, unless, in his opinion, satisfactory arrangements can be made for using the milk from such dairy farm or butter-making purposes only until the difficulty has been found and corrected.

During the entire year of 1909 only 39 samples of milk (or 3.8 per cent of the 1,018 samples examined by the Richmond Health Department) were found to contain as many as 250,000 bacteria per cubic centimeter. Only 2 of these 39 (or two-tenths of 1 per cent of all the samples examined) contained over 500,000 bacteria per cubic centimeter. These results show that it is entirely practicable and reasonable to insist that no milk containing over 250,000 bacteria per cubic centimeter shall come on the Richmond market.

All bacterial counts for the purpose of these rules shall be made by plating the milk (in the proper dilutions) on agar made in accordance with the recommendations of the committee on standard methods of water analysis of the American Public Health Association, and the counts shall be made after incubating the plates at body temperature for 18 to 24 hours.

The words "Certified milk" are universally understood as applicable only to milk complying with certain especially high standards and certified to by a body competent to furnish such certificate. The unauthorized use of these words on bottle caps, in circulars, in advertisements, or in any manner whatsoever in connection with milk not complying with the conditions commonly demanded for certified milk is hereby declared to be improper and misleading, and any person guilty of such improper use of the words "Certified milk" will be reported to the police court.

Pasteurization of milk or cream, or any other process of a similar character, will not be accepted by the Richmond Health Department as a substitute for cleanliness in the production and handling of milk. Pasteurization of milk or cream is not prohibited, but the milk or cream so treated shall be produced under conditions in all respects equal to those demanded for the production of milk or cream not subjected to pasteurization.

All milk wagons from which milk is sold by measure shall be provided with a tight metal receptacle for all measures and other utensils used in the handling of milk on the streets, which receptacle shall have a false, removable, perforated metal bottom. All measures and utensils shall be kept in this receptacle while the wagon is on its rounds and the receptacle shall be thoroughly cleansed and aired twice a day, the false bottom being taken out for cleaning.

No dairyman shall deliver bottled milk at any house in which there is a case of contagious or infectious disease. In such cases, the householder shall provide his own receptacle for milk, which shall not be taken to the dairy. The presence of a warning sign of the Richmond Health Department on the premises shall be considered sufficient notice to the driver of the presence of contagious disease, but for those diseases which are not placarded (especially typhoid fever), the chief health officer will, so far as possible, send written notices to the dairyman in each case. Whenever any person in whose home there is a case of contagious or infectious disease changes milkmen before the case has recovered it shall be the duty of the dairyman who discontinues the delivery of milk at said house to inform the chief health officer at once in order that his successor may also be notified.

No person shall use, or cause or permit to be used for any other purpose than the holding of milk or cream any milk bottle, can, or other receptacle used for the transportation or delivery of milk.

It shall be the duty of all persons having in their possession bottles, cans, or other receptacles used for the transportation or delivery of milk or cream to cleanse, or cause to be cleansed, all such milk vessels immediately after emptying. All dairymen are requested to report to the health department any person who returns milk bottles in dirty condition or milk bottles which have apparently been used for other purposes.

Such preliminary washing of bottles by the consumer is intended only to prevent the accumulation of caked milk, which is difficult to remove subsequently. All bottles, cans, and other vessels used in the distribution of milk shall be thoroughly cleansed at the dairy before being again used, the cleansing and general methods of handling being conducted in such manner as approved by the chief health officer.

Under the milk ordinance of June 9, 1904, the use of distillery waste as a food for milch cows was expressly prohibited. Since the work of dairy inspection was actively undertaken in May, 1907, this matter has been carefully and continuously investigated and considered, with the result that the board of health has reached the conclusion that distillery waste is a valuable food and that its use is free from objection provided the product is properly handled. For this reason the board of health requested the city council to amend the original ordinance so as to allow the use of distillery waste under such rules and regulations of the board of health as are necessary to insure its proper handling. The ordinance has now been amended (Mar. 19, 1910) and the board of health has adopted the following rules, which will be rigidly enforced.

RULES AND REGULATIONS OF THE BOARD OF HEALTH CONCERNING THE FEEDING OF DISTILLERY WASTE AND "BREWERS' GRAINS" TO MILCH COWS PRODUCING MILK OR CREAM TO BE SOLD ON THE RICHMOND MARKET.

[Adopted by the board of health Mar. 28, 1910.]

(1) Distillery waste and brewers' grains are subject to rapid decomposition, making them liable to give rise to serious nuisances. It is therefore necessary that the greatest care be observed by dairymen in the use of these products.

(2) No distillery waste or brewers' grains shall be fed in barns for two hours previous to milking cows, and only then in a well-ventilated barn.

(3) Distillery waste shall not be fed in the pure state, but must be mixed with at least an equal amount of other grains.

(4) Where a barn contains a nonabsorbent trough or manger, distillery waste or brewers' grains may be fed in same, provided trough or manger be kept clean and in a perfectly sanitary condition. Where a barn contains a trough or manger which, in the opinion of the dairy inspector, is absorbent, buckets must be used for the feeding of distillery waste or brewers' grains. These buckets must be kept clean, and only allowed in the barn during feeding time. (See rule 2.)

(5) No tank wagons, barrels, feed boxes, or any other receptacle used for the transportation or storage of distillery waste or brewers' grains shall be kept within 200 feet of cow barns or milk houses.

(6) Tanks, barrels, or other receptacles used for hauling distillery waste or brewers' grains must be water tight and have tops on same, and where in daily use they must be washed clean and thoroughly aired at least once in every three days in order to prevent decomposition and the development of maggots, flies, etc.

(7) If, in the opinion of the dairy inspector, any dairyman is using distillery waste or brewers' grains in other than a perfectly sanitary manner, the dairy inspector shall order the use of same immediately discontinued, and shall not permit the sale of milk by said dairyman until conditions have been corrected; and if he shall further be of opinion that the arrangements at any dairy farm are not such as to make possible the continuance of the feeding of distillery waste or brewers' grains in a perfectly sanitary manner, he shall order the use of same discontinued until suitable arrangements have been made for the proper and sanitary use of these products.

RULES CONCERNING THE REISSUING OF PERMITS FOR THE SALE OF MILK AFTER SAID PERMITS HAVE BEEN SUSPENDED OF REVOKED ON ACCOUNT OF UNCLEANLY METHODS.

[Adopted by the board of health on June 14, 1909.]

Whenever the dairy inspector or his assistant shall find such lack of cleanliness about any dairy farm supplying milk to the Richmond market as shall make necessary the suspension or revocation of the permit of such dairy farm, said permit shall not be restored or reissued for a period of at least two days

from the time of such suspension or revocation, and for the second dereliction the period of suspension shall be not less than one week.

Wherever the word "milk" is used in the preceding rules and regulations it shall be understood as including cream also, except where otherwise stated or where clearly excluded.

The word "person" shall include firms and corporations.

All temperatures are "Fahrenheit."

By order of the board of health.

E. C. LEVY, M. D.,  
Chief Health Officer.

Table showing results of bacteriological examination of milk in Richmond during 1909.

Class.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	<i>P. ct.</i>											
Below 10,000.....	7.7	13.1	15.8	7.6	9.4	1.0	.....	.....	.....	3.6	2.2	6.9
10,000 to 100,000.....	89.7	80.3	84.2	89.4	78.9	76.2	55.0	62.6	64.6	79.5	81.2	88.1
100,000 to 250,000.....	2.6	6.6	.....	3.0	11.7	22.8	29.0	29.3	31.7	9.6	10.0	5.0
250,000 to 500,000.....	.....	.....	.....	.....	.....	.....	14.0	8.1	3.7	7.3	6.6	.....
500,000 and over.....	.....	.....	.....	.....	.....	.....	2.0	.....	.....	.....	.....	.....
Number of samples.....	78	76	57	66	85	101	100	99	82	83	90	101
Average air temperature at 8 a. m.....	<i>° F.</i> 37	<i>° F.</i> 48	<i>° F.</i> 46	<i>° F.</i> 52	<i>° F.</i> 62	<i>° F.</i> 71	<i>° F.</i> 72	<i>° F.</i> 67	<i>° F.</i> 65	<i>° F.</i> 43	<i>° F.</i> 49	<i>° F.</i> 31

Total samples examined, 1,018; above 250,000 bacteria per cubic centimeter, 39 samples, or 3.8 per cent of all; above 500,000 bacteria per cubic centimeter, 2 samples (included in above 39), or two-tenths of 1 per cent of all samples examined.

#### CARE OF MILK IN THE HOME.

[Issued by the health department of Richmond, Va.]

OFFICE OF HEALTH DEPARTMENT,  
Richmond, Va., July 10, 1907.

The quality of the milk supply of a city has a great deal to do with the health of the people. The health department of Richmond is doing everything in its power to make the milk supply of this city all that it should be from a sanitary standpoint, and the dairymen are actively responding to our efforts. Since the 1st of May, when this work was begun, there has been a very great improvement, though much still remains to be done.

But it is not sufficient that the milk should be clean and pure when delivered to you. Unless the proper care is taken in your own home after the milk is received you will not have good milk in spite of our efforts and the work of the dairymen. It is therefore important that you should carefully follow the instructions given in this circular—not just to-day, but every day the whole year round.

Milk is the most valuable single article of diet known to man, and it is the only proper food for babies under 1 year of age, when they can not get the nourishment which nature intended for them—their mother's milk.

But, while good milk is such an excellent food, bad milk is one of the most dangerous foods possible, being responsible for a large part of the bowel troubles of babies and for the death of very many of them.

The chief means by which milk is often made dangerous are: (1) Dirty methods of keeping and milking the cows, dirty milkers, and dirty milk vessels; (2) failure to cool the milk promptly and keep it cold until used; and (3) keeping the milk too long before it is used.

Bad milk, therefore, so far as danger to health is concerned, is dirty milk or warm, stale milk.

We are rapidly getting the dairymen of Richmond to understand these facts, and we can promise you that the milk supply of Richmond will soon be among the best in this country.

In the home, as on the farm and in the city dairy, cleanliness and cold are the two essentials in the securing of wholesome milk.

All vessels used for milk should be thoroughly cleansed as soon as empty, using first clean cold water for rinsing, and then scalding them with hot water containing a small amount of washing soda or borax. Do not use soap for this purpose. After thorough washing, the vessels should be rinsed with clean water and then well aired and sunned, in some place where they will be protected from dust.

If your milkman delivers his milk in sealed bottles, see that he does not leave these in a place where they will be exposed to the heat of the sun before being brought into the house. They should be taken in as soon as possible and stood at once in the refrigerator until used. As soon as you have emptied a bottle, wash it out carefully. Do not return to your milkman bottles containing stale milk.

If you are getting bottled milk and if a case of typhoid fever or other "catching" disease breaks out in your house, you should tell your milkman at once, and he should not take away any milk bottles from your house until after the case has gotten well, as one of these bottles might otherwise be the means of carrying the disease to other houses. We will instruct the milkmen what to do in such cases.

If your milkman does not deliver his milk in bottles it is best to have him deliver it directly to you or your servant, and you should see that it is put on ice immediately and kept cold.

The practice of putting out an uncovered pitcher or other vessel for milk the night before can not be too strongly condemned.

Such a pitcher or vessel, exposed to the dust and dirt of the street, will collect thousands of germs before the milk is put into it. Many of these may be dangerous to life and health, besides which they will certainly cause the milk to sour in a short time and become unfit for use. The purest milk received in such a vessel may become as bad in a few hours as the worst milk from a dirty farm.

If you are compelled to stand out a vessel to receive your milk, provide yourself with several glass preserve jars, which should be used for this purpose only. They should be kept well washed and aired as above described. Get jars with clamp tops. Those with screw tops are hard to keep properly cleansed. Do not use the rubber ring which comes with most jars, as it is difficult to keep clean and the jar will be sufficiently tight without it. Instead of a preserve jar a bowl, covered by a plate, may be used. A pitcher can not be tightly covered on account of the projecting spout.

Give your own personal attention to your milk vessels.

The milkmen of Richmond state that many persons in this city have the idea that if milk is delivered to them warm this is a proof of its being fresh from the cow, and hence better. So far from this being true, only by cooling the milk as soon as it is gotten from the cow is it possible to prevent rapid decomposition of the milk in warm weather. The regulations of the health department (which have been adopted for your benefit) require that all milk sold in Richmond shall be cooled as soon as possible after milking.

While bad milk is the chief cause of bowel troubles among young infants, it is by no means the only cause. Improper feeding is another cause. Never give anything but milk to a child under 1 year, unless advised to do so by your family doctor.

If your baby has any bowel trouble call in your doctor at once, so that the case may be treated before it has gone too far.

Never buy milk for the baby from a grocery store. Store milk has often been kept over from the day before, and only too often without ice or in an open pitcher in a refrigerator in which meats and vegetables are also kept. It is dangerous as food for babies.

By paying careful attention to the above instructions you will do much toward keeping your family well during the summer (and especially the little ones who live on milk). You will also find that your milk will keep longer and taste better.

Keep this circular and read it from time to time until thoroughly familiar with its contents. If you change servants be sure to give instructions to the new ones in the care of milk in your home.

## TOPEKA, KANS.

[Published in the Topeka State Journal Oct. 27, 1910.]

AN ORDINANCE (No. 4008) Creating the office of milk inspector in the city of Topeka, providing for his appointment and regulating the sale and delivery of milk, cream, and ice cream in said city, providing penalties for the violation thereof; repealing ordinance No. 2938, approved May 5, 1909, and ordinance No. 2946, approved May 26, 1909, and all other ordinances and parts of ordinances in conflict with this ordinance.

*Be it ordained by the board of commissioners of the city of Topeka:*

SECTION 1. *Inspector; qualifications; terms; salary.*—There is hereby created the office of milk inspector of the city of Topeka, Kans. Such milk inspector shall be appointed by the board of commissioners of said city. He shall be a graduate of an accredited veterinary college. His term of office shall be for a period of two years and until his successor is appointed and qualified: *Provided, however,* That his term of office shall expire with the term of office of the board appointing him. He shall receive a salary of \$1,200 per annum, payable monthly. Before entering upon the discharge of his duties he shall give a bond in the sum \$500, conditioned for the faithful performance of his duties.

SEC. 2. *Registration; fees; records.*—It shall be unlawful for any person, firm, or corporation to sell, offer for sale, or have in their possession with intent to sell, any milk or cream for consumption as milk or cream, or for the manufacturing of ice cream, or to manufacture ice cream for sale, within the city of Topeka, without possessing a registration certificate from the milk inspector of said city. Such registration certificate shall be obtained by filing with the milk inspector an application giving the number and particular location of the cows or of the place of business from which such person, firm, or corporation purposes to sell milk, cream, or ice cream. Upon receipt of said application, and upon payment by the applicant of a clerical fee of 25 cents, said milk inspector shall issue to such person, firm, or corporation a registration certificate. Such registration certificate shall remain in force and effect during the current fiscal year in which it is issued—that is, until the January 1 following its date of issue—unless revoked by the milk inspector for failure to comply with the provisions of this ordinance. A revoked registration certificate shall be renewed only upon recommendation of the milk inspector.

For the purpose of paying the cost of inspection, as provided in this ordinance, all persons, firms, and corporations engaged in keeping milk depots, conducting ice-cream manufactories, or peddling milk within the city limits of the city of Topeka shall pay to the city treasurer the following fees, respectively, to wit:

Milk depots and retail milk peddlers selling less than—

15,000 pounds of milk and cream, per month	\$1
15,000 pounds to 40,000 pounds, per month	2
40,000 pounds to 80,000 pounds, per month	4
80,000 pounds to 160,000 pounds, per month	8
160,000 pounds to 240,000 pounds, per month	12
240,000 pounds to 320,000 pounds, per month	15
320,000 pounds or over, per month	20

*Provided, however,* That no inspection fees shall be required of persons living in the city and keeping only one cow.

Above fees to be based on the number of pounds of milk and of cream sold during the month next preceding and to be paid on or before the fifth day of each calendar month.

Ice-cream factories, making ice cream for sale only on the premises

where made, per year	\$10
All other ice-cream manufacturers, per year	20

Above fees shall be paid semiannually on or before the 1st day of January and July of each year.

Milk depots shall keep such records as will enable the milk inspector to determine the number of pounds of milk or cream sold by them, and these records shall, at all times, be open for his inspection.

SEC. 3. Each vendor of milk, cream, or ice cream shall, before engaging in the sale of milk, cream, or ice cream, cause his name and place of business to be placed, and to remain, in letters not less than 3¼ inches in height on each outer side of all wagons or other vehicles used by such vendor in the conveyance or sale of milk, cream, or ice cream.

**SEC. 4. Unwholesome milk defined.**—Milk produced from cows kept in an insanitary, poorly lighted, or poorly ventilated stable, or produced by cows not kept clean, or any milk obtained from cows that are fed on city slop or refuse matter from any starch factory, decomposed feed, stable manure, bedding, or any article of food which is fermenting or fermented other than clean, well-cured silage; or milk stored in an insanitary place, or milk kept or delivered in vessels not properly cleaned, or vessels which are rusted, or in wooden vessels, or milk in which a sediment collects on standing. It shall be unlawful for any person to sell or offer for sale or exchange milk known as "unwholesome milk." The milk inspector shall have authority to condemn unwholesome milk for food purposes.

**SEC. 5. Skimmed milk.**—It shall be unlawful for any person, firm, or corporation to sell, offer for sale, or have in possession with intent to exchange or sell, any milk from which any cream has been removed, or from which any stripplings have been kept back or removed, unless the utensils in which said milk is stored and sold are marked in clear letters, showing the per cent of fat which such milk contains, or be marked "skim milk."

**SEC. 6. Milk and cream; standard.**—It shall be unlawful for any person, firm, or corporation to sell, offer for sale, or have in possession with intent to sell, any milk to which any water or other adulterant has been added, or milk showing less than 3.25 per cent of fat or less than 8.75 per cent of solids not fat, unless branded in clear letters and figures showing the per cent of fat the milk contains. The person purchasing the same must be informed by the salesman of said milk that the milk is not up to the standard required. All restaurants selling milk below the required standard shall have posted in a conspicuous place a sign containing the legend "We serve skim milk," in letters not less than 2 inches in height. It shall be unlawful to sell, offer for sale, or have in possession with intent to sell, any milk produced by any cow or cows before the sixth day after freshening and less than 20 days before freshening. It shall also be unlawful to sell or offer for sale any cream containing less than 18 per cent of fat, unless the said cream be labeled showing the per cent of fat contained therein.

**SEC. 7. Infection; contamination; temperature.**—It shall be unlawful for any person, firm, or corporation to sell or offer for sale any milk, cream, or ice cream which has been milked or handled by any person suffering from or exposed to any contagious or infectious disease, or milk, cream, or ice cream handled in utensils washed in water from creeks, springs, or other places liable to contamination from surface draining, or milk having a temperature of more than 60° one hour or longer after it is drawn.

**SEC. 8. Where handled.**—It shall be unlawful for any person, firm, or corporation to sell, offer for sale, or have in possession with intent to sell, any milk or cream bottled in any barn, living room, wagon, general store, or in any other room used for any purpose other than the handling of milk and its products.

**SEC. 9. Closed containers.**—It shall be unlawful for general stores to sell, offer for sale, or have in their possession with intent to sell, milk or cream in any but closed containers, and such containers must not be opened within such stores, or for any retailers of milk or other person, firm, or corporation to have for sale, milk or cream on any street in any but closed containers, and such containers must not be opened for the delivery of milk or cream or for any purpose other than procuring samples by the milk inspector.

**SEC. 10. Physicians; duties.**—Any physician finding a case of typhoid fever, diphtheria, or scarlet fever within the city shall ascertain the name of the dairyman furnishing milk to the family in which the disease occurs and report at once to the milk inspector the location of the disease and the name of the dairyman furnishing milk to the family. But nothing in this section shall be construed to apply to regularly conducted hospitals.

**SEC. 11. Sanitary places and utensils.**—Every person, firm, or corporation handling milk or cream or ice cream for sale in the city of Topeka shall keep such milk or cream or ice cream in a clean, well-ventilated, and sanitary place, and it shall be the duty of said person, firm, or corporation to cause all cans, bottles, and other receptacles used in the handling of milk or cream or ice cream to be thoroughly washed and then sterilized with boiling water or live steam each time they are used, as soon as they are empty. Cans used for delivery of milk or cream to depots shall be treated as above at the depot and be returned empty to the shipper. It shall be unlawful for any person or persons handling milk or cream to use any of the milk or cream utensils for storing or transporting any substance other than milk or cream.

SEC. 12. *Ice cream; regulation.*—It shall be unlawful for any person, firm, or corporation to sell, offer for sale, or have in possession with intent to sell, ice cream that has been placed in cans not properly cleaned or in rusted cans, or ice cream made from unwholesome cream, or ice cream containing less than 14 per cent of butter fat: *Provided*, That fruit ice cream may contain as low as 12 per cent butter fat.

SEC. 13. *Unhealthy cows.*—It shall be unlawful for any person, firm, or corporation to sell, offer for sale, trade, or exchange milk produced by unhealthy cows or by cows milked or handled in the same stable, corral, or place of milking where such diseased cows are kept. The health of the cow shall be determined by a competent veterinarian.

SEC. 14. It shall be unlawful for any person, firm, or corporation to sell or offer for sale any milk or cream within the city of Topeka unless the cows producing such milk or cream shall have passed the tuberculin test administered under the direction of the live stock sanitary commissioner, and shall be subsequently tested under the same authority as frequently as may in the judgment of the milk inspector be necessary. The milk inspector shall have the authority to administer, whenever he deems it advisable, any approved test for tuberculosis to any cow producing milk or cream for sale within the city of Topeka, and his findings shall be final unless reversed by the live stock sanitary commissioner: *Provided*, That the provisions of this section shall not apply to cows producing cream sterilized by heating to a temperature of 190° F. and used in the manufacture of ice cream.

SEC. 15. *Preservatives.*—Any milk or the products made therefrom found to contain any form of preservatives shall be condemned for food by the milk inspector, and any person, firm, or corporation offering for sale or selling any such milk or milk products or trading or exchanging the same in the city of Topeka shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished as hereinafter provided.

SEC. 16. *Inspector to visit score cards.*—It shall be the duty of the said inspector to visit, or cause to be visited, as frequently as he deems necessary, all dairies and inspect and score the same according to the score card authorized and used by the Bureau of Animal Industry of the United States Department of Agriculture, and he shall have the authority to revoke the registration certificate of anyone maintaining an unsatisfactory dairy and of anyone selling milk from such dairy. A copy of the score card shall be left with the owner and such information given as will assist the producer to improve the sanitary conditions or remedy such defects as the score card indicates. A copy of the score shall be filed in the inspector's office. The said inspector shall make reports to the city clerk annually, or oftener, as the commissioner of parks and public buildings may direct.

SEC. 17. *Inspection; qualifications; power; samples.*—The inspector must be a competent man and he shall prove his proficiency by passing an examination, both oral and written, which shall be prepared and given under the direction of the State dairy commissioner and the professor of dairy husbandry of the Kansas State Agricultural College.

The said inspector shall have authority to enter, without previous notice, any dairy, milk depot, ice cream or milk salesrooms, or any place where milk or cream or their products are kept, sold, or prepared for sale and take such amount as will prove a sufficient sample to perform the necessary tests, such as may be desired by the said inspector.

Where the said inspector finds any milk indicating the presence of water or the removal of fat it shall be his duty, whenever practicable, to visit the herd where such milk is produced and see the herd milked and the milk mixed, after which he shall take a sample of milk and seal the same with the seal of his office and keep the sample locked in a cool place until he has secured a sample of the next regular milking. The sample must be in proportion to the milk given at each milking. The per cent of solids not fat and the fat of these collected samples shall be considered the standard of the said herd, provided these samples are collected within four days from the time the suspected sample was collected and tested.

SEC. 18. *Milk wagons; inspector; duty.*—The inspector of milk shall provide himself with proper instruments for testing the purity of milk, and he shall have authority to stop any wagon or person carrying milk for sale or selling or offering for sale in the city of Topeka at any time or place and either test or procure a sample of the same: *Provided*, The inspector of milk shall not detain any wagon or person engaged in carrying milk for a longer period than is neces-

sary to test the same, and may confiscate such milk if found unwholesome as specified in this ordinance, and shall arrest and prosecute any person found selling, exposing, or offering for sale any milk in violation of this ordinance.

SEC. 19. *Inspector; test of samples.*—The said inspector may have tests made of milk samples for fat, adulteration by water or any solid or liquid for preservatives, or bacterial contents, or the bacterial contents of water used for cleaning milk utensils by sending samples to the director of experiment station at Manhattan, Kans., with description of test desired. The result of such test shall be taken as correct.

SEC. 20. *Inspector; rules and regulations.*—The inspector shall have authority, by and with advice of the State dairy commissioner and interested dairymen, to formulate rules and regulations for carrying into effect the provisions of this ordinance, which shall, when approved by the board of commissioners of the city of Topeka, be in force and effect binding as parts of this ordinance.

SEC. 21. *Penalty.*—It shall be unlawful for any person, firm, or corporation, or any officer, agent, servant, or employee of such person, firm, or corporation, to violate any of the provisions of this ordinance; and any person, firm, or corporation, or any officer, agent, servant, or employee of such person, firm, or corporation, violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than \$5 nor more than \$100 for each offense; and such person shall thereby forfeit his registration certificate.

SEC. 22. No prosecution now pending, and no offenses heretofore committed under ordinances heretofore enacted, shall be affected in any way by the provisions of this ordinance; but all such prosecutions shall be conducted to final judgment and all such offenses shall be prosecuted in the same manner as if this ordinance had not been enacted.

SEC. 23. *Repeal.*—Ordinance No. 2938, approved May 5, 1909, entitled "An ordinance creating the office of milk inspector in the city of Topeka, providing for his appointment, and regulating the sale and delivery of milk, cream, and ice cream in said city, providing penalties for the violation thereof, and repealing ordinance No. 2871, approved August 6, 1908, and all ordinances and parts of ordinances in conflict with this ordinance." and ordinance No. 2946, approved May 26, 1909, amending section 2 of said ordinance No. 2938, and all other ordinances and parts of ordinances in conflict with this ordinance are hereby repealed.

SEC. 24. *Taking effect.*—This ordinance shall take effect and be in force from and after its publication in the official city paper.

Passed the board of commissioners October 24, 1910.

Approved October 25, 1910.

[SEAL.]

Attest:

J. B. BILLARD, *Mayor.*

C. B. BURGE, *City Clerk.*

## WHEELING, W. VA.

AN ORDINANCE Regulating the sale of milk and prohibiting the sale or exchange of unclean, impure, adulterated, or unwholesome milk or cream; providing for the issuing of permits to persons engaged in dealing in milk; for the inspection of samples; authorizing the health officer to require the tuberculin test of any herd suspected of infection with tuberculosis, etc.

*Be it ordained by the council of the city of Wheeling:*

SECTION 1. No person, dealer, firm, or corporation shall bring or send into the city of Wheeling, W. Va., or sell or exchange, or offer or expose for sale or exchange, any milk without first having obtained a legal permit so to do, to be furnished without cost by the city health officer. The applicant will be required to present a satisfactory certificate from the city veterinarian showing his premises and herd to be in a clean and sanitary condition and his herd free from disease. Such permits must be renewed in the month of May each year and such permit must be furnished without cost to the applicant. The health officer may require the tuberculin test of any herd suspected of infection with tuberculosis. After the permit is granted, no person, dealer, firm, or corporation may change source of milk or cream supply without the approval of the city health officer, and no permit shall be transferred without consent of said health officer.

The city health officer may at any time revoke any permit or license that may be granted by him for a failure on the part of the licensee to comply with the orders and regulations for the sale of milk or cream now in force.

Sec. 2. No person, firm, or corporation shall sell or exchange, or offer or expose for sale or exchange any unclean, impure, unwholesome, adulterated, or unhealthy milk or cream within the city of Wheeling. The terms "adulterated" or "unwholesome" as used in this ordinance are held to mean—

First. Milk containing more than 87 per cent of water or fluids.

Second. Milk containing less than 13 per cent of milk solids.

Third. Milk containing less than  $3\frac{1}{2}$  per cent of fats, or having a specific gravity of less than 1.029.

Fourth. Milk drawn from animals within 15 days before or 5 days after parturition.

Fifth. Milk drawn from animals fed on any unhealthy or unwholesome food or drink.

Sixth. Milk drawn from cows kept in a crowded or unhealthy condition.

Seventh. Milk containing more than 2 per cent acidity.

Eighth. Milk containing pus cells.

Ninth. Milk which has been adulterated with water or any other fluid, or to which has been added, or into which has been introduced any foreign substance whatever.

Tenth. Cream sold or offered or kept for sale as such must contain at least 18 per cent butter fat.

Eleventh. Milk containing more than 100,000 bacteria to cubic centimeter.

Twelfth. Milk or cream reacting to the usual or ordinary test or tests for formalin, salicylic acid, or boric acid.

Sec. 3. No person, dealer, firm, or corporation shall sell, or offer for sale, or have in possession for the purpose of sale, any milk from which the cream or any part of such cream has been removed, unless in a conspicuous place, above the center and on the outside of every vessel in which such milk is sold or kept, the words "skimmed milk" are distinctly marked in metallic letters, permanently soldered, to be not less than 1 inch in height; or, where the entire can of milk is sold and delivered to one place or customer, a paper label, white with red letters, "skimmed milk," posted on the can near center; paper label to be 4 inches by 6 inches and to be furnished by the health officer, none other can be used: *Provided*, That in case of the delivery of skimmed milk in glass bottles the words "skimmed milk" shall be blown in the bottles in letters not less than 1 inch in height. Nor shall any person, firm, or corporation selling milk, or his, their, or its agent or agents sell as skimmed milk any milk which has a less percentage of casein and salts than that contained in unskimmed milk.

Sec. 4. No person, firm, or corporation within the city of Wheeling shall deliver, sell, offer, or expose for sale, or have in his, their, or its possession for the purpose of sale, any milk or cream in glass jars or bottles, unless said jars or bottles have been thoroughly washed and cleaned before being last filled; no person shall keep milk or fill glass jars or bottles with milk or cream in any barn or stable, or in any public street or place.

Sec. 5. No person, firm, or corporation within the city of Wheeling shall sell, offer, or expose for sale, milk from any vehicle unless said vehicle bears in a conspicuous place, plainly and legibly on each outer side and near the front thereof, a metal sign issued annually by the city bearing the year, license number, and name of business; and in case milk is sold from cans or vessels, where no vehicle is used, unless the license number shall be placed in a conspicuous place on such can or vessel; or if such milk is sold or exposed for sale within a store or a house, unless such license number shall be there exposed in some conspicuous place.

Sec. 6. No person, firm, or corporation within the city of Wheeling shall keep milk intended for sale or exchange in a sleeping or living room, or in any room which is not kept clean at all times, or in which the plumbing is not constructed in accordance with sanitary plumbing; or keep milk in any cans not made of well-tinned iron with inner surfaces smooth and free from rust; or fail to report forthwith to the health officer any cases of contagious disease on the premises where milk is produced or sold. The owner shall be held liable for the acts of his agent for any violation of the sections of this ordinance, and the intention of any person doing or omitting to do any such act is immaterial in prosecution hereunder.

SEC. 7. Inspections of milk in all dairies, and of all milk venders, shall be made under the direction of milk inspectors authorized by the health officer of the city; and all persons, firms, or corporations selling, exchanging, or offering or exposing for sale or having in possession milk or cream for sale, delivery, or exchange, either on their own account or for any other person or corporation, shall at all times on demand furnish to the said milk inspectors of the city of Wheeling, and permit such inspectors to take from them such samples as said inspectors may require; and such samples shall be given, or permitted to be taken, at such time and place as may be demanded by said inspectors. Every sample of milk delivered to any of the milk inspectors of the city shall have a label attached to the vessel containing such sample, which shall have been written thereon at the time of the delivery of such sample, the number of the dealer's license, the number of the sample, the date of collection, and the name of the inspector; and a memorandum shall be made by the inspector collecting such sample of the number of the sample, the name of the owner and driver from whom collected, and a duplicate of the sample sealed in the bottle or vessel shall be delivered to the person from whom such sample is taken. Each sample shall be examined separately, according to its number, by the milk inspector, who shall register the specific gravity, temperature, and the percentage of butter fat opposite a corresponding number in the book kept for that purpose; the name of the owner to be subsequently inserted.

SEC. 8. No person, firm, or corporation selling or exchanging or offering or exposing for sale milk in the city of Wheeling in bottles to any dwelling or other house that has in it any contagious disease or diseases, or that is placarded by the health officer for contagious disease or diseases, shall remove from such dwelling or house any bottle or receptacle which has been or is used for the purpose of receiving or storing milk, until such placard has been removed by the proper authorities. No person suffering from, or who has knowingly, within a period of 20 days, been exposed to diphtheria, scarlet fever, erysipelas, smallpox, or other dangerous contagious disease, unless proper disinfection under direction of health officer has been had, shall work or assist in or about any dairy or dairy farm; no proprietor, manager, or superintendent of any dairy or dairy farm who supplies milk to the citizens of the city of Wheeling, W. Va., shall knowingly permit any person suffering, or exposed as aforesaid, to work or assist in or about said dairy or dairy farm.

SEC. 9. The health officer shall not issue a permit to any person to sell milk in the city of Wheeling who does not furnish once in every six months the health department with a certificate from a duly qualified veterinary surgeon to the effect that the cattle from which the milk he proposes to sell is obtained are entirely free from disease; and said certificate shall be kept on file in the health department, and shall embrace a descriptive enumeration of the cattle examined. The health officer may require the tuberculin test if any herd is suspected of infection with tuberculosis.

SEC. 10. Every person, firm, or corporation maintaining a dairy farm shall keep the same and all appurtenances thereto clean and wholesome at all times, shall change the water in the coolers at least once in each day, and no building or space shall be used for dairy purposes which is not well lighted and ventilated and which is not provided with a suitable floor and properly drained or which contains less than 600 feet clear space for each cow.

SEC. 11. Every person, firm, or corporation using premises for keeping cows for dairy purposes shall keep the entire premises clean and in good repair and the buildings well painted or whitewashed, and no accumulation of dung shall be allowed, but shall be removed at least twice daily and one hour preceding every milking of the cows.

SEC. 12. Milkers and those engaged in the handling of milk or cream shall maintain strict cleanliness of their hands and persons while milking and while so engaged.

SEC. 13. Every person, firm, or corporation keeping cows for the production of milk for sale shall cause them to be kept clean and wholesome at all times and shall cause the teats and the udder to be carefully cleaned with a damp cloth immediately before milking and shall cause each of such cows to be properly fed and watered.

SEC. 14. Any person, firm, or corporation using any premises for keeping cows for dairy purposes shall provide and use a sufficient number of receptacles of nonabsorbent material for the reception, storage, and delivery of milk, shall keep them clean and wholesome at all times, and at milking time shall remove each receptacle as soon as filled from the stable or room in which the cows are

kept, and it shall immediately be cooled to 50° F. and strained through one-half inch absorbent cotton or its equivalent. Nor shall any milk or cream be stored or kept within any room used for stabling cows or other domestic animals.

Sec. 15. It shall be the duty of every person having charge or control of any premises upon which cows are kept to notify the health officer of the city of Wheeling of the existence of any contagious or infectious disease among such cows by letter delivered or mailed within 24 hours after the discovery thereof, and to thoroughly isolate any cow or cows so diseased or which he may reasonably believe to be infected, and to exercise such other precaution as may be directed, in writing, by the said health officer.

Sec. 16. No person, firm, or corporation in the city of Wheeling engaged in the business of producing milk for sale or exchange, or engaged in the business of storing or delivering milk in said city, shall store, cool, or mix said milk in any room which is occupied by horses, cows, or other animals. All rooms in which milk is stored, cooled, kept, or mixed shall be provided with tight walls and floor and kept constantly clean; the walls and floor of the said rooms to be of such a construction as to allow easy and thorough cleansing. The room or rooms aforesaid shall contain proper appliances for washing and sterilizing all utensils actually employed in the storage, sale, or distribution of milk, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after being so used.

Sec. 17. All dairies or milk depots from which milk is offered for sale in the city of Wheeling shall be open at all times to the inspection of the health officer of the city of Wheeling or any officer representing him. No dip milk shall be sold or exchanged or offered or exposed for sale or exchange in any grocery store, bakery, meat shop, confectionery, or any other store where milk is not sold exclusively. Milk sold in such places must be bottled at the dairy or city depots and kept in a covered box, cooler, or refrigerator under such conditions as shall be approved by the health officer.

Sec. 18. That any person, firm, or corporation violating any of the provisions of this ordinance, upon conviction for the first time, shall be adjudged to pay a fine of not less than \$10 nor exceeding \$100, and in default of payment of such fine and costs to be imprisoned in the workhouse of said city for not less than 10 nor more than 30 days, or both fine and imprisonment may be imposed, at the discretion of the judge of the police court. Upon a second conviction the fine shall not be less than \$25 nor more than \$100, and in default of the payment of such fine and costs imprisonment for not less than 30 days nor more than 60 days, or both fine and imprisonment, at the discretion of the court. And in addition to the penalty of fine or imprisonment, or both, upon said second conviction, the health officer may revoke the license of such person or persons, firm, or corporation so offending.

SEC. 19. All ordinances and parts of ordinances in conflict herewith are hereby repealed.

SEC. 20. This ordinance shall take effect from and after its passage.

Adopted, second branch, June 11, 1907.

Adopted, first branch, June 11, 1907.

Sections 1 and 17 were passed as an amended ordinance April 14, 1908.

[Post this in your barn.]

[Department of health, the city of Wheeling.]

## RULES AND REGULATIONS WHICH MUST BE OBSERVED BY FARMERS AND DAIRYMEN IN THE CARE OF THE COWS AND HANDLING OF MILK SHIPPED TO THE CITY OF WHEELING.

### THE COWS.

1. The cows must be kept clean.
2. Manure must not be permitted to collect upon the tail, sides, udder, and belly of any milch cow.

### STABLES.

1. Cow stables must be well lighted and ventilated.
2. Floors must be tight and well drained.
3. Manure must be removed from the stalls and gutters at least twice daily. This must not be done during milking nor within one hour prior thereto.

4. Walls and ceilings must be kept clean.
5. The ceilings must be so constructed that dust and dirt therefrom shall not readily fall to the floor or into the milk.
6. Stables must be whitewashed at least once a year.

THE WATER SUPPLY.

1. The water used in the barn and for washing milk utensils must be free from contamination.

THE MILK HOUSE.

1. A milk house must be provided, which is separated from the stable and dwelling house.
2. It must be kept clean and must not be used for any purpose except the handling of milk.

THE MILKERS.

1. No person having any communicable disease, or one caring for persons having any such disease, must be allowed to handle the milk or milk utensils.
2. The hands of the milkers must be carefully washed immediately before milking.

THE UTENSILS.

1. All milk utensils, including pails, cans, strainers, and dippers, must be kept thoroughly clean and must be washed and scalded after each using.

THE MILK.

1. Milk from diseased cows must not be shipped.
2. The milk must not be in any way adulterated.
3. The straining of milk must be done in the milk house only.
4. All milk must be cooled to a temperature not above 55° within two hours after being drawn and kept thereafter below that.
5. The use of any preservative or coloring matter is an adulteration and its use by a producer or shipper will be a sufficient cause for the exclusion of his product from the city of Wheeling.

RECOMMENDATIONS.

In addition to the preceding rules, the department makes the following recommendations:

THE BARNYARD.

1. It should be well drained and dry and should be as much sheltered as possible from the wind and cold.
2. Manure should not be allowed to collect in the barnyard and should not be at any time in contact with the stable or milk house.

THE STABLE.

1. The cow stable should have abundance of light and ventilation. The ventilation should preferably be from the top.
  2. There should be at least 600 cubic feet of air space for each cow.
  3. It is desirable that the place where the cows are kept be used for no other purpose. A cow barn should not be used as a storage place for straw, hay, or other feeds, or as a wagon or tool house, as the dust and dirt which accumulates in a place of this character is liable to drop into the milk while being drawn.
  4. Stable floor should be made tight and be of some nonabsorbent material.
  5. Cement or brick floors are the best, as they can be more easily kept clean than wood or earth.
  6. If the space over the cow is used for storage of hay, the ceiling should be made tight, to prevent chaff and dust falling through.
- The practice, somewhat common among farmers, of packing hay, etc., on loose poles over the cows is exceedingly bad, since it invites the collection of dust and cobwebs, and the difficulty of keeping the stable clean is increased.

7. The stable should be whitewashed at least once a month.
8. The manure gutter should be from 6 to 8 inches deep and should be kept free from manure.
9. The use of land plaster or lime upon the floors and gutters is recommended.
10. The flooring where the cows stand should be short enough so that all manure will be dropped into the gutter and not upon the floor itself.
11. The floor should be swept at least an hour before milking, in order that the dust may have a chance to settle before the milking is begun.
12. If individual drinking basins are used for the cows they should be frequently drained and cleaned.

#### THE COWS.

1. The cows should be kept at all times in a healthy condition and an examination by a veterinary surgeon should be made twice a year.
2. The cows should be groomed daily and all collection of manure, mud, or other filth should not be allowed to remain upon their flanks, sides, udders, or bellies during milking.
3. The clipping of long hairs from the udder and right side of the cow is of assistance in preventing the collection of filth, which may drop into the milk.
4. The hair on the tails should be cut so that the brush will be well above the ground.
5. In winter the tail may be clipped.
6. The cows should be bedded with shavings, dried leaves, straw, or some equally clean material.
7. The use of horse manure for bedding is to be condemned.
8. To prevent the cows from lying down and getting dirty between cleaning and milking, a throat latch of rope or chain should be fastened across the stanchions under the cow's neck.

#### THE MILKING AND MILKERS.

1. The milkers should be clean.
2. Their hands should be thoroughly washed with soap and water and carefully dried on clean towels before milking.
3. Clean overalls and jumpers should be worn during the milking of the cows, should be used for no other purpose, and when not in use should be kept in a clean place protected from dust.
4. The hands and teats should be kept dry during milking.
5. The practice of moistening the hands with milk is to be condemned.
6. The first few streams from each teat should be rejected, as this contains more bacteria than the rest of the milk.
7. All milk drawn from the cows 30 days before and 10 days after calving should be rejected, and also all milk from diseased cows.
8. The pails in which the milk is drawn should have as small an opening at the top as can be used in milking. This renders the collection of dust less likely.
10. Dry fodder should not be fed to the cows during or just before milking, as dust therefrom will fall into the milk.

#### THE MILK.

1. The milk should be removed to the milk house as soon as drawn and strained and cooled to the proper temperature at once.
2. A good plan is to strain the milk into cans which are standing in ice water which reaches the neck of the can.
3. The more rapidly the milk is cooled the safer it is and the longer it will keep sweet.
4. Ice should be used in cooling, as very few springs are cool enough for the purpose.
5. If aerators are used, they should stand where the air is free from dust or odor, and on no account should they be used in a stable.
6. Milk strainers should be kept exceedingly clean and scalded a second time just before using, and if cloth strainers are used, several of them should be provided, in order that they may be frequently changed during the straining of the milk.

By order of the department of health, Wheeling, W. Va.  
(Milk is just as clean as the dirtiest thing it touches.)

## APPENDIX H.

COMMUNICATIONS FROM MR. HERBERT P. CARTER SUBMITTING DETAILS FOR ESTABLISHMENT OF LARGE DAIRY FARM FOR SUPPLYING MILK TO THE WASHINGTON MARKET.

MANOR DAIRY Co.,  
Arlington, Va., November 1, 1910.

Mr. J. L. WILLIGE.

DEAR SIR: I should be glad if you would look over the inclosed paper, which is merely an outline sketch. I should also be very pleased if you could come out and see our dairy, which was only organized this year. The matter of the milk supply is simply a matter of straightforward business, I believe, which can easily be settled by competent business men. I will try to see you very soon.

Yours, truly,

HERBERT P. CARTER.

CONSUMERS' MILK ASSOCIATION OF THE DISTRICT OF COLUMBIA.

It is of the utmost importance to residents in the District to have a pure and abundant supply of milk.

This supply can be obtained only by generous treatment of the farmers in the matter of payment, together with a demand for milk of high quality.

If the farmers find that it pays to supply good milk, they will soon increase their facilities until all the demands of the District are satisfactorily met.

At the present time they have not the necessary capital to submit to the tuberculin test for their herds and to meet all the requirements of the health department. Even if they could do so, the price which the dealers are willing to pay is insufficient to compensate them for the outlay of capital and the labor and trouble involved.

A system could easily be inaugurated of more direct dealing between the consumer and the farmer than obtains under the existing system, and the result would be a better article for the consumer at no higher price than he has been accustomed to pay, and far more satisfactory conditions for the farmer.

It is unnecessary here to dwell on conditions which are well known in regard to the scarcity of milk and the unwillingness of farmers to have their herds tuberculin tested. It is believed that some such scheme as that which is explained below would meet all the difficulties of the situation.

If the farmers can be insured against loss and a satisfactory price secured for their milk, all difficulties in the way of meeting the requirements of the health department and of the consumer would speedily be overcome.

OUTLINE OF PROPOSED SCHEME FOR THE FORMATION OF A CONSUMERS' MILK ASSOCIATION.

A company to be incorporated with sufficient capital to carry out the following objects:

1. The establishment of one or more stations for the bottling and delivery of milk in Washington, with all the necessary equipment.

2. The making of loans to farmers to enable them to submit their herds to the tuberculin test without delay, to replace diseased by healthy cattle, and to bring their equipment up to the standard required by the association. These loans would be secured by the cattle in the farmer's possession, or other approved security, and would be repaid by the deduction of a reasonable sum from the price paid to the farmer for every gallon of milk shipped by him. He would be under contract to ship a certain minimum to the association.

An additional security for these loans would be the compensation by the Legislatures of Virginia and Maryland—if any should be voted—for cattle slaughtered after reacting to the test. Compensation is already given in the District.

The financial assistance indicated in the second of the above two objects is the key to the present situation. The association can gain the good will of the farmers, give them a satisfactory return for their products, and at the same time earn handsome dividends for the stockholders.

It will be obvious that at the present time the carrying out of such a scheme will be given plenty of publicity by the papers, and that comparatively little advertising will be needed to enable the association to place all the milk that it can purchase from the farmers.

Probably it will be found desirable for the association to give financial help to farmers who have good barn accommodation to spare, to enable them to increase their stock and the association's supply.

By paying 30 cents a gallon for highest grade milk and 26 cents a gallon for second grade, and retailing them at 10 and 9 cents a quart, respectively, the association would make a profit of 10 cents a gallon. The above wholesale prices are much higher than dealers now pay, and 2,000 gallons a day could easily be obtained.

#### A CONCRETE INSTANCE OF THE WAY THE ABOVE PLAN WOULD WORK.

Farmer B now ships to Washington 40 gallons of milk. He has 20 cows, which are not tuberculin tested, and he has inadequate facilities for cooling the milk and cleaning his cans.

He obtains, at most, 22 cents a gallon for his milk, and can not afford to have his cattle tested without compensation, or to improve his equipment.

The association arranges with farmer B to have his herd tested and to improve his outfit. It advances, say, \$300, for replacing reacting cows with healthy animals and for the needed improvements.

Farmer B can now ship 20 gallons of milk of higher quality, and the association can afford to pay him 30 cents a gallon. From this they can deduct 5 cents and so pay off the loan, with interest, in less than a year. The farmer will have been getting a net advance of 3 cents a gallon, and at the end of the year will have a better herd and better equipment than he had before.

#### Capital:

From \$10,000 to \$15,000 advanced to farmers at interest.

Bottles, and complete equipment for bottling, washing, sterilizing, etc .....	\$6,000
2 motor trucks, at \$2,000 .....	4,000
2 small motor delivery trucks, at \$1,000 .....	2,000
20 delivery wagons and horses, at \$350 .....	7,000
Preliminary advertising .....	1,000
	<hr/>
	20,000
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#### Monthly charges:

Wages and manager's salary .....	2,500
Rent .....	300
Depreciation, repairs, gasoline and oil, horses' feed, bad debts, etc. . .	1,400
Advertising, etc .....	100
	<hr/>
	4,300
	<hr/> <hr/>

#### Monthly income:

2,000 gallons of milk daily for 30 days sold at a profit of 10 cents a gallon over wholesale price .....	6,000
Net monthly profit on investment of \$20,000 .....	1,700

MANOR DAIRY Co.,  
Arlington, Va., November 2, 1910.

#### Mr. J. L. WILLIGE.

DEAR SIR: I have pleasure in inclosing an outline of a plan for the organization of a large dairy business.

Officials of the Dairy Division, Bureau of Agriculture, would be well able to pass on the reasonableness of my estimates.

I may say that if a corporation was formed somewhat on the lines suggested I should be pleased, if the directors so desired, to become associated in the management and to place all my time at their disposal for a year or two and accept payment entirely according to the results achieved. I am confident that the plan is the most efficient and economical possible, if it can be organized with sufficient capital.

Yours, very truly,

HERBERT P. CARTER.

The proposed establishment of a large dairy farm near Washington, together with a town depot for the distribution of milk, the whole to be owned and operated by a corporation financed by the people of Washington, D. C.

Modern requirements in the handling of milk and modern improvements in farm machinery make a dairy farm operated on an extensive scale the only logical way of dealing with the milk question.

The essential conditions for any location to be considered for the farm are:

- (1) Part of the farm must touch a convenient railroad line.
- (2) There must be an abundant supply of good water on the farm. A running stream, indeed, is essential.

#### ADVANTAGES, EFFICIENT COOLING OF MILK, CLEANING AND STERILIZING OF ALL UTENSILS.

The small farmer can not be expected to get all the expensive apparatus which is needed for cooling milk efficiently and for cleaning and sterilizing all utensils.

On the other hand, on a large farm operating its own ice plant, where 2,000 gallons of milk had to be handled, the cost per gallon for efficient cooling, etc., would be insignificant.

If pasteurizing was desired, it could also be carried out economically.

#### EFFICIENT AND ECONOMICAL SHIPPING.

A refrigerator car on a private siding adjacent to the dairy building, ready to be filled with milk cans and attached to a passenger train for Washington.

Contrast this with the shipping methods possible to the small farmer!

It would probably be found desirable to bottle the milk at the farm ready for delivery to the consumer. This would add to the cost of shipment, but is the most sanitary of all methods, and avoids the delay and expense of an extra handling of the milk.

#### ECONOMY IN LABOR.

With a large number of employees, labor can be much more economically and systematically directed than is possible on a small farm.

Reasonable provision, too, can be made for the entertainment of the men and their families and for the education of their children. In this way the best class of labor can be attracted to the place.

Besides, the men would always feel certain of their pay. This is not the case on every small farm.

#### LABOR-SAVING DEVICES.

Manure spreaders, 2-horse corn planters, and feed cutter with powerful engine are typical instances of the kind of machinery which saves a large amount of labor on a large farm, but which would be out of the question on a small place.

A large farm can have a blacksmith shop of its own, which in itself means a great saving of time and money.

#### ECONOMY IN FARM HORSES.

By going in for mule raising and using brood mares for the farm work, except for one or two strong teams for the heaviest work, it is possible to make the horses almost, if not quite, pay for their own keep. This plan could not be carried out on a small farm, but where 20 or more horses were needed for farm work it would be most remunerative.

In the following estimate of capital required, the cost of buildings, etc., is based on the actual cost of material and labor in putting up barns and dairy buildings at Arlington, Va., in the summer of 1910, according to plans furnished by the Bureau of Agriculture and thoroughly approved by the health department of the District. Allowance is made for grading and all extras.

With the economies possible in work undertaken on a large scale, with ready cash, it is probable that the estimate given might be materially reduced, even if everything used was of the best quality.

The average price of milk to the retail customer is placed at 9 cents per quart. Probably 10 cents would be charged for seven months and 8 cents for five months in the year. This would make the average price more than 9 cents. Cream is sold at a proportionate rate and need not be treated separately.

It might be profitable to undertake butter making on account of the high price which could readily be obtained for genuine buttermilk properly shipped.

There is now a very large and profitable trade in artificial buttermilk, but no account is taken of this in order that the estimate of income may be well within the mark.

The profits easily obtainable from hog raising are also disregarded.

The amount of milk given by each cow is calculated at 2 gallons a day on an average. With such a liberal allowance as \$100 for the price of each cow, this amount ought certainly to be exceeded.

It is assumed that not much feed would be raised on the farm during the first year, and the daily allowance is therefore placed at 20 cents per cow. For the second year 10 cents per cow is allowed, but this amount would gradually be reduced as the farm reached a higher state of cultivation, and the profits would be correspondingly increased. For the summer months, at any rate, it is safe to assume that the estimates of 20 and 10 cents given above would be in excess of the actual cost.

The estimates made for labor, feed, and depreciation give ample margin to allow of raising sufficient calves to keep up the standard of the herd.

With the estimates here given a profit is shown on the investment of \$500,000 of over 12 per cent in the first year, rapidly increasing to over 20 per cent.

If we allowed 2½ gallons of milk for each cow as a daily average—no unreasonable estimate—the profits would be increased to at least 17 per cent for the first year and 24 per cent for the second year, gradually increasing to 28 per cent or more.

Efficient management would undoubtedly increase even these profits.

#### Capital:

1,500 acres, at \$100 per acre-----	\$150,000
1,000 cattle, at \$100-----	100,000
Barns, silos, farm and dairy buildings, fences, cottages for men employed, machinery, dairy utensils, etc-----	175,000
Depot in Washington for distribution of milk, land and buildings owned by company-----	75,000
	<hr/>
	500,000
	<hr/>

#### Daily expenses:

Labor and management, including town depot-----	250
Shipping and distribution, depreciation, taxes, etc-----	100
Feed (first year)-----	200
	<hr/>

550

Estimating feed at \$100 for second year, the total would be \$450.

Daily income: 2,000 gallons of milk, at 36 cents, \$720.

Daily profit: \$170 in first year, \$270 in second year, increasing in later years to \$320 or more.

Annual profit: \$62,050 in first year, \$98,550 in second year, \$116,800 or more in later years, or 12.41 per cent, 19.71 per cent, 23.36 per cent, respectively.

It is important to observe that 2,000 gallons is only a small part of the milk consumed in Washington; that the milk shipped by the corporation would be of the highest quality and would meet with a ready sale, probably even at a higher price than that here estimated.

If the stock of the company were divided among 8,000 people, each of whom took 1 quart of milk daily, the whole output would be disposed of.

By accepting subscriptions for \$10 or \$20 of stock a large number of customers would immediately be secured. Stockholders would of course have the first privilege of purchasing milk from the company, and so help to earn their own dividends.

It would seem that there should be very little difficulty about securing the necessary capital if the directors of the company are men who would command the unquestioning confidence of the people of Washington.

HERBERT P. CARTER.

ARLINGTON, VA., November 2, 1910.

MANOR DAIRY Co.,  
Arlington, Va., November 4, 1910.

Mr. J. L. WILLIGE.

DEAR SIR: I inclose some more matter in regard to our dairy-farm scheme, which will explain itself. I hope you will agree with me that this thing must go through somehow.

Yours, very truly,

HERBERT P. CARTER.

If I can get any further information for you, or be of any use to you in any way, please consider me at your service. I am not particularly busy just now.

ARLINGTON, VA., November 4, 1910.

While the proposed scheme for a large dairy farm under the management of a Washington corporation should be considered primarily on its merits as a dairy business, there are other sides to the question which should be kept in view from the first.

If over a thousand acres are to be acquired within easy reach of the city of Washington, it is important to have in view the possible developments from a real estate point of view.

A well-organized dairy business should make it possible to own a large tract of land, earn enough to pay taxes and good interest on capital from the very first, and at the same time pave the way for important developments in real estate business.

All property within 30 miles of Washington is likely to have a remarkable increase in value within the next few years, but probably the most promising part of the surrounding country, both for present purposes in the dairy business and for ultimate purposes as suburban real estate, is the Virginia side of the Potomac between Alexandria and Mount Vernon.

The communications are already good, with the Mount Vernon electric line, the Washington Southern—Accotink, Franconia, etc.—and last, but perhaps most important of all, the Potomac.

A company which owned land on the Potomac, with a good site for a wharf, and touching the Mount Vernon Electric Railroad, and also property on the Washington Southern having good road communication with its property on the Potomac, would be in a remarkably favorable position for awaiting, and to a great extent controlling, future developments. No more satisfactory location for a dairy business at the present time could well be imagined.

A wharf on the Potomac would probably provide the most economical and satisfactory way of conveying milk to Washington. A kind of refrigerator barge and a suitable tug would not be very expensive, and by this means the morning's milk could easily be brought to town, bottled and ready for the customer, in ample time for the afternoon delivery. Similarly the afternoon milk could easily be brought to town in time for the early morning delivery. The service, in fact, would be as prompt as the circumstances could require. It would be most convenient to be independent of any railway line with its fixed schedules; the tug could start off whenever the necessities of the business required, and the cost of the service would be insignificant. If the tug broke down, another could be chartered at short notice. Weight and space being of relatively small account, the chief objection to bottling the milk at the farm and bringing it to town ready to be put on the delivery wagon would be removed.

The wharf would be useful in other ways. Manure and also slop for hogs and chickens could be hauled from town by this method at small expense and prove a most satisfactory source of revenue on a well-managed farm. To most farmers the cost of hauling such stuff as this is prohibitive, though the value of the stuff itself may be judged from the fact that many farmers do find it profitable to haul it several miles from the city by 4-horse wagons.

Another great economy would be effected by using this wharf to bring the large amount of lumber, cement, etc., which would be needed for building operations. In fact, when buying lumber on such a large scale, it might be possible to begin a very satisfactory lumber business in Washington. There would be an abundance of storage room, the tug could convey lumber to Washington in large quantities at short notice, and there would be horses in town to deliver lumber in between milk deliveries. A trade in vegetables, fruit, poultry, eggs, and all farm produce would naturally form part of the trade when the farm

got into proper working order. It could hardly fail to be profitable with such cheap and excellent transportation at hand.

As to the real estate development, it would only be necessary at first to devote a little attention to the laying out of suitable roads, planting trees, etc. Now and then a desirable tenant would be found who would put up a good house somewhere on the place. One would help others, and in course of time it might be necessary for the dairy farm to move a little farther into the country. Then the process could begin over again. The strength of the plan lies in the fact that the company could afford to wait.

HERBERT P. CARTER.

P. S.—With regard to the particular merits of the country indicated above for real estate—apart from the obvious value of Mount Vernon and the present means of communication—it should be recalled that Congress has already appropriated \$10,000 for the survey of Mount Vernon Avenue, and that Virginia has already voted that its claim on the United States Government of \$200,000, when recovered, should be devoted to the construction of this road. It would seem certain in any case that the making of a splendid road between Washington and Mount Vernon is only a question of time. The Daughters of the American Revolution and other influential bodies are interesting themselves in the scheme.

MANOR DAIRY Co.,

Arlington, Va., November 7, 1910.

J. L. WILLIGE, Esq.

DEAR SIR: Miss Hurn was with us yesterday and told me that you were going into the question of modified milk. There is no reason why modified milk should not form part of the trade on our proposed large dairy. The formulas could be made up and bottled at the farm and delivered from door to door with the other milk. In this way the babies would get the morning milk in the afternoon and the afternoon milk in the morning—as efficient a service as could be organized. By bottling at the farm and delivering in the usual course of business, the price could be made as low as that charged by the Straus Laboratories now, yield a reasonable profit, and give the parents the advantage of delivery to their homes. The only possible objection that Miss Hurn saw was that of breakage in shipment. This, of course, is easily overcome by proper packing.

I think you know that we have shipped the milk for the Straus Laboratories since they opened last spring.

I am, yours, truly,

HERBERT P. CARTER.

ARLINGTON, VA., November 7, 1910.

J. L. WILLIGE, Esq.

DEAR SIR: I saw Miss Hurn to-day, after giving you my letter on the subject of modified milk, and she was emphatic in expressing the opinion that it would be impossible to sell the various formulas at the price charged by the Straus Laboratories and make any profit by it.

I have never dealt in modified milk myself, so do not claim the same authority for my figures that I would in other branches of the trade, where I have been able to test them by actual experience. I will, however, give you the figures on which I based my conclusion, only hoping that I am not troubling you with too many details and too much of my own opinion.

One thing, however, is certain. Modified milk could be handled more economically by a concern which produced and delivered a large amount of ordinary milk than by a concern which dealt in modified milk exclusively.

Some such plan as that which I have outlined will provide the most efficient and economical way of dealing with modified milk.

Putting aside all considerations of charity, it might be good business to sell modified milk at a very small profit in order to help other branches of the trade. But it is my emphatic opinion that such a price ought to be placed on modified milk as will allow a small profit to the dealer and place the trade on a business basis.

There are many families who, while anxious to get milk for their babies at as reasonable a price as possible, would prefer not to be in receipt of charity in any form, considering it injurious to their self-respect. Moreover, the milk ought certainly to be delivered to their doors. Time is money, even to the poor,

and it would pay them to give a few cents more for their milk instead of having to walk some distance to get it.

There can, of course, be no charity more deserving of support than that of providing proper nourishment for babies. By all means let there be a fund, supported either by public or private benevolence, to enable the poor to get the milk which their children need. But a truer charity, one deeper and more far-reaching in its effects, would be to provide milk for the young children of the self-respecting wage-earning class at such a price as would at least pay for the cost of production, but still make no exorbitant demands on people of limited means.

Modified milk delivered to the door of the consumer at cost price and a fund to help the really needy to buy it; this I believe to be the ideal at which we should aim.

To take a definite instance of modified milk for purposes of estimating the cost:

*Formula (Nathan Straus Laboratories) for infants from second to sixth month.*

	Ounces.
Full milk -----	18
Water -----	16½
Lime water -----	1½
Milk sugar -----	1½

The milk at the farm may be certainly assumed to cost not more than 16 cents per gallon. The cost of the above would therefore not exceed—

	Cents.
18 ounces milk -----	2½
1½ ounces milk sugar -----	2
Lime water and water (distilled) -----	½
<b>Total -----</b>	<b>5</b>

Allowing 4 cents for compounding and bottling the above (in 6 bottles) and for delivery and incidental expenses, the price would be 9 cents, as now charged by the Straus Laboratories.

This allowance would naturally not be sufficient where a special building had to be rented, special managers engaged, a large boiler kept specially in operation by a licensed engineer, and a large amount of ice bought, to say nothing of paying a high price for milk and providing for a special delivery to substations. But where there was already an abundance of steam and ice, and all the operations were under the same management as the rest of the trade, there would be great economy, and it is safe to say that the price of modified milk, delivered to the door of the customer, would not be very greatly in excess of that now charged by the Nathan Straus Laboratories.

I remain, yours, very truly,

HERBERT P. CARTER.

## APPENDIX I.

TESTIMONY ADDUCED AT HEARING BEFORE DISTRICT COMMISSIONERS,  
OCTOBER 20, 1910.

### DR. MELVIN'S TESTIMONY.

Dr. Melvin testified as follows:

For several years the Department of Agriculture has been endeavoring to ascertain the approximate percentage of the tuberculosis that exists among cattle in the various sections of the United States, and we had previously made a great many tests in and about Washington and other sections.

In doing that it was determined that tuberculosis did exist to considerable extent in the District. The test showed that 1,701 cattle were tested with tuberculin. Of that number 319 responded, and there were two held as suspects for subsequent testing at a later date, usually from two to three months. The total reimbursement to owners was \$13,855.10, for 305 cases. The average loss to owners was 27.65 per cent of the value of the destroyed stock.

Other tests have been made in Virginia and Maryland. In Virginia, from July 1, 1909, to June 30, 1910, there were tested 899 cattle, of which 162 reacted, 39 were held as suspicious, and the per cent of reactors and suspects was 18.27.

In Maryland, in the same time, 289 were tested. Forty-eight reacted, 6 were suspected, and the percentage of reactors and suspects was 15.74.

During that same period of time there were retested in Virginia and Maryland animals previously tested. In Virginia 923 passed, 39 reacted, 4 were held as suspects, making a percentage on the retest of 4.45 per cent, a reduction from 18.27 from the first test.

In Maryland, on the retest, 301 passed, 5 reacted, 3 were suspects, making a percentage of reactors and suspects of 2.58, a reduction from 15.74.

#### CONDITIONS IN DISTRICT.

In the District we have retested and found free from tuberculosis 423; we have found 31 reactors and 1 suspect, or a percentage of reactors and suspects of 7.03.

We have demonstrated beyond any question the feasibility of eliminating tuberculosis by three or four tests of this sort. In the tests that we made here in the District tuberculosis was demonstrated in cattle that reacted in something over 98 per cent of the cases.

We found in 126 cattle in and near the city of Washington that tuberculosis was demonstrated in 99.21 per cent of the cases which reacted. In a table I made as a result of the tuberculin testing of cattle by State and Federal officers with tuberculin prepared by the Bureau of Animal Industry, we found that between 1893 and 1908, there were tested 400,008 cattle. The number reacting was 37,000. These were in all parts of the United States, and were a percentage of 9.25 of all cattle tested.

The number slaughtered under inspection was 24,784; the number of these found tuberculous upon post mortem was 24,387, or 98.39 per cent.

#### DR. MOHLER'S STATEMENT.

Dr. Mohler's testimony was as follows:

Introductory to my statement concerning the tuberculin test I would present extracts from bulletins on bovine tuberculosis in Virginia and Maryland, States which now supply the greatest amount of milk to the citizens of the District of Columbia. I refer first to the statement of Dr. Buckley, of the Maryland Agricultural Experiment Station. He says:

"Usually the discovery of an agent which, when properly used by competent persons, enables them to detect positively the existence of a condition that is not revealed by any other means is hailed as a wonderful triumph. If the opposition to the use of tuberculin as a diagnostic agent came from those, only, who were ignorant of its properties and who could not inform themselves of its virtues it would be wholly excusable. The practice of using tuberculin, however, has been and is now condemned by some who know its value and who have been in a position to observe its reliability."

On the other side of our line, in Virginia, I would like to take a sentence from the book of Dr. Nelson Mayo. He is the veterinary in charge of the agricultural station at Blacksburg, Va. In his book, on page 382, he states as follows:

"The most accurate means of detecting tuberculosis in cattle is by injecting a small amount of tuberculin beneath the skin. When prepared for use, tuberculin contains no germs of tuberculosis and is incapable of producing any disease."

#### TUBERCULIN HARMLESS.

During the last 15 years statistics with reference to bovine tuberculosis show that over 98 per cent of the animals tested show adhesions at the post-mortem. Tuberculin is the most accurate diagnostic agent known when it is in the hands of competent men. As to the possibility of defeating the test, the farmer might infect his cattle before the inspector comes around. The best means to prevent this would be for the inspector to stay with the herd about 24 hours. An attempt to defeat the tuberculin test should be considered as any other fraud and guarded against by precautions.

I would like to speak of the Report of the International Commission on the Control of Bovine Tuberculosis, of which I was a member, and to leave a copy of the report with you and call your attention to this resolution in it:

"That tuberculin, properly used, is an accurate and reliable diagnostic agent for the detection of active tuberculosis.

"That tuberculin may not produce a reaction under the following conditions:

"(a) When the disease is in a period of incubation.

"(b) When the progress of the disease is arrested.

"(c) When the disease is extensively generalized.

"The last condition is relatively rare and may usually be detected by physical examination."

Thirty-three cities in the United States now require that herds which supply their milk be tuberculin tested. Error in the application of the tuberculin test has never been found to be greater than 3 per cent.

#### VIEWS OF DR. SCHROEDER.

Dr. Schroeder testified as follows:

The efficiency of the tuberculin test has been well demonstrated and it is hardly necessary to say anything more on the subject. When we consider that the tuberculin test gives an accurate diagnosis of tuberculosis in cattle, in between 98 and 99 per cent of the cases, we must recognize that we have a more reliable diagnostic method in this disease than in any other known disease. I have given the tuberculin test a great deal of attention throughout many years. I have given animals as high as 1,000 doses of tuberculin at a single time and in healthy animals it produces no injury.

We use at the experiment station a great many animals in various forms of experiments. Before using them we inject tuberculin to assure ourselves they are perfectly well. We have injected large quantities of tuberculin into well animals and they have shown no symptoms of trouble, and after being killed have been found perfectly well.

At the experiment station I had a number of animals from District herds, apparently in the best of health, so far as physical examination was concerned. We submitted them to the tuberculin test and 40 per cent, apparently healthy, reacted.

#### HUMAN AND BOVINE TUBERCULOSIS.

Relative to human and bovine tuberculosis, from the researches of the German and British investigating commissions, and independent investigators, we know that bovine tubercle bacilli are fairly common in human beings.

There was one interesting feature brought out at the last International Congress on Tuberculosis. It was an investigation by W. H. Park, of the New York research laboratory. Twenty-six per cent of the children under 5 years examined by him and found to have tuberculosis were affected by bovine tubercle bacilli.

I do not believe it is necessary to add anything to this. We have the efficiency of the tuberculin test thoroughly demonstrated, and the frequent occurrence of bovine tuberculosis among children alone shows we must eliminate those cattle or do something to the milk to prevent it doing injury. That something is pasteurization.

The tuberculin test should be required of all dairy herds. Where it is not required, all milk should be pasteurized before it is used. This should apply not only to milk and cream used in their raw state, but to all milk and cream contained in ice cream, buttermilk, butter, and cheese.

I have demonstrated that 40 per cent of apparently healthy cows that have tuberculosis in its early stages pass tubercle bacilli in the feces. Unquestionably, much of the tubercle bacilli in milk enters it in this way. Tuberculous cows whose milk does not show the presence of tubercle bacilli pass the bacilli in the feces, and for this reason their product can not be safely used unless it is pasteurized. This shows the menace in the apparently healthy cow that has not been tuberculin tested.

Dr. Anderson's recital of his observations concerning the milk supply of Washington follows:

Just prior to October, 1907, 1,147 cows of the District of Columbia were given the tuberculin test, and 214, or 18.6 per cent, responded. About the same time 1,059 cows from 51 herds of Virginia, Maryland, and the District, supplying milk to Washington, were tested; of this number, 160, or 15.1 per cent, reacted. These figures do not give a fair idea of the prevalence of tuberculosis in the herds supplying milk to Washington, as only the owners of those herds

who had reason to think their herds were free from tuberculosis permitted the test to be made.

I took, in the fall and winter of 1908, 272 samples of the market milk of Washington and injected them into guinea pigs. Of the 272 animals 49, or 18 per cent, died within 3 weeks of other causes before tuberculosis could have developed. I wish to direct attention, also, to the fact that the milk from some of the dairies, therefore, killed actually a high percentage of all the animals to which milk was given, showing the milk contained other bacteria.

Of the 223 samples that remained for study 15, or 6.72 per cent, contained sufficient tubercle bacilli to cause typical tuberculosis in the inoculated animals.

Of the samples of milk from 104 dairies 2 were lost by acute death of the animals, leaving 102; the milk from 11 of these 102 dairies contained tubercle bacilli. This gave a percentage of 10.7 of the dairies examined showing tubercle bacilli in the milk supplied their customers.

#### ELEVEN PER CENT AFFECTED.

These results, showing that approximately 11 per cent of the dairies whose milk was examined contained tubercle bacilli virulent for guinea pigs, do not, however, give a fair idea of the frequency of the presence of tubercle bacilli in the market milk of the city of Washington. When two animals were inoculated with the same sample both did not always develop tuberculosis. This would indicate that the bacilli were so few in the amount inoculated that one of the animals, by being a little more resistant, was able to overcome the infection.

The amount inoculated, less than 2 cubic centimeters of milk, is a very small portion of a pint bottle. The creamy layer was not inoculated, and other workers have shown that tubercle bacilli are more frequent in this than in the bottom milk. It is very probable that if more animals had been inoculated with the same sample and both cream and sediment used, the percentage of positive results would have been much higher.

The results, however, as they are found are sufficiently high to emphasize the necessity for the enactment and rigorous enforcement of a law requiring that all cows supplying milk to the District be tuberculin tested and freed from tuberculosis. This test, which is now universally recognized as a means of determining whether an animal has tuberculosis, should be made by a competent veterinarian, and those animals that respond should be disposed of in some way so that their milk may no longer be a source of danger to the community.

I have compiled the statistics of investigators who have collected in all 1,734 samples of milk in recent years. Of these samples 11.3 have been found to contain tubercle bacilli.

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Mr. HERBERT P. CARTER. I speak from the producers' point of view. There are two questions brought up which I have nothing to do with. One is the personal controversy between the officials of the health department and the dealers in milk here, and the second is the matter of the scientific controversy as to the merits of pasteurization. I am not entitled to any opinion on its merits, but I can be convinced by an examination of the evidence, which shows that the tuberculin test is sufficient in a large number of cases.

I can say for my part I am not bothered about the order for the tuberculin test, as my herd has been tuberculin tested from the first, and I know about the cattle that have been slaughtered from my herd after reacting, and I should have been sorry to serve milk from them. It certainly served to weed out the bad cattle from my herd, cattle that I would be sorry to keep in.

It seems to me this is a matter which neither the producers nor dealers have a right to discuss. We can not pretend to be scientists. If the scientific opinion requires such tests, it is the business of the producer to obey them as well as he can.

The whole question is a matter of compensation. It is a matter of dollars and cents. There may be many people who have worked hard for many years to produce a herd of, say, 20 cattle, honest, hard-working, laboring men. They have not had any tuberculin tests applied, and they have not done anything against the law or against their conscience. The profit of the herd of 20 cattle is not anything extraordinary. You must consider in this connection that the producer of milk has an exceptionally hard life. It is a case of working seven days in the week and not six. He should therefore receive additional compensation.

Suppose he has a herd of 20 calves. He may rely on getting 2 gallons of milk from each calf on an average. If he gets 40 gallons a day and in the winter gets 22 cents, which is a pretty good price, that represents \$8.80 a day from that herd of 20 calves. If we calculate the cost of feeding each one at 20 cents in winter we would deduct \$4 from the \$8.80, leaving the producer with a net income of \$4.80 a day. He would have to pay his rent and for sending the milk to town, and from time to time his cows go dry, so his income is really inadequate.

If farmers are to be required to meet all kinds of expensive requirements, it will add more expense. I think, personally, it is desirable that the cattle should be housed in thoroughly sanitary stables, but that means an investment of considerable capital, and if the tuberculin test is applied it means also a certain amount to be written off at a loss; but it has a more serious bearing if it is applied suddenly and without warrant or compensation.

A man may have his whole fortune staked on this herd, and if he is to have the test applied, having done nothing against the law, it may mean that half of his cattle will be condemned; and it is not infrequent for half the cattle to go under the test, especially if housed under insanitary conditions.

He faces a loss of half his herd with only what he can get from the butcher for the meat; maybe in some cases he will lose all. At any rate it means a serious loss to the producer.

I don't think the producers or dealers should attempt to down the laws as to what test should be applied, but if we submit to certain tests we have a right to ask for proper compensation. It is not for us to determine whether the test is by the Government of Maryland or Virginia or the District, but it is fair that the people of the District should pay up a proper amount if they require it. If there is increased protection to the public, the producers must be properly compensated for it. If they have proper compensation, I don't think there is any objection to submitting to the test.

Then if the test is continually applied after proper compensation is given, all that is required is that sufficient price is paid for the milk. A higher price will have to be paid by the consumer for a more valuable article. I therefore ask the commissioners to use their influence to obtain proper compensation for the producer of milk. If this business is made productive enough to the people in the neighborhood, there will be enough milk coming into Washington.

Under present conditions it is not to be expected that any of the poor class of producers can attempt to meet the requirements in the District, but if they get compensation for the cattle condemned and get better prices they will increase the facilities, and there will be no friction between the health department and themselves in meeting the requirements.

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## APPENDIX J.

COMMUNICATION FROM A. S. TRUNDLE, REPRESENTING THE DAIRYMEN'S ASSOCIATION OF THE DISTRICT OF COLUMBIA, MARYLAND, AND VIRGINIA.

THE DAIRYMEN'S ASSOCIATION OF THE  
DISTRICT OF COLUMBIA, MARYLAND, AND VIRGINIA,

Washington, D. C., November 20, 1910.

Mr. J. LOUIS WILLIGE, *Chairman.*

DEAR SIR: In compliance with your suggestion, under date of November 18, would say the complaints lodged by me in behalf of the Dairymen's Association of the District of Columbia, Maryland, and Virginia were, first, that the health officer, in violation of law, has refused to issue permits to ship milk into the District of Columbia, although all sanitary requirements had been complied with; second, that the health officer had in the absence of any possible authority cited members of this association to appear before him and show cause why milk claimed to have been sold by them contained so-called excessive numbers of bacteria (this in the absence of law or regulations to name any specific number) and had threatened to have them summoned in court; third, that in the opinion of this association the health officer had mislead the District of Columbia Commissioners, by making to them (this determined by their reply

to our complaints) statements that were misleading. To sustain these charges we offer the applications of producers for permits filed with the health department and not granted, copies of summons to dealers and to producers to appear as cited, and copies of letters and answers thereto as indicated in charge third, to all of which proof is to be found in the health office records, if such records are kept and filed as is the general custom and if such records have not been tampered with. A further claim, together with a request to the chamber of commerce, for investigation was to the effect that if such policies as indicated in charges first and second and the requirements of a compulsory tuberculin test were to be carried out, such policies would drive producers and dealers out of business or would result in shipments to other markets, thus diverting money to other cities that should naturally come to Washington. A further claim that I wish personally to file is, that, in my opinion, if the health officer had a right to issue an order for the compulsory tuberculin test (which order was issued to take effect on November 3, 1910, and since rescinded), he has that right now and has had such right for 15 years or since the milk law of 1895. That if, as he claims, recent researches and advanced knowledge has convinced him that milk from cows not having stood the tuberculin test is dangerous to public health, he is not only violating the laws of Congress but his sworn obligations, and further, if, as I understand, he claims to have knowledge that death has ensued as a result from consumption of milk from cows not having undergone the tuberculin test, he stands to-day a confessed party to the cause of probable death and therefore a criminal in the eyes of the law. Please find inclosed list of members as asked for.

Very truly, yours,

A. S. TRUNDLE, *Chairman.*

P. S. I can but feel that we have not had ample opportunity to present to your committee many facts without a knowledge of which it is absolutely impossible for anyone to arrive at conclusions which would insure full justice to the cause and business we represent as concerns ourselves or the general public.

A. S. T.

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## APPENDIX K.

COMMUNICATIONS FROM HEALTH OFFICER, DISTRICT OF COLUMBIA, DATED  
NOVEMBER 14 AND 23 AND DECEMBER 20, 1910.

COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
HEALTH DEPARTMENT,  
*Washington, November 14, 1910.*

Mr. J. LOUIS WILLIGE,  
*Chairman Committee on Milk Supply,  
Chamber of Commerce, Washington, D. C.*

DEAR MR. WILLIGE: As your committee has decided, I understand, to give no more public hearings, the following comments are submitted for consideration:

*As to the accuracy of the records of births and deaths in this department.*—The allegation made by Mr. Trundle at the first hearing, and the correctness of which was denied by the health officer, was to the effect that the records of the department showed that more infants died than were born. Evidence that could not be disputed having been offered to show that the statement was incorrect, Mr. Trundle shifted his ground so as to make it appear that he had said that more people died than were born. It is not alleged that this shifting of ground was intentional, but possibly Mr. Trundle's original statement was unintentionally inaccurate. The fact that I have quoted accurately what he actually said is, I think, certain, since I recall the statement that one member of the committee remarked that it was hardly possible that a sufficient number of babies would be imported into the District during the year to make up the deficiency represented by the alleged excess of births over deaths.

*With respect to the Trundle-Childs difficulty.*—The committee has not heard Dr. Childs's version of the affair, and in view of the fact that Trundle was found guilty while Dr. Childs was not, is sufficient evidence to show who was the culpable party. Dr. Childs is a very polite respectable colored physician

In this city, where he is now and for years has been practicing his profession. As there was no evidence whatsoever, beyond that of the aggrieved party, to show that Childs was in any way at fault in the matter, the health officer declined to detail another inspector to examine Trundle's place of business. To detail an inspector to inspect Trundle's place of business, out of the regular course of the department's work, would necessitate the making of similar details to every other dairyman who desired it, particularly for those who did not threaten inspectors with ice picks, but made the request in a proper way, and to do this would have disorganized the inspection force.

Mr. Trundle's reference to the prosecution of a Mr. Estes, unsuccessfully, by Inspector Childs is unfortunate for Mr. Trundle's argument. Inspector Childs prosecuted Mr. Estes because Mr. Estes was maintaining a dairy without a license; he was selling much milk and cream, and some butter, eggs, and cheese. A prosecution was instituted by Inspector Childs on direct orders from the health officer. And the defense was to the effect that the sale of milk and cream was a mere incident to some other business. Mr. Estes was acquitted, but subsequently, and while continuing the very same business, applied for and was given a permit to maintain a dairy.

*In so far as relates to the alleged delay in prosecuting Mr. Trundle for the sale of low-grade cream.*—The case referred to was promptly referred by the health department to the office of the corporation counsel for prosecution. Such delay as occurred occurred in that office and in the police court and not in the health department. The reason for the delay is therefore unknown to the health department, but such delay could probably have been avoided by Mr. Trundle had he demanded of the court prompt trial. Acquittal was presumably brought about in large part by the length of time that had elapsed between the collection of the sample and the prosecution, thus weakening the force of the evidence.

Respectfully,

WM. C. WOODWARD, M. D., *Health Officer.*

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COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
HEALTH DEPARTMENT,  
Washington, November 23, 1910.

Mr. J. LOUIS WILLIGE, *Chairman, etc.,*  
*Chamber of Commerce, Twelfth and F Streets NW., Washington, D. C.*

DEAR MR. WILLIGE: Until the receipt of your letter of the 18th instant I had presumed that the inquiry sheets recently received from your committee were the same as had been sent out by the committee generally, and that the desired information had been given in the hearings. I readily see now, however, that the inquiries recently received call for information that was not given at that time. The accompanying statement furnishes, I believe, the information which you wish, so far as it is possible for me to furnish it. If, however, there is any further information that you desire, please do not hesitate to call on me.

Yours, very truly,

WM. C. WOODWARD, M. D.,  
*Health Officer.*

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MEMORANDUM FURNISHED THE COMMITTEE ON THE MILK SUPPLY OF THE DISTRICT OF COLUMBIA, APPOINTED BY THE CHAMBER OF COMMERCE, IN RESPONSE TO ITS REQUEST OF NOVEMBER 3, 1910.

NOVEMBER 23, 1910.

1. Please furnish, if practicable, a statement of the number of producers and shippers of milk to the District of Columbia for a series of years past.

Milk and cream shipped into District of Columbia :	Farms.
1905-6.....	918
1906-7.....	965
1907-8.....	906
1908-9.....	882
1909-10.....	1,091

2. Please furnish, if practicable, a statement of the number of cows furnishing milk to the District of Columbia for some years past.

Number cows on dairy farms supplying milk to District of Columbia :

1905-6.....	16, 250
1906-7.....	15, 950
1907-8.....	16, 172
1908-9.....	16, 116
1909-10.....	17, 688

3. Please furnish, if practicable, a statement of the number of permits applied for and the number issued for selling milk in the District of Columbia for some years past.

Number of permits in force June 30, 1905, were as follows :

To maintain dairies.....	285
To maintain dairy farms.....	102
To bring milk or cream into the District of Columbia.....	974

	To main- tain dairies.	To main- tain dairy farms.	To bring or send milk or cream into Dis- trict of Colum- bia.
<b>Applications received:</b>			
1905-6.....	47	19	310
1906-7.....	69	24	403
1907-8.....	45	18	190
1908-9.....	8	12	194
1909-10.....	10	7	388
<b>Permits granted:</b>			
1905-6.....	37	15	139
1906-7.....	36	7	173
1907-8.....	14	3	9
1908-9.....	3	0	3
1909-10.....	5	3	1

4. What amount of milk, in your opinion, is daily supplied to the District of Columbia?

Amount of milk per day sold in the District of Columbia, 19,000 gallons.

5. Should the retail price of milk sold in the District be increased, and to what price?

Answer. It costs more to produce milk now than it did 10 years ago; and if the price then paid was a fair one, the price now should be increased. A fair retail price for milk, however, can be determined only after information is at hand relative to the cost of production and distribution under intelligent economical businesslike management in this particular section of the country, and so far as I know no figures are available to show such cost.

6. Would this price, in your judgment, be prohibitive to the poorer classes to any extent whatsoever?

Answer. This question is in part answered by the answer to question 5. I may add, however, that I know of no evidence to show that wholesome milk can not be sold at a price within the reach of what may be termed in a general way "the poorer classes." The burden of furnishing evidence to show that a fair price for milk would be prohibitive to such classes rests upon those who allege the fact; but while there may have been allegations as to the occurrence of a prohibitive price, there have been no reliable figures to show that such a price would be necessary. It must be borne in mind, of course, that the adoption of more economical methods with respect to production and distribution will tend to offset increased prices otherwise necessary.

7. In your judgment, is the farmer receiving his proper share of the money derived from the production and sale of milk?

Answer. Probably, I think, the farmer is not receiving his proper share of the retail price of milk, but, so far as I know, no farmer in this vicinity has ever produced any figures to show that that is the case. Until evidence to the con-

trary is shown it may clearly be presumed as long as farmers continue to produce and sell milk that they are finding it profitable to do so.

8. In your opinion, is a uniform standard of wholesale and retail prices of milk practicable?

Answer. I do not believe that a uniform standard of wholesale and retail prices of milk is desirable, but I do not understand just what is meant by the word "practicable" as used in this connection. I doubt very much whether the farmers in this vicinity are sufficiently well organized to fix a uniform standard for the wholesale price of milk. The retail milk dealer, however, does apparently fix a uniform standard for the retail price of ordinary milk, and I think he comes very close to fixing the price that the farmer gets.

9. Are the existing freight and express charges for transporting milk reasonable, in your judgment?

Answer. I am hardly qualified to answer this question.

10. State whether, in your judgment, the requirements of the health department, including the proposed tuberculin test, can be observed by the producers without increasing the wholesale and retail price of milk in Washington.

Answer. The elimination of diseased cows from the dairy herds that would result from the application of the tuberculin test and the necessity for purchasing sound cows to replace the cattle thus eliminated would doubtless for a while justly result in an increase in the cost of milk, although it should result in no substantial increase. Only a single item in the cost of milk production would be increased by the application of the tuberculin test; that is, the cost of the cattle. It costs no more to feed, house, and care for a well cow than it does to care for a sick one, and in the long run the well cow may be expected to have a longer productive commercial life than one that is diseased. Ultimately, as the number of tuberculous cows in the dairy country is reduced to a minimum, the cost of milk should return to substantially what it is at present, supposing, of course, that in the meantime events do not show that the present selling price of milk is, because of other factors, too low.

11. To what extent is compulsory pasteurization, in your opinion, practicable, and is such action under consideration by the health department?

Answer. With proper restrictions as to the installation of apparatus and as to the keeping of records, there would seem to be no reason why compulsory pasteurization should not be practicable. The fact that regulations directed to this end might in some cases be evaded, notwithstanding a proper system of inspection, is no reason why such regulation should not be made and enforced as far as practicable. Laws against murder, embezzlement, housebreaking, and all other kinds of crimes and misdemeanors are very commonly evaded, notwithstanding a well-organized system of police protection, but that has never been set forth as a reason why such laws should not be kept on the statute books. The health department has for some time had under consideration the advisability of the compulsory pasteurization of all milk coming from cows not tuberculin tested and believes that with respect to that part of the milk supply pasteurization should be enforced.

12. Would compulsory pasteurization, in your opinion, have any effect in reducing the amount of milk daily supplied to the District, provided the retail cost of milk (and consequently the price received by the farmer) be increased, and to what extent?

Answer. I can conceive of no reason why compulsory pasteurization should reduce the amount of milk daily supplied to the district.

13. What effect, in your judgment, would the enforcement of the tuberculin test have on the wholesale and retail prices of milk supplied to the District of Columbia in summer and in winter?

Answer. This question seems to have been answered in answering question 10. The enforcement of the tuberculin test would not increase the price of land, the price of foodstuffs, the price of stable accommodations, the price of labor, the cost of transportation, or the cost of distribution. It would increase for a while a single item, to wit, the cost of cattle. For purposes of illustration, assume that a farmer has a herd of 100 cattle, worth \$75 each, making the total value of his cattle \$7,500. Interest on this capital at 5 per cent per annum is equivalent to \$375. Assume now that the tuberculin test is applied, 20 per cent of the herd react and are killed, and 20 new cows are introduced, tuberculin tested, costing \$100 apiece, or 33 $\frac{1}{3}$  per cent more than the value of the original herd before testing. If we disregard the increased value of the herd that has stood the test that arises out of the fact that it has done so, the value of the herd will then be as

follows: 80 cattle at \$75 each, equivalent to \$6,000; 20 cattle at \$100 each, equivalent to \$2,000; total value of herd, \$8,000. The interest on this capital at 5 per cent per annum is equivalent to \$400. Between the interest in the capital invested on the untested herd and the interest on the capital invested in the tested herd the difference amounts, therefore, to but \$25 per annum. This amount is distributed over the entire output of a herd of 100 cows for 12 months. It represents the increased cost to the producer of producing milk from tuberculin-tested cattle. This amount would probably be materially reduced if not altogether eliminated by the increased period of usefulness of the tuberculosis-free cattle as compared with those infected with the disease otherwise in the herd.

Viewing the matter in the light most favorable to the producer, the increased cost of producing milk from tuberculin-tested cows should not amount to more than a small fraction of a cent per gallon. Taking the herd of 100 cows, untested, worth \$75 per cow, the gross value of the herd would be \$7,500. Kill 20 per cent of these cows on account of tuberculosis, without remuneration of any kind to the farmer, and appraise the remaining 80 animals as still worth as much as the entire herd—\$7,500. Replace the 20 animals that have been destroyed by 20 tuberculin-tested cows costing \$100 per cow, or \$2,000. The value of the 100 tuberculin-tested cows would then be \$9,500. Five per cent on this investment would amount to \$475 per annum, or just \$100 per annum more than the interest charged on the untested herd. If then we presume that the average production for each animal in the entire herd is but  $1\frac{1}{2}$  gallons per day, the production of the herd for the entire year will be 36,500 gallons, and the increased cost per gallon, representing the interest charge on the increased cost of the herd, would amount to one-fifth of 1 per cent.

Of course, if a larger percentage of the herd reacted, the net increase in the cost of production would be increased, but it does not appear likely that there will be any material increase. In view of the experience with respect to the testing of cattle in the District, however, it would appear that the figure taken for condemnations—20 per cent—was extremely liberal.

14. Would the tuberculin test, as a matter of practice, require to be applied on the farm, or would it be practicable to establish testing laboratories within convenient reach of most farms supplying milk to the District of Columbia?

Answer. As a matter of practice, the tuberculin test would ordinarily have to be applied on the farm. Some cattle might be tested in the hands of dealers, and possibly quarantine or testing stations might be established to economize with respect to the application of the test.

15. Would the enforcement of the tuberculin test, in your judgment, create a milk famine in the District of Columbia?

Answer. If the test could be applied within a day or a week, and were so applied, a milk famine would undoubtedly result. If the application of the tests in the first instance were spread over a reasonable length of time, no famine would result. Under ordinary conditions, the routine application of the test would not diminish the milk supply.

16. Please furnish, if practicable, a statement of mortality, and especially of infant mortality, in the District of Columbia for some years past.

Years.	Under 2 years—diarrhea.	Under 1 year—all causes.	Total deaths all ages.	Years.	Under 2 years—diarrhea.	Under 1 year—all causes.	Total deaths all ages.
1880 <sup>1</sup> .....	372	1,235	4,243	1895.....	299	1,424	5,782
1881.....	209	1,197	4,504	1896.....	463	1,465	5,832
1882.....	417	1,105	4,223	1897.....	419	1,306	5,486
1883.....	298	1,135	4,558	1898.....	385	1,249	5,815
1884.....	226	1,250	4,841	1899.....	317	1,266	5,863
1885.....	360	1,234	4,982	1900.....	387	1,344	6,059
1886.....	297	1,223	4,728	1901.....	344	1,234	6,050
1887.....	348	1,298	4,699	1902.....	329	1,235	5,788
1888.....	341	1,493	5,225	1903.....	382	1,092	5,944
1889.....	332	1,308	5,158	1904.....	323	1,128	6,221
1890.....	430	1,483	5,534	1905.....	337	1,139	6,205
1891.....	355	1,484	6,103	1906.....	318	1,233	6,316
1892.....	427	1,716	6,416	1907.....	325	1,125	6,343
1893.....	490	1,642	6,119	1908.....	333	1,100	6,136
1894.....	506	1,514	5,868	1909.....	250	1,042	6,216

<sup>1</sup> Diarrheal diseases from years 1880 to 1899, inclusive, are for fiscal years.

17. To what extent, in your judgment, is the decrease in mortality due to the improvement of the milk supply?

Answer. It is impossible to estimate the extent to which the decrease in the mortality of this District is due to the improvement of the milk supply. The fact that the decrease in infant mortality has been greater than the decrease in the mortality of the population as a whole, and the fact that there has been a very marked decrease in the infant mortality from diarrheal diseases, the decrease in the infant mortality beginning almost coincidentally with the enforcement of the milk law of 1895, suggests very strongly the existence of a causal relation. The extent of that causal relation, however, as stated above, is impossible to determine. There have, of course, been many other factors at work tending toward the reduction of infant mortality. It should be noted in studying the figures given in the preceding answer that the decrease in the number of deaths of children under 1 year of age from all causes and the decrease in the number of deaths of children 2 years of age from diarrheal diseases have occurred, notwithstanding a general increase in the population.

18. Can you suggest any additional requirements for the betterment of the District's milk supply, and the safeguarding of public health?

Answer. All milk should be tuberculin tested or else pasteurized. All milk should be properly cooled and kept cool. Arrangements should be made for the instruction of mothers in caring for their infants, and this can in no other way be done so well as in connection with the free distribution of proper milk to persons unable to pay for it and the distribution of milk at reduced prices to persons who are unable to pay the ordinary market price for a milk of proper quality. There are, of course, many other suggestions that might be made with respect to the improvement of the health of the District, but these seem to be those most directly connected with the subject now under consideration.

19. Have inspectors been cautioned to exercise patience and tact in the discharge of their duties?

Answer. Inspectors have been told repeatedly that it is desired that they act primarily as instructors and advisers to persons producing and selling milk, dealing with those with whom they come in contact rather as persons who desire to do right and who are to be helped along than as persons who are unwilling to do right and have to be driven along. Inspectors have been directed to use compulsion only when compulsion was necessary.

20. Have there been many complaints filed of improper action on the part of inspectors in the performance of their duty?

Answer. During the fiscal year ended June 30, 1910, there were approximately 10 complaints filed against inspectors in the dairy-farm and milk-inspection service, numbering in all 10 inspectors. None of these complaints were regarded, after investigation, as well founded.

21. Is the present force of inspectors sufficient to compel the proper observance of the existing and proposed regulations?

Answer. No; the present force can not compel proper compliance with existing regulations, and the necessity of applying the tuberculin test to dairy herds hereafter will still further diminish its capacity to accomplish that end.

22. Has a bacteriological laboratory recently been established for the health department?

Answer. No; the health department had a bacteriological laboratory for many years. The bacteriological laboratory has, however, up to the early part of the current fiscal year been devoted exclusively to the contagious disease service, having been established and operated from funds appropriated exclusively for that service. The appropriation act for the current year, however, approved May 18, 1910, provided \$500 for the equipment and maintenance of the bacteriological laboratory, and authorized the bacteriologist employed out of the contagious disease appropriation, under direction of the health officer, to undertake the bacteriological examination of milk and of other dairy products and of the water supplies of dairy farms, whether such examinations be or be not directly related to contagious diseases. Since that time, therefore, the health department has undertaken the bacteriological examination of milk.

23. Have any attempts been made, to your knowledge, to secure legislation by Congress affecting the production, transportation, and distribution of milk, under the authority vested in the national legislation to regulate commerce between the several States?

Answer. The act of 1895, relating to the production of milk in and for the District of Columbia, was made by Congress, quite as much by virtue of its power to regulate interstate commerce as by virtue of its power to legislate for the District of Columbia. The food and drugs act of 1898, enacted by Congress for

the District of Columbia, regulated the sale of milk and cream in the District of Columbia, and having been enacted by Congress, would doubtless apply quite as well to "original packages" as to any other form in which the milk might be sold. The Federal food and drugs act of June 30, 1906, which is distinctly an interstate act, although it regulates local commerce within the District of Columbia, applies to milk and cream.

24. To what extent are milk products (including also prepared, condensed, modified, and powdered milk) regulated by the provisions of the pure food and drugs act?

Answer. So far as the provisions of the act referred to are applicable to the products named, and generally speaking they are applicable to them quite as much as to other food products, the manufacture and sale of milk and milk products (including also prepared, condensed, modified, and powdered milk) is governed by the provisions of said act.

25. Kindly furnish copies, if practicable, or refer the committee to the milk law of 1895, and any House or Senate bills or documents relating to legislation already in effect and contemplation, or regulations of the health department referring to the subject under investigation by this committee.

Answer. A copy of the milk law of 1895, of the regulations promulgated by virtue thereof, of the act regulating the manufacture and sale of foods in the District of Columbia, enacted in 1898, and of the Federal food and drugs act of June 30, 1906, are inclosed herewith; also copies of the bill now pending looking toward the improved regulation of the milk supply of this District.

Yours, very truly,

WM. C. WOODWARD, M. D.,  
Health Officer.

COMMISSIONERS OF THE DISTRICT OF COLUMBIA  
HEALTH DEPARTMENT,  
Washington, December 20, 1910.

MR. J. LOUIS WILLIGE, *Chairman, etc.,*  
*Chamber of Commerce, Washington D. C.*

DEAR MR. WILLIGE: I beg to acknowledge the receipt of your letter of the 24th ultimo, requesting certain information relative to the milk supply of this District. I regret very much that absence from the city has prevented a more prompt compliance with your request, and hope that the following information will meet your needs.

1. What routine, if any, is prescribed for procuring reports of communicable diseases among dairymen and dairy farmers, and their assistants.

Answer. No routine has ever been laid out aimed at this particular end. The reporting of all cases of communicable diseases, with but few exceptions, within the District of Columbia, is required by law. These reports, however, do not state whether the patient or any member of the household is employed on a dairy farm or about a dairy. Such information is obtained by the inspector who visits the premises, and such visits are always made in connection with reported cases of typhoid fever, scarlet fever, and diphtheria, the diseases most likely to be communicated by milk. Outside of the District of Columbia, cases of communicable diseases are not reported to the health officer, whether they occur on dairy farms or not. The employment of any one who has been exposed to diphtheria, scarlet fever, erysipelas, smallpox, anthrax, or other dangerous contagious diseases, in or about the dairy or dairy farm, is forbidden by law. (See sec. 3, an act to regulate the sale of milk in the District of Columbia, etc., approved Mar. 2, 1895.)

2. Are there any restrictions against feeding "wet malt," or other brewery products, to milch cows?

Answer. No effort has been made to restrict the feeding of dairy cows with any of the foods named. The only brewery product, however, that, to the knowledge of the health department, is used for milch cows, is wet malt. This, it is believed, can be safely fed until it has begun to sour; after it has begun to sour it is regarded as having spoiled, and its use would not be tolerated any more than the use of any other spoiled food for dairy cows. In the consideration of this matter, the committee must bear in mind the difference between wet malt and other brewery products on the one hand, and distillery waste on the other, so as to avoid coming to erroneous conclusions as to the views of various sanitary authorities with respect thereto.

3. Has the feeding of such products a prejudicial effect upon the milk of animals so fed?

Answer. I do not believe that it has yet been demonstrated that the feeding of fresh sweet brewer's grains has a prejudicial effect upon the milk of animals so fed. Attention is invited, however, to the preceding answer.

4. With what average frequency are inspections of dairies and dairy farms made by the health department?

Answer. By the term "dairy" is understood a place where the sale of milk and milk products is the principal part of the business carried on. There are in the District of Columbia 60 such places, independently of those located on dairy farms; those located on dairy farms are inspected as a part of the dairy farm and therefore are not included in the following statement of average frequency of inspection of dairies. The dairies of the District of Columbia, independent of those located on dairy farms, were during the year ended June 30, 1910, inspected on an average of 23.6 times. The dairy farms supplying milk to the District of Columbia were during the same year inspected on an average of 3.79 times each.

5. Is there any need for more inspectors under the present regulations?

Answer. The number of inspectors of dairy farms should be increased. Because of the distance between dairy farms in outlying districts, a considerable part of the time of any inspector is consumed in going from his headquarters to the various farms and from farm to farm. The proportion of his time that is practically lost in this way is, of course, increased in proportion as the size of his territory is increased, and with the large territories that individual inspectors now have to cover a very large part of their time is lost in going to and fro. At least one new inspector is urgently needed, and more could be used with advantage. What, however, is most urgently needed is a competent officer of the health department to devote his entire time to the supervision of the food-inspection service. No salary has ever been provided sufficient to tempt into the service any veterinary surgeon or graduate of a dairy school willing to give up his entire time to the work of the office, as proper supervision of the food-inspection service practically requires. The men who have been assigned to this work have been, therefore, men not specially qualified or trained, and however willing they may have been to discharge the duties of their office, they have not always been capable of doing so when put to the test. As an illustration of the difference between the situation in Washington and elsewhere, it may be stated that New Orleans pays its chief food inspector \$200 a month and allows him time for a reasonable amount of private work. The chief food inspector in the city of Winnipeg receives \$2,000 a year. The most that the District of Columbia has ever paid for this service is \$1,200 per annum.

6. What number of additional inspectors will probably be required if a low bacterial content, the tuberculin test, and compulsory pasteurization be required?

Answer. It is impossible to answer this question with any degree of accuracy. Four additional employees, for instance, would be sufficient to supervise from a bacteriological standpoint the milk supply of this District in a very satisfactory way. One additional inspector, however, would very much improve the present service, and two would improve it in proportion to the increase in the number of employees. While an increase in the number of employees assigned to the supervision of the milk supply from a bacteriological standpoint would not do away altogether with the necessity for the inspection of the farms, yet if it were permitted to fix an arbitrary bacteriological content and to insist that milk shipped into the District for sale or sold within the District show no greater number of bacteria than that allowed the necessity for the supervision of dairy farms would be very much reduced. A farmer or a dealer in milk can not produce and market a milk containing a small number of bacteria unless his premises and his methods are what may be designated as sanitary. A bacteriologist examining the milk as it reaches the city and as it is offered for sale can tell quite as much regarding the conditions under which it has been produced, from a general sanitary standpoint, as can the inspector on the farm. The bacteriologist can not, however, determine as accurately as can the inspector on the farm the condition of the dairy cattle, nor can the bacteriologist pick up as well as can the inspector who visits the dairy farm information concerning the presence of contagious diseases in the families of milk producers. It must be borne in mind, of course, that the isolation of disease germs in milk is exceedingly difficult, with the possible exception of the isolation of tubercle bacilli, and that the isolation of tubercle bacilli is a slow and somewhat expensive process, which can not well replace the physical and tuberculin testing of the dairy cattle. If all tuberculin testing is to be done by employees of the District government, three additional veterinary inspectors should be provided, for the present at least, when there is a very large number of untested herds to be

looked after. The number of inspectors required to supervise properly the pasteurization of milk would depend upon the number of pasteurizing plants established. Three would probably be a fair estimate for such work. The more important part of the supervision of the pasteurizing plant, it might almost be said, would rest with the inspectors charged with the bacteriological supervision of the milk supply. Generally speaking, therefore, it might be said that if a fixed bacterial standard be established, the tuberculin test required, and compulsory pasteurization insisted upon from six to ten additional inspectors would be needed properly to supervise the work.

7. What number of dealers are at present purveying milk in the District of Columbia?

Answer. The health department has no record of the numerous grocers and other keepers of stores other than dairies who are purveying milk. It is estimated, however, that milk is sold at 2,000 places within the District of Columbia.

8. What number of producers are at present furnishing the milk consumed in the District of Columbia?

Answer. The number of licensed dairy farms at present is 1,142.

9. Will you kindly furnish, if possible, a statement of the prices paid to the dairy farmer and by the consumer for milk during the past several years?

Answer. The price paid to the dairy farmer during the past five years has been practically unchanged at from 14 to 16 cents for the summer months and 20 to 22 for winter months. The consumer has paid in that time 32 cents in the summer time and 36 to 40 cents in the winter. These prices are per gallon. So-called "special" milk is being sold at 40 cents per gallon throughout the year.

10. What individuals or companies now maintain plants for pasteurizing milk consumed in the District of Columbia?

Answer. George M. Oyster, jr., J. J. Bowles, W. A. Simpson, Belmont Dairy Co., J. W. Gregg (no holding device), Nathan Straus Laboratory, all in Washington, D. C.; Baltimore & Washington White Cross Milk Co., Frederick, Md.; Tri-State Sanitary Milk Co., Cumberland, Md.; International Milk Products Co., Cooperstown, N. Y., and the following creameries which ship only cream, so far as is known to this department: Chapin-Sacks Manufacturing Co., Buckeystown, Md., and Woodstock, Va.; Rosemary Creamery Co., Adams, N. Y.

11. Does any present requirement of the health department forbid the use of milk bottles or other receptacles for holding coffee, tea, paint, coal oil, molasses, vinegar, gasoline, etc.?

Answer. Section 6a of an ordinance to prevent the sale of unwholesome food and the distribution of medicinal and poisonous substances in the District of Columbia provides as follows:

"Sec. 6a. That any person in the District of Columbia who receives milk or cream for sale shall, immediately after emptying the receptacle in which such milk or cream has been received, thoroughly rinse such receptacle so as to free the same from all remnants of milk and of cream, or shall cause such receptacle to be so rinsed; and no person in said District shall put or, having power and authority to prevent, permit to be put into any receptacle which is commonly used for the storage or delivery of milk or cream for sale anything which is filthy or offensive or any refuse matter of any kind. Any person violating the provisions of this section shall, upon conviction thereof, be punished by a fine not exceeding \$25 for each and every such offense." (Commissioners' Regulation of Apr. 21, 1903.)

The health department has prosecuted persons who have failed to rinse the receptacles in which milk or cream has been received, such prosecutions being against, as the regulation quoted above will indicate, persons who have received milk or cream for sale. Cases in which householders have used the receptacles in which milk or cream has come into their possession for purposes suggested by the question propounded by the committee have not been prosecuted by the health department, for the simple reason that the health department does not obtain knowledge of such offenses, and the milk dealers who do obtain knowledge of such offenses have never appeared to enter complaint against their customers.

12. What is the temperature maintained in household refrigerators in the District of Columbia?

Answer. The health department is unable to answer this question.

13. In what respect, if any, is the drinking of sour milk deleterious?

Answer. The drinking of sour milk is ordinarily not injurious to health. The milk that seems to do harm is not milk that is actually and manifestly soured, but milk that is more or less advanced in the process of souring. Whether this is due to the fact that up to a certain point disease-producing

organisms multiply in milk, whereas at a later period by reason of the changes produced by the ordinary milk bacteria such disease-producing organisms are either killed or inhibited in their action, or whether the injurious effect that seems to follow in many cases from the drinking of old and partially soured milk results from changes in the process of souring that follow its ingestion, is not clear.

14. Has the health department expressed any views as to the desirability of compulsory pasteurization?

Answer. Yes. In the present state of the production and sale of milk commercially, pasteurization seems to be the only way of safeguarding the public health against milk-borne diseases. There will, however, probably always be some use for raw milk, either as a medicinal agent or for culinary purposes, or for use by the exceptional individual, similar to the individual who now without any physical necessity uses raw meat and raw eggs, and therefore there appears to be no reason why the sale of raw milk should be forbidden.

15. Has a bacteriological laboratory been recently established in connection with the health department, and on what date?

Answer. This question was answered, it is believed, in the answers previously submitted to the committee. Briefly, however, a bacteriological laboratory has not been recently established in connection with the health department, but such a laboratory has been used by the department for some years past. Until the beginning of the current fiscal year, however, that laboratory was devoted exclusively to the contagious-disease service, because it was maintained from the appropriation provided for the maintenance of that service. With legislation enacted by Congress at its last session it became possible to use this laboratory for other purposes, and with the beginning of the fiscal year its use for such other purposes, notably for milk work, was begun.

16. Are additional or better facilities desired for this laboratory?

Answer. The laboratory is in need of additional room. It is possible to operate it on its present basis only by the detail of a sanitary inspector to assist the bacteriologist, and in order to obtain an inspector to do this work it has been necessary to train him. There should be provision for an assistant bacteriologist, with salary and prospects sufficient to bring into the service a generally trained bacteriologist, say with an initial salary of \$1,500 per annum, with some assurance of promotion in event of giving satisfactory service. Provision should be made for the more general supervision from a bacteriological standpoint of the milk supply of the District, by providing for from one to four minor assistants in the bacteriological laboratory, and if such assistants be provided it will be necessary to have additional equipment as well as additional space.

17. In your judgment will the specification of 500,000 bacteria to the cubic centimeter suffice as a maximum indication of acceptable milk, or should this number be decreased, and if so to what figure?

Answer. In the present state of the production and vending of milk, 500,000 bacteria per cubic centimeter represents a fair standard. Good raw milk should contain not in excess of that number, but it will hardly be practicable during the summer season to prosecute for every sample of milk that contains a number in excess of the standard suggested. In the case of pasteurized milk, a bacterial standard should be fixed not in excess of 50,000 per cubic centimeter. If bacterial standards are to be fixed by law, it might be well to provide generally that no milk should be sold having a higher bacterial content than that claimed for it by the vender, so that the producer and vender of special grades of milk who claims for such milk a bacterial count not in excess of say 10,000 per cubic centimeter could not with impunity sell to his customer milk containing a greater number.

18. Can you refer the committee to a statement of the present requirements of the health department as to stabling cows, etc.?

Answer. A copy of the regulations of the department relative to the stabling of cows is inclosed herewith.

19. Can you conveniently furnish copies of all orders of the health department at present in operation governing the production and sale of milk?

Answer. The production and sale of milk is governed rather by laws and regulations, copies of which have already been furnished the committee, than by orders of the health department. Orders of the health department are generally directed to the employees of the department, and thereupon departmental interpretations of existing laws and regulations. Copies of all such orders can not be easily furnished, but if the committee desires copies of such orders relating to any particular feature of the milk-inspection work, copies of such orders will be made and furnished.

The department stands ready to furnish the committee with any other information in its possession which the committee believes will be of service to its work.

Respectfully,

WM. C. WOODWARD, M. D.,  
Health Officer.

APPENDIX L.

SCORE CARDS EMPLOYED BY DISTRICT GOVERNMENT AND DEPARTMENT OF AGRICULTURE FOR RATING DAIRIES AND DAIRY FARMS.

[Health Department of the District of Columbia, Dairy and Dairy Farm Service.]

SCORE CARD FOR DAIRIES.

Owner or manager: \_\_\_\_\_, Trade name: \_\_\_\_\_,  
Street and No.: \_\_\_\_\_, Permit No. \_\_\_\_\_,  
Number of wagons: \_\_\_\_\_,  
Date of inspection: \_\_\_\_\_, 19—  
Gallons sold daily:  
Milk: \_\_\_\_\_,  
Cream: \_\_\_\_\_,  
Buttermilk: \_\_\_\_\_.

Equipment.	Score.		Methods.	Score.	
	Perfect.	Allowed.		Perfect.	Allowed.
<b>Plant:</b>			<b>Plant:</b>		
Location.....10			Cleanliness.....15		
Convenience.....2	2		Floor.....3	3	
Surroundings.....8	8		Walls.....2	2	
Arrangement.....5			Ceilings.....1	1	
Proper rooms.....4	4		Doors.....1	1	
Convenience.....1	1		Windows.....1	1	
Construction.....10			Good order.....1	1	
Floor and drainage.....6	6		Free from odors.....1	1	
Walls.....3	3		Freedom from flies.....5	5	
Ceiling.....1	1		Machinery and utensils:		
Light.....5	5		Cleanliness.....30	30	
Ventilation.....5	5		Milk: (Handling).....20		
Screens.....5	5		Clarifying.....5	5	
Machinery and utensils (kind, quality, condition, and arrangement).....30	5		Bottling.....10	10	
Bottle and can washer.....5	5		Pasteurizing.....5	5	
Bottling machine.....5	5		Storage.....20	20	
Capping machine.....5	5		45° F. or below.....20		
Crates, racks, etc.....5	5		45 to 50° F.....15		
Cold storage.....5	5		50 to 55° F.....10		
Pasteurizer.....5	5		Salesroom—		
Water for cleaning.....20			Cleanliness.....10	10	
Steam.....10	10		Attendants' cleanliness.....5	5	
Hot water.....5	5			100	
Cold water.....5	5				
Salesroom.....10					
Location.....3	3				
Construction.....4	4				
Equipment.....3	3				
	100				
Additional deductions for exceptionally bad condi- tions—			Additional deductions for exceptionally bad condi- tions—		
.....			.....		
.....			.....		
.....			.....		
.....			.....		
Total deductions.....			Total deductions.....		
Net total.....			Net total.....		

Score for equipment ..... ; multiplied by 1 .....  
 Score for methods..... ; multiplied by 2 .....  
 Total to be divided by 3 .....  
 Final score.....

Supplemental score for wagons.		Perfect.	Allowed.
Construction.....		3	
Condition.....		7	
		10	

This score does not cover quality of milk purchased by this dealer.

....., Inspector.

[Health Department of the District of Columbia, Dairy and Dairy-Farm Inspection Service.]

SCORE CARD FOR DAIRY FARMS.

Farm of ———. Location ———. Consignee ———.

Permit number ———. D. C. Md. Va. ——— 191—. Rating ———.

Equipment.	Score.		Methods.	Score.	
	Perfect.	Allowed.		Perfect.	Allowed.
<i>Cows, 16.</i>					
Comfort:			Cleanliness of stables:		
Bedding.....	1		Floor.....	2	
Temperature of stable.....	1		Walls.....	1	
Food.....	2		Ceiling and ledges.....	1	
Water:			Mangers and partitions.....	1	
Clean.....	1		Windows.....	1	
Fresh.....	1		Stable air.....	6	
Light: 4 square feet or more of glass per cow (3 square feet, 3; 2 square feet, 2; 1 square foot, 1).....	4		Barnyard, clean and well drained.....	2	
Ventilation: Automatic system (adjustable windows, 1).....	3		Removal of manure daily to field or pit (manure stored less than 50 feet from stable, 0).....	2	
Cubic feet air space per cow, 600 to 1,000 feet (less than 600 feet, 2; less than 500 feet, 0).....	3		<i>Utensils and milking, 24.</i>		
<i>Stable, 6.</i>					
Location of stable:			Care and cleanliness of utensils:		
Well drained.....	1		Thoroughly cleansed.....	6	
Free from contaminating surroundings.....	1		Steaming or scalding utensils.....	6	
Construction of stable:			Inverting utensils in pure air and sunlight.....	3	
Tight, sound floor and proper gutter.....	2		Cleanliness of milking:		
Smooth, tight walls and ceiling.....	1		Clean, dry hands.....	3	
Proper stall, tie, and manger.....	1		Udders washed and dried (udders cleansed with moist cloth, 4).....	6	
<i>Utensils, 14.</i>					
Construction of utensils.....	1		<i>Handling the milk, 20.</i>		
Water for cleaning, clean, convenient, and sufficient.....	2		Cleanliness of attendants.....	2	
Facilities for steam (hot water sufficient to immerse utensils, 2).....	4		Milk of each cow removed immediately from the stable.....	2	
Small top milking pail.....	3		Cleanliness of milk room.....	3	
Milk cooler.....	2		Prompt cooling (cooled immediately after milking each cow).....	2	
Clean milking suits.....	2		Efficient cooling; below 50° F. (51° to 55°, 4; 56° to 60°, 2).....	5	
<i>Handling the milk, 4.</i>					
Location of milk room:			Storage; below 50° F. (51° to 55°, 2; 56° to 60°, 1).....	3	
Free from contaminating surroundings.....	1		Transportation; iced (for jacket or wet blanket allow 2; dry blanket or covered wagon, 1).....	3	
Convenient.....	1				
Construction of milk room:					
Floors, walls, and ceiling.....	1				
Light, ventilation, and screens.....	1				
Total.....	40		Total.....	60	

This report indicates the sanitary condition of these premises only at the time this inspection was made; any person desiring to learn the general sanitary condition should refer to a series of not less than three consecutive reports, which may be seen in the health office.

SCORE FOR CATTLE.

Number of cattle in dairy herd.....  
 Perfect score for each cow or bull..... 100

Total possible score for herd.....

*Deductions on account of cattle diseased, etc.*

Number of cattle.	Nature of disease, defect, etc.	Deductions per cow.	Total deductions.
.....	1. Tuberculosis as shown by a physical examination or by the tuberculin test.	100.....	.....
.....	2. Absence of a tuberculin test within one year of the date of inspection, not to include cattle scored under paragraph 1.	30.....	.....
.....	3. Inflammatory diseases of the udder.....	100 or less.....	.....
.....	4. Diseases other than or in addition to the diseases mentioned above.	...do.....	.....
.....	5. Unclean condition of the teats and udders.....	40 or less.....	.....
.....	6. Unclean condition of the cows other than specified in the preceding paragraph.	30 or less.....	.....
.....	7. Undue emaciation or cows otherwise out of condition.....	10 or less.....	.....
	Total deduction for herd.....		
	Net score.....		

Net score (——) divided by the total possible score for herd (——) equals——. Percentage score,——.

Remarks.....

\_\_\_\_\_, *Inspector.*

The health department believes that if a cow is suffering from tuberculosis her entire value as a dairy cow is gone. If she is suffering from an inflammatory disease of the udder as well as from tuberculosis, she becomes even a greater danger to the herd. And if she is furthermore otherwise diseased or out of condition or dirty she becomes even a more serious menace to public health. For these reasons the above system of scoring has been arranged so that an individual cow may count against the score of the entire herd more than would have been allotted to her had she been in perfect condition.

All cows stabled with the dairy herd or found in the milking line will be scored as part of the herd.



[Front of card.]

[United States Department of Agriculture, Bureau of Animal Industry, Dairy Division.]

SANITARY INSPECTION OF DAIRIES.

DAIRY SCORE CARD.

Adopted by the Official Dairy Instructors' Association.  
(Subject to revision at future meetings.)

Owner or lessee of farm : \_\_\_\_\_.  
 P. O. address : \_\_\_\_\_, State : \_\_\_\_\_.  
 Total number of cows : \_\_\_\_\_, Number milking : \_\_\_\_\_.  
 Gallons of milk produced daily : \_\_\_\_\_.  
 Product retailed by producer in \_\_\_\_\_.  
 Sold at wholesale to \_\_\_\_\_.  
 For milk supply of \_\_\_\_\_.  
 Permit No. : \_\_\_\_\_, Date of inspection : \_\_\_\_\_, 19  
 Remarks : \_\_\_\_\_, Inspector.

[Back of card.]

DETAILED SCORE.

Equipment.	Score.		Methods.	Score.	
	Perfect.	Allowed.		Perfect.	Allowed.
<i>Cows.</i>					
Health.....	6		Cleanliness of cows.....	8	
Apparently in good health..... 1			<i>Stables.</i>		
If tested with tuberculin once a year and no tuberculosis is found, or if tested once in six months and all reacting animals removed..... 5			Cleanliness of stables.....	6	
(If tested only once a year and reacting animals found and removed, 2.)			Floor..... 2		
Comfort.....	2		Walls..... 1		
Bedding..... 1			Ceiling and ledges..... 1		
Temperature of stable. 1			Mangers and partitions..... 1		
Food (clean and wholesome).....	2		Windows..... 1		
Water.....	2		Stable air at milking time.....	6	
Clean and fresh..... 1			Barnyard clean and well drained.....	2	
Convenient and abundant..... 1			Removal of manure daily to field or proper pit (to 50 feet from stable, 1).....	2	
<i>Stables.</i>					
Location of stable.....	2		<i>Milk room.</i>		
Well drained..... 1			Cleanliness of milk room.....	3	
Free from contaminating surroundings.... 1			<i>Utensils and milking.</i>		
Construction of stable.....	4		Care and cleanliness of utensils.....	8	
Tight, sound floor and proper gutter..... 2			Thoroughly washed and sterilized in live steam for 30 minutes..... 5		
Smooth, tight walls and ceiling..... 1			(Thoroughly washed and placed over steam jet, 4; thoroughly washed and scalded with boiling water, 3; thoroughly washed, not scalded, 2.)		
Proper stall, tie, and manger..... 1			Inverted in pure air... 3		
Light: 4 square feet of glass per cow (3 square feet, 3; 2 square feet, 2; 1 square foot, 1. Deduct for uneven distribution).....	4		Cleanliness of milking.....	9	
Ventilation: Automatic system (adjustable windows, 1).....	3		Clean dry hands..... 3		
Cubic feet of space for cow: 500 to 1,000 feet (less than 500 feet, 2; less than 400 feet, 1; less than 300 feet, 0; over 1,000 feet, 0).....	3		Udders washed and dried..... 6		
			(Udders cleaned with moist cloth, 4; cleaned with dry cloth at least 15 minutes before milking, 1.)		

DETAILED SCORE—Continued.

Equipment.	Score.		Methods.	Score.	
	Perfect.	Allowed.		Perfect.	Allowed.
<i>Utensils.</i>			<i>Handling of Milk.</i>		
Construction and condition of utensils.....	1	.....	Cleanliness of attendants.....	1	.....
Water for cleaning (clean, convenient, and abundant).....	1	.....	Milk removed immediately from stable.....	2	.....
Small-top milking pail.....	3	.....	Prompt cooling. (Cooled immediately after milking each cow).....	2	.....
Facilities for hot water or steam (should be in milk house, not in kitchen).....	1	.....	Efficient cooling; below 50° F. (51° to 55°, 4; 56° to 60°, 2).....	5	.....
Milk cooler.....	1	.....	Storage; below 50° F. (51° to 55°, 2; 56° to 60°, 1).....	3	.....
Clean milking suits.....	1	.....	Transportation; leed (for jacket or wet blanket allow 2; dry blanket or covered wagon, 1).....	3	.....
<i>Milk room.</i>					
Location of milk room.....	2	.....		3	.....
Free from contaminating surroundings... 1	1	.....			
Convenient..... 1	1	.....			
Construction of milk room.....	2	.....			
Floor, walls, and ceiling..... 1	1	.....			
Light, ventilation, screens..... 1	1	.....			
Total.....	40	.....	Total.....	60	.....

Score for equipment+score for methods=final score.

NOTE 1.—If any filthy condition is found, particularly dirty utensils, the total score shall be limited to 49.  
 NOTE 2.—If the water is exposed to dangerous contamination or there is evidence of the presence of a dangerous disease in animals or attendants, the score shall be 0.

APPENDIX M.

FOOD AND DRUGS ACT, APPROVED JUNE 30, 1906

AN ACT For preventing the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein, and for other purposes.

[34 Stats., 768.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful for any person to manufacture within any Territory or the District of Columbia any article of food or drug which is adulterated or misbranded, within the meaning of this Act; and any person who shall violate any of the provisions of this section shall be guilty of a misdemeanor, and for each offense shall, upon conviction thereof, be fined not to exceed five hundred dollars or shall be sentenced to one year's imprisonment, or both such fine and imprisonment, in the discretion of the court, and for each subsequent offense and conviction thereof shall be fined not less than one thousand dollars or sentenced to one year's imprisonment, or both such fine and imprisonment, in the discretion of the court.

SEC. 2. That the introduction into any State or Territory or the District of Columbia from any other State or Territory or the District of Columbia, or from any foreign country, or shipment to any foreign country of any article of food or drugs which is adulterated or misbranded, within the meaning of this act, is hereby prohibited; and any person who shall ship or deliver for shipment from any State or Territory or the District of Columbia to any other State or Territory or the District of Columbia, or to a foreign country, or who shall receive in any State or Territory or the District of Columbia from any other State or Territory or the District of Columbia, or foreign country, and having so received, shall deliver, in original unbroken packages, for pay or otherwise, or offer to deliver to any other person, any such article so adul-

terated or misbranded within the meaning of this act, or any person who shall sell or offer for sale in the District of Columbia or the Territories of the United States any such adulterated or misbranded foods or drugs, or export or offer to export the same to any foreign country, shall be guilty of a misdemeanor, and for such offense be fined not exceeding two hundred dollars for the first offense, and upon conviction for each subsequent offense not exceeding three hundred dollars or be imprisoned not exceeding one year, or both, in the discretion of the court: *Provided*, That no article shall be deemed misbranded or adulterated within the provisions of this act when intended for export to any foreign country and prepared or packed according to the specifications or directions of the foreign purchaser when no substance is used in the preparation or packing thereof in conflict with the laws of the foreign country to which said article is intended to be shipped; but if said article shall be in fact sold or offered for sale for domestic use or consumption, then this proviso shall not exempt said article from the operation of any of the other provisions of this act.

SEC. 3. That the Secretary of the Treasury, the Secretary of Agriculture, and the Secretary of Commerce and Labor shall make uniform rules and regulations for carrying out the provisions of this act, including the collection and examination of specimens of foods and drugs manufactured or offered for sale in the District of Columbia, or in any Territory of the United States, or which shall be offered for sale in unbroken packages in any State other than that in which they shall have been respectively manufactured or produced, or which shall be received from any foreign country, or intended for shipment to any foreign country, or which may be submitted for examination by the chief health, food, or drug officer of any State, Territory, or the District of Columbia, or at any domestic or foreign port through which such product is offered for interstate commerce, or for export or import between the United States and any foreign port or country.

SEC. 4. That the examinations of specimens of foods and drugs shall be made in the Bureau of Chemistry of the Department of Agriculture, or under the direction and supervision of such bureau, for the purpose of determining from such examinations whether such articles are adulterated or misbranded within the meaning of this act; and if it shall appear from any such examination that any of such specimens is adulterated or misbranded within the meaning of this act, the Secretary of Agriculture shall cause notice thereof to be given to the party from whom such sample was obtained. Any party so notified shall be given an opportunity to be heard, under such rules and regulations as may be prescribed as aforesaid, and if it appears that any of the provisions of this act have been violated by such party, then the Secretary of Agriculture shall at once certify the facts to the proper United States district attorney, with a copy of the results of the analysis or the examination of such article duly authenticated by the analyst or officer making such examination, under the oath of such officer. After judgment of the court, notice shall be given by publication in such manner as may be prescribed by the rules and regulations aforesaid.

SEC. 5. That it shall be the duty of each district attorney to whom the Secretary of Agriculture shall report any violation of this act, or to whom any health or food or drug officer or agent of any State, Territory, or the District of Columbia shall present satisfactory evidence of any such violation, to cause appropriate proceedings to be commenced and prosecuted in the proper courts of the United States, without delay, for the enforcement of the penalties as in such case herein provided.

SEC. 6. That the term "drug," as used in this act, shall include all medicines and preparations recognized in the United States Pharmacopœia or National Formulary for internal or external use, and any substance or mixture of substances intended to be used for the cure, mitigation, or prevention of disease of either man or other animals. The term "food," as used herein, shall include all articles used for food, drink, confectionery, or condiment by man or other animals, whether simple, mixed, or compound.

SEC. 7. That for the purposes of this act an article shall be deemed to be adulterated:

In, case of drugs:

First. If, when a drug is sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality, or purity, as determined by the test laid down in the United States Pharmacopœia or National Formulary official at the time of investiga-

tion: *Provided*, That no drug defined in the United States Pharmacopœia or National Formulary shall be deemed to be adulterated under this provision if the standard of strength, quality, or purity be plainly stated upon the bottle, box, or other container thereof although the standard may differ from that determined by the test laid down in the United States Pharmacopœia or National Formulary.

Second. If its strength or purity fall below the professed standard or quality under which it is sold.

In the case of confectionery:

If it contain terra alba, barytes, talc, chrome yellow, or other mineral substance or poisonous color or flavor, or other ingredient deleterious or detrimental to health, or any vinous, malt or spirituous liquor, or compound or narcotic drug.

In the case of food:

First. If any substance has been mixed and packed with it so as to reduce or lower or injuriously affect its quality or strength.

Second. If any substance has been substituted wholly or in part for the article.

Third. If any valuable constituent of the article has been wholly or in part abstracted.

Fourth. If it be mixed, colored, powdered, coated, or stained in a manner whereby damage or inferiority is concealed.

Fifth. If it contain any added poisonous or other added deleterious ingredient which may render such article injurious to health: *Provided*, That when in the preparation of food products for shipment they are preserved by any external application applied in such manner that the preservative is necessarily removed mechanically, or by maceration in water, or otherwise, and directions for the removal of said preservative shall be printed on the covering or the package, the provisions of this act shall be construed as applying only when said products are ready for consumption.

Sixth. If it consists in whole or in part of a filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal, or one that has died otherwise than by slaughter.

Sec. 8. That the term "misbranded," as used herein, shall apply to all drugs, or articles of food, or articles which enter into the composition of food, the package or label of which shall bear any statement, design, or device regarding such article, or the ingredients or substances contained therein which shall be false or misleading in any particular, and to any food or drug product which is falsely branded as to the State, Territory, or country in which it is manufactured or produced.

That for the purposes of this act an article shall also be deemed to be misbranded:

In case of drugs:

First. If it be an imitation of or offered for sale under the name of another article.

Second. If the contents of the package as originally put up shall have been removed, in whole or in part, and other contents shall have been placed in such package, or if the package fail to bear a statement on the label of the quantity or proportion of any alcohol, morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate, or acetanilide, or any derivative or preparation of any such substances contained therein.

In the case of food:

First. If it be an imitation of or offered for sale under the distinctive name of another article.

Second. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when not so, or if the contents of the package as originally put up shall have been removed in whole or in part and other contents shall have been placed in such package, or if it fail to bear a statement on the label of the quantity or proportion of any morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate, or acetanilide, or any derivative or preparation of any of such substances contained therein.

Third. If in package form, and the contents are stated in terms of weight or measure, they are not plainly and correctly stated on the outside of the package.

Fourth. If the package containing it or its label shall bear any statement, design, or device regarding the ingredients or the substances contained therein, which statement, design, or device shall be false or misleading in any particular: *Provided*, That an article of food which does not contain any added poisonous or deleterious ingredients shall not be deemed to be adulterated or misbranded in the following cases:

First. In the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food, under their own distinctive names, and not an imitation of or offered for sale under the distinctive name of another article, if the name be accompanied on the same label or brand with a statement of the place where said article has been manufactured or produced.

Second. In the case of articles labeled, branded, or tagged so as to plainly indicate that they are compounds, imitations, or blends, and the word "compound," "imitation," or "blend," as the case may be, is plainly stated on the package in which it is offered for sale: *Provided*, That the term blend as used herein shall be construed to mean a mixture of like substances, not excluding harmless coloring or flavoring ingredients used for the purpose of coloring and flavoring only: *And provided further*, That nothing in this act shall be construed as requiring or compelling proprietors or manufacturers of proprietary foods which contain no unwholesome added ingredient to disclose their trade formulas, except in so far as the provisions of this act may require to secure freedom from adulteration or misbranding.

SEC. 9. That no dealer shall be prosecuted under the provisions of this act when he can establish a guaranty signed by the wholesaler, jobber, manufacturer, or other party residing in the United States, from whom he purchases such articles, to the effect that the same is not adulterated or misbranded within the meaning of this act, designating it. Said guaranty, to afford protection, shall contain the name and address of the party or parties making the sale of such articles to such dealer, and in such case said party or parties shall be amenable to the prosecutions, fines, and other penalties which would attach, in due course, to the dealer under the provisions of this act.

SEC. 10. That any article of food, drug, or liquor that is adulterated or misbranded within the meaning of this act, and is being transported from one State, Territory, District, or insular possession to another for sale, or, having been transported, remains unloaded, unsold, or in original unbroken packages, or if it be sold or offered for sale in the District of Columbia or the Territories, or insular possessions of the United States, or if it be imported from a foreign country for sale, or if it is intended for export to a foreign country, shall be liable to be proceeded against in any district court of the United States within the district where the same is found, and seized for confiscation by a process of libel for condemnation. And if such article is condemned as being adulterated or misbranded, or of a poisonous or deleterious character, within the meaning of this act, the same shall be disposed of by destruction or sale, as the said court may direct, and the proceeds thereof, if sold, less the legal costs and charges, shall be paid into the Treasury of the United States, but such goods shall not be sold in any jurisdiction contrary to the provisions of this act or the laws of that jurisdiction: *Provided, however*, That upon the payment of the costs of such libel proceedings and the execution and delivery of a good and sufficient bond to the effect that such articles shall not be sold or otherwise disposed of contrary to the provisions of this act, or the laws of any State, Territory, District, or insular possession, the court may by order direct that such articles be delivered to the owner thereof. The proceedings of such libel cases shall conform, as near as may be, to the proceedings in admiralty, except that either party may demand trial by jury of any issue of fact joined in any such case, and all such proceedings shall be at the suit of and in the name of the United States.

SEC. 11. The Secretary of the Treasury shall deliver to the Secretary of Agriculture, upon his request from time to time, samples of foods and drugs which are being imported into the United States or offered for import, giving notice thereof to the owner or consignee, who may appear before the Secretary of Agriculture, and have the right to introduce testimony, and if it appear from the examination of such samples that any article of food or drug offered to be imported into the United States is adulterated or misbranded within the meaning of this act, or is otherwise dangerous to the health of the people of the United States, or is of a kind forbidden entry into, or forbidden to be sold or restricted in sale in the country in which it is made or from which it is

exported, or is otherwise falsely labeled in any respect, the said article shall be refused admission, and the Secretary of the Treasury shall refuse delivery to the consignee and shall cause the destruction of any goods refused delivery which shall not be exported by the consignee within three months from the date of notice of such refusal under such regulations as the Secretary of the Treasury may prescribe: *Provided*, That the Secretary of the Treasury may deliver to the consignee such goods pending examination and decision in the matter on execution of a penal bond for the amount of the full invoice value of such goods, together with the duty thereon, and on refusal to return such goods for any cause to the custody of the Secretary of the Treasury, when demanded, for the purpose of excluding them from the country, or for any other purpose, said consignee shall forfeit the full amount of the bond: *And provided further*, That all charges for storage, cartage, and labor on goods which are refused admission or delivery shall be paid by the owner or consignee, and in default of such payment shall constitute a lien against any future importation made by such owner or consignee.

SEC. 12. That the term "Territory" as used in this act shall include the insular possessions of the United States. The word "person" as used in this act shall be construed to import both the plural and the singular, as the case demands, and shall include corporations, companies, societies, and associations. When construing and enforcing the provisions of this act, the act, omission, or failure of any officer, agent, or other person acting for or employed by any corporation, company, society, or association, within the scope of his employment or office, shall in every case be also deemed to be the act, omission, or failure of such corporation, company, society, or association as well as that of the person.

SEC. 13. That this act shall be in force and effect from and after the first day of January, nineteen hundred and seven.

Approved, June 30, 1906.

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## APPENDIX N.

COMMUNICATION FROM CHIEF OF BUREAU OF CHEMISTRY, UNITED STATES  
DEPARTMENT OF AGRICULTURE, REFERRING TO PROSECUTIONS UNDER  
FEDERAL PURE-FOOD LAW.

UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF CHEMISTRY,  
Washington, D. C., December 2, 1910.

The WASHINGTON CHAMBER OF COMMERCE,  
Washington, D. C.

GENTLEMEN: In further reply to your inquiries respecting standards for milk, I am transmitting, in accordance with your request of November 18, additional data bearing specifically upon the question which your committee is so carefully considering. Attached to this is also a memorandum prepared by the assistant chief of this bureau, Dr. W. D. Bigelow, and copies of certain notices of judgment obtained as a result of prosecutions secured against interstate shipments of milk.

I need not assure you again how earnestly this bureau is endeavoring to cooperate with you in your efforts to secure a proper milk supply. In this connection I beg to say that the ordinary pasteurized milk of commerce is a dangerous article—far more so than the so-called raw milk. I may say that as many as 54,000,000 organisms per cubic centimeter have been found in milk alleged to have been pasteurized 24 hours after the pasteurization is said to have been accomplished. Pasteurized milk is only to be tolerated when certified by an independent official as to the efficiency of pasteurization and the suitability of it for consumption.

Respectfully,

H. W. WILEY, *Chief.*

MEMORANDUM FOR DR. WILEY.

UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF CHEMISTRY,  
*Washington, D. C., December 1, 1910.*

In the inspection of milk shipped into interstate commerce the bureau adheres to the standards promulgated by the Secretary of Agriculture respecting the composition of milk.

No prosecutions are actually brought, however, for the shipment of milk which very nearly complies with those standards. Prosecutions have been successfully maintained for the shipment in interstate commerce of milk shown by chemical analysis to be adulterated, as, for instance, by skimming, by the addition of water or ice, or by the addition of formaldehyde. Prosecutions have also been maintained for the shipment of badly contaminated milk on the ground that it was filthy, decomposed, and putrid, and contained filthy, decomposed, and putrid material. This question is judged by its bacteriological condition.

There are now pending in the court, or preparing for the courts, about 170 cases of violations of the food and drugs act by shipping adulterated milk and cream. The following notices of judgment, copies of which are attached hereto, refer to cases which have already been prosecuted: N. J. 5, 37, 81, 88, 125, 132, 185, 206, 214, 219, 223, 228, 229, 241, 264, 265, 267, 268, 273, 285, 287, 307, 308, 312, 331, 335, 336, 338, 347, 370, 419, 420, 421, 423, 425, 430, 437, 445, 446, 451, 460, 479, 484, 485, 502, 503, 510, 512, 513, 514, 515, 517, 521, 522, 523, 524, 525, 526, 527, 528, 538, 557, 558, 586, 587, 588, 590, 607, 628, 629, 632, and 638.

W. D. BIGELOW.

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## APPENDIX O.

### SUGGESTIONS CONCERNING SANITARY ARRANGEMENTS FOR DAIRY FARMS.

By ED. H. WEBSTER, Chief of Dairy Division, Bureau of Animal Industry, United States Department of Agriculture.

[Reprinted from Bulletin No. 56, Hygienic Laboratory, United States Public Health and Marine-Hospital Service, pp. 570, 571.]

#### TWENTY-ONE SUGGESTIONS.

##### THE COWS.

1. Have the herd examined frequently by a skilled veterinarian. Promptly remove any animals suspected of being in bad health. Never add an animal to the herd until certain it is free from disease, especially tuberculosis.
2. Never allow a cow to be excited by hard driving, abuse, loud talking, or unnecessary disturbances; do not unduly expose her to cold or storms.
3. Clean the entire body of the cow daily. Hair in the region of the udder should be kept short. Wipe the udder and surrounding parts with a clean, damp cloth before milking.
4. Do not allow any strong flavored feed, such as garlic, cabbage, or turnips, to be eaten except immediately after milking.
5. Salt should always be accessible.
6. Radical changes in feed should be made gradually.
7. Have fresh, pure water in abundance, easy of access, and not too cold.

##### THE STABLES.

8. Dairy cattle should be kept in a stable where no other animals are housed, preferably without cellar or storage loft. Stable should be light (4 square feet of glass per cow) and dry, with at least 500 cubic feet of air to each animal. It should have air inlets and outlets, so arranged as to give good ventilation without drafts of air on cows. The presence of flies may be reduced by darkening the stable and removing the manure as directed below.

9. The floor, walls, and ceilings of the stable should be tight, walls and ceilings being kept free of cobwebs and whitewashed twice a year. There should be as few dust-catching ledges and projections as possible.

10. Allow no musty or dirty litter or strong smelling material in the stable. Store manure under cover at least 40 feet from the stable in a dark place. Use land plaster daily in gutter and on floor.

#### THE MILK HOUSE.

11. Cans should not remain in the stable while being filled. Remove the milk of each cow at once from the stable to a clean room; strain immediately through cotton flannel or absorbent cotton; cool to 50° F. as soon as strained; store at 50° F. or lower. All milk houses should be screened.

12. Milk utensils should be made of metal, with all joints smoothly soldered, or, when possible, should be made of stamped metal. Never allow utensils to become rusty or rough inside. Use milk utensils for nothing but handling, storing, or delivering milk.

13. To clean dairy utensils, use pure water only. First rinse the utensils in warm water; then wash inside and out in hot water in which a cleansing material has been dissolved; rinse again; sterilize with boiling water or steam; then keep inverted in pure air that may have ready access, and sun if possible, until ready for use.

#### MILKING AND HANDLING MILK.

14. The milker should wash his hands immediately before milking and should milk with dry hands. He should wear a clean outer garment, which should be kept in a clean place when not in use. Tobacco should not be used while milking.

15. In milking be quiet, quick, clean, and thorough. Commence milking at the same hour every morning and evening and milk the cows in the same order.

16. If any part of the milk is bloody, stringy, or unnatural in appearance, or if by accident dirt gets into the milk pail, the whole mess should be rejected.

17. Weigh and record the milk given by each cow.

18. Never mix warm milk with that which has been cooled, and do not allow milk to freeze.

19. Feed no dry, dusty feed just previous to milking.

20. Persons suffering from any disease, or who have been exposed to a contagious disease, must remain away from the cows and the milk.

21. It is needless to say that the shorter the time between the production of milk and its delivery, and between delivery and use, the better will be the quality of the milk.

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## APPENDIX P.

### ACT TO REGULATE THE SALE OF MILK IN THE DISTRICT OF COLUMBIA, APPROVED MARCH 2, 1895.

AN ACT To regulate the sale of milk in the District of Columbia, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That from and after the passage of this act no person shall, within the District of Columbia, keep or maintain a dairy or dairy farm without a permit so to do from the health officer of said District; application for said permit shall be made in writing, upon a form prescribed by said health officer: *Provided,* That no applicant for said permit shall be restrained from conducting business until said application has been acted upon by the health officer of the District of Columbia or his duly appointed agent. It shall be the duty of said health officer, upon receipt of said application in due form, to make or cause to be made an examination of the premises which it is intended to use in the maintenance of said dairy or dairy farm; if after such examination said premises are found to conform to the regulations governing dairies and dairy farms within the District of Columbia, said health officer shall issue the permit hereinbefore specified, without charge: *Provided,* That said permit may be suspended or revoked at any time, without notice, by said

health officer whenever the milk supply from said dairy or dairy farm is exposed to infection by Asiatic cholera, anthrax, diphtheria, erysipelas, scarlet fever, smallpox, splenic fever, tuberculosis, typhoid fever, typhus fever, or yellow fever, so as to render its distribution dangerous to public health.

SEC. 2. That no person shall bring or send into the District of Columbia for sale any milk without a permit so to do from the health officer of said District; application for said permit shall be made in writing, upon a form prescribed by said health officer, and shall be accompanied by such detailed description of the dairy farm or dairy where said milk is produced or stored as said health officer may require, and by a sworn statement as to the physical condition of the cattle supplying said milk: *Provided*, That no applicant for said permit shall be restrained from conducting business until said application has been acted upon by the health officer of the District of Columbia or his duly appointed agent. If after examination of said application said health officer is satisfied that said milk will be brought into the District of Columbia for sale or consumption without danger to public health, he shall issue, without charge to the applicant, a permit so to do, on condition that none but pure and unadulterated milk shall be, with knowledge of its impurity, brought into said District; that in the management of said dairy or dairy farm said applicant shall be governed by the regulations of the health office of the District of Columbia, approved by the Commissioners of the District of Columbia, issued for dairies and dairy farms in said District, when said regulations do not conflict with the law of the State in which said dairy or dairy farm is located, and that said dairy or dairy farm may be inspected at any time without notice by the health officer of the District of Columbia or his duly appointed representative: *Provided*, That said permit may be suspended or revoked at any time without notice by said health officer whenever the milk supply from said dairy or dairy farm is exposed to infection by Asiatic cholera, anthrax, diphtheria, erysipelas, scarlet fever, smallpox, splenic fever, tuberculosis, typhoid fever, typhus fever, or yellow fever, so as to render its distribution dangerous to public health.

SEC. 3. That no person suffering from, or who has knowingly, within a period specified by the health officer of the District of Columbia, been exposed to diphtheria, scarlet fever, erysipelas, smallpox, anthrax, or other dangerous contagious disease, shall work or assist in or about any dairy or dairy farm; no proprietor, manager, or superintendent of any dairy or dairy farm within the District of Columbia shall knowingly permit any person suffering, or exposed as aforesaid, to work or assist in or about said dairy or dairy farm.

SEC. 4. That all milk wagons shall have the name of the owner, the number of permit, and the location of dairy from which said wagons haul milk, painted thereon plainly and legibly.

SEC. 5. That all grocers, bakers, and other persons having or offering for sale milk shall at all times keep the name or names of the dairymen from whom the milk on sale shall have been obtained posted up in a conspicuous place wherever such milk may be sold or kept for sale.

SEC. 6. That no person shall offer or have for sale in the District of Columbia any unwholesome, watered, or adulterated milk, or milk known as swill milk, or milk from cows that are fed on swill, garbage, or other like substance, nor any butter or cheese made from any such milk.

SEC. 7. (Repealed by act of February 17, 1898. See *Wiegand v. D. C.*, 31 Wash. Law Rep., 730.)

SEC. 8. That no person shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver, skimmed milk containing less than nine and three-tenths per cent of milk solids, inclusive of fat.

SEC. 9. That no dealer in milk, and no servant or agent of such a dealer, shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver, milk from which the cream, or any part thereof, has been removed, unless in a conspicuous place, above the center or upon the outside of every vessel, can, or package thereof, in which milk is sold, the words "skimmed milk" are distinctly marked in gothic letters, not less than one inch in length.

SEC. 10. That it shall not be lawful for any person or persons to sell or offer for sale, within the District of Columbia, milk taken from any cow less than fifteen days before or ten days after parturition, or from any cow which is known to be suffering from tuberculosis, splenic fever, anthrax, or any general or local disease which is liable to render the milk from said cow unwholesome.

SEC. 11. That it shall be the duty of the health officer of the District of Columbia, under direction of the commissioners of said District, to make and

enforce regulations to secure proper water supply, drainage, ventilation, air space, floor space, and cleaning of all dairies and dairy farms within said District; to secure the isolation of cattle suffering from any contagious disease, and to carry into effect the provisions of this act.

Sec. 12. That the health officer of the District of Columbia, or his duly appointed assistants, shall have the right to enter, without previous notice, for the purpose of inspection, any dairy or dairy farm within said District.

Sec. 13. (Repealed by act of February 17, 1898. See *Weigand v. D. C.*, 31 Wash. Law Rep., 730.)

Sec. 14. That prosecutions under this act shall be in the police court of said District, on information signed by the attorney of the District or one of his assistants, and any person or persons violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and shall, on conviction, be punished for the first offense by a fine of not less than five dollars nor more than twenty-five dollars, to be collected as other fines and penalties, or by imprisonment in the workhouse for a period of not more than thirty days, and for the second offense and each subsequent offense, by a fine of not less than fifty dollars nor more than one hundred dollars, or by imprisonment in the workhouse for ninety days, or by both such fine and imprisonment, in the discretion of the court, and if the person so convicted of a second or subsequent offense hold a permit under this act, the same shall be canceled and no permit shall be issued to said person for a period of six months: *Provided*, That any person or persons under this act shall have the privilege, when demanded, of a trial by jury as in other jury cases in the police court.

Sec. 15. That all laws and parts of laws inconsistent with the foregoing be, and the same are hereby, repealed.

Approved, March 2, 1895.

## APPENDIX Q.

### REGULATIONS FOR GOVERNMENT OF DAIRIES AND DAIRY FARMS, PROMULGATED JULY 31, 1897, TOGETHER WITH AMENDMENTS OF NOVEMBER 5, 1910.

[Health Department, District of Columbia, Washington.]

#### REGULATIONS FOR THE GOVERNMENT OF DAIRIES AND DAIRY FARMS.

OFFICE OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
*Washington, July 31, 1897.*

*Ordered*: That the following regulations made by the health officer of the District of Columbia, pursuant to the requirements of section 11 of "An act to regulate the sale of milk in the District of Columbia, and for other purposes," approved March 2, 1895, in lieu of the regulations on the same subject made and approved June 26, 1895, are hereby approved:

Section 1. No building or space shall be used for dairy purposes which is not well lighted and ventilated, which is not provided with a suitable floor; and, if such room or space be a cellar or subcellar, or be located in a cellar or subcellar, which is not properly concreted, guttered, and drained.

Sec. 2. No dairy shall be located or maintained within any kitchen, wash room, workshop, or inhabited room, nor in proximity to any water-closet, privy, cesspool, or urinal, nor in any room or space which is not of such size and construction as to permit the entire separation of all milk and milk products, both in process of handling and storing the same, from all probable sources of contamination either by dirt, noxious gases, infective organisms or substances, or anything liable to alter unnecessarily the quality of such milk or milk products.

Sec. 3. Every person maintaining a dairy shall provide for the use thereof, and shall use a sufficient number of receptacles made of nonabsorbent material for the reception, storage, and delivery of milk, and shall cause them to be kept clean and wholesome at all times; and having delivered any such receptacle to a consumer shall not again use the same for the reception, storage, or delivery of milk or cream in any form until it has been, to his personal knowledge, properly cleaned after such use.

Sec. 3a. Elsewhere than in the proper parts of premises which have been duly constructed and equipped, and which are duly maintained for the handling, storage, and sale of milk or cream, no person shall fill or partly fill with milk or cream any receptacle intended for delivery to a customer unless such receptacle, at the time of filling be furnished by the customer for whose service such receptacle is intended.

(Amendment of July 14, 1903.)

Sec. 4. Every person maintaining a dairy shall provide for the use thereof a supply of pure and suitable water, sufficient for the proper washing of all cans, bottles, and appliances.

Sec. 5. Every person maintaining a dairy shall keep the same and all appurtenances thereto clean and wholesome at all times, and shall change the water in the coolers at least once each day.

Sec. 6. No building shall be used for stabling cows for dairy purposes which is not well lighted, ventilated, drained, and constructed, or which is not provided with stalls or with proper stanchions for anchoring the cows so arranged as to allow not less than  $3\frac{1}{2}$  feet width of space for each milch cow; or which is not provided with good and sufficient facilities for feeding the animals in a cleanly manner; or which contains less than 600 cubic feet clear air space for each cow, unless the use of such building for stabling cows for dairy purposes has been authorized prior to the promulgation of these regulations, in which case it shall contain not less than 500 cubic feet clear air space for each cow.

Sec. 7. No room shall be used for stabling cows for dairy purposes which contains any water-closet, privy, cesspool, urinal, or manure pit; nor shall any fowl, hog, horse, sheep, or goat be kept in any room used therefor.

Sec. 8. Every person using any premises for keeping cows for dairy purposes shall, when so directed by the health officer, erect and maintain in the stable, stall, shed, or yard connected therewith one or more proper receptacles for drinking water for such cows, and shall keep the same supplied with clean, fresh water and none other.

Sec. 9. Every person using any premises for keeping cows for dairy purposes shall keep the entire premises clean and in good repair, and the buildings well painted or whitewashed.

Sec. 10. Every person using any premises for keeping cows for dairy purposes shall cause the dung to be removed from the stables at least twice daily, and always within one hour preceding every milking of the cows; and shall not allow any accumulation of dung within the building occupied by the cows, but shall, whenever in the opinion of the health officer it is required by local conditions and surroundings, provide temporary storage for the same and for other refuse in a separate place, which shall be covered, and which, when so ordered by said health officer, shall be a water-tight receptacle.

Sec. 11. Every person keeping cows for dairy purposes within the city of Washington or its more densely populated suburbs, or elsewhere in the District of Columbia, if, in the opinion of the health officer, local conditions require it, shall cause the inclosure in which such cows are kept to be graded and drained, so as to keep the surface reasonably dry and to prevent the accumulation of water therein, except as may be permitted for the purpose of supplying drinking water; and shall not permit any garbage, urine, fecal matter, or similar substance to be placed or to remain in such inclosure, nor any open drain to run through it.

Sec. 12. Every person keeping cows for the production of milk for sale shall cause them to be kept clean and wholesome at all times, and shall cause the teats, and, if necessary, the udder, to be carefully cleaned by brushing, washing, or wiping before milking, and shall cause each such cow to be properly fed and watered.

Sec. 13. Any person using any premises for keeping cows for dairy purposes shall provide and use a sufficient number of receptacles of nonabsorbent material for the reception, storage, and delivery of milk, and shall keep them clean and wholesome at all times, and at milking time shall remove each receptacle as soon as filled from the stable or room in which the cows are kept; nor shall any milk or cream be stored or kept within any room used for stabling cows or other domestic animals.

Sec. 14. It shall be the duty of every person having charge or control of any premises upon which cows are kept to notify the health officer of the District of Columbia of the existence of any contagious or infectious disease among such cows, by letter delivered or mailed, with 24 hours after the discovery thereof, and to thoroughly isolate any cow or cows so diseased or which may

reasonably be believed to be infected, and to exercise such other precautions as may be directed, in writing, by said health officer.

Sec. 15. Milkers and those engaged in the handling of milk or cream shall maintain strict cleanliness of their hands and persons while milking or while so engaged. It shall be the duty of every person holding a permit to maintain a dairy or dairy farm to enforce this regulation in reference to such persons as may assist them in the maintenance thereof.

Sec. 16. That any person violating any of the foregoing regulations shall, on conviction thereof in the police court, be punished by a fine of not more than \$10 for each and every such offense, to be collected as other fines and penalties are collected.

Sec. 17. That the regulations for the government of dairies and dairy farms in the District of Columbia promulgated June 26, 1895, are hereby repealed.

WM. C. WOODWARD, M. D.,  
*Health Officer, District of Columbia.*  
 JOHN W. ROSS,  
 JOHN B. WIGHT,  
 W. M. BLACK,  
*Commissioners of the District of Columbia.*

[Health department, District of Columbia.]

WASHINGTON, November 5, 1910.

*Ordered:* That the following amendments of the regulations made July 31, 1897, by the health officer of the District of Columbia and approved by the Commissioners of said District, pursuant to the requirements of section 11, of "An act to regulate the sale of milk in the District of Columbia, and for other purposes," approved March 2, 1895, are hereby made by adding after section 14 thereof the following sections:

Sec. 14a. No new dairy cow and no new bull, which has not been demonstrated by the tuberculin test to be free from tuberculosis and officially tagged to show that fact, shall be brought upon any dairy farm in the District of Columbia and maintained there for a period longer than is necessary to have said cow or bull officially tuberculin tested. And any cow or bull so tested and reacting to the tuberculin test shall be tagged so as to show that fact, and killed or promptly removed from said farm.

Sec. 14b. Whenever there is found on any dairy farm any cow or bull presenting such physical evidence of tuberculosis as to make it appear to the satisfaction of the health officer that such cow or bull has tuberculosis, then and in that event the licensee or applicant for license to produce for sale milk on said farm upon which such cow or bull is, shall, upon written notice from the health officer, have said cow or bull immediately killed, or removed from the dairy farm, or else separated from the dairy herd and officially tuberculin tested; and if said animal reacts to the tuberculin test, then such licensee or applicant, as the case may be, shall have said cow or bull forthwith tagged so as to show that fact, and promptly killed or removed from the said dairy farm.

Provided, That nothing in section 14a or in section 14b, of these regulations, shall in any way modify or repeal any of the provisions of the order of the Commissioners of the District of Columbia for the suppression and prevention of tuberculosis in cattle, promulgated November 26, 1909.

Sec. 14c. With respect to all applications filed after October 1, 1910, prompt action will be taken, and if all cattle on the dairy farm to which any such application relates are not free from tuberculosis as shown by the tuberculin test, the application will in the discretion of the health officer be promptly rejected.

WM. C. WOODWARD, M. D.,  
*Health Officer of the District of Columbia.*

By direction of the Commissioners of the District of Columbia, November 5, 1910:

CUNO H. RUDOLPH,  
 JOHN A. JOHNSTON,  
 W. V. JUDSON,  
*Commissioners of the District of Columbia.*

By order:  
 W. TINDALL, *Secretary.*

## APPENDIX R.

ACT RELATING TO THE ADULTERATION OF FOODS AND DRUGS IN THE DISTRICT OF COLUMBIA, APPROVED FEBRUARY 17, 1898.

AN ACT Relating to the adulteration of foods and drugs in the District of Columbia.

[30 Stat., 246.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That no person shall within the District of Columbia, by himself, or by his servant, or agent, or as the servant or agent of any other person, sell, exchange, or deliver, or have in his custody or possession with the intent to sell or exchange, or expose or offer for sale or exchange, any article of food or drug which is adulterated within the meaning of this act.

SEC. 2. That the term "drug," as used in this act, shall include all medicines for external or internal use, antiseptics, disinfectants, and cosmetics. The term "food," as used herein, shall include confectionery, condiments, and all articles used for food or drink by man, and if there be more than one quality of any article of food or drug known by the same name the best quality thereof shall be furnished to the purchaser, unless he otherwise requests at the time of making such purchase, or unless he be notified at such time of the inferior quality of the article delivered.

SEC. 3. That an article shall be deemed to be adulterated within the meaning of this act:

(a) In the case of drugs: First, if, when sold under or by a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality, or purity laid down in the edition thereof at the time official; second, if, when sold under or by a name not recognized in the United States Pharmacopœia, but which is found in the German, French, or English Pharmacopœia, it differs from the strength, quality, or purity laid down therein; third, if, when sold as a patented medicine, compounded drug, or mixture, it is not composed of all the ingredients advertised or printed or written on the bottles, wrappers, or labels of or on or with the patented medicine, compounded drug, or mixture: *Provided*, That if the defendant in any prosecution under this act, in respect to the sale of any such patented medicine, compounded drug or mixture, shall prove to the satisfaction of the court that he had purchased the article in question as the same in nature, substance, and quality as that demanded of him by the purchaser, and with a written warranty to that effect; that he had no reason to believe at the time when he sold it that the article was otherwise, and that he sold it in the same state as when he purchased it, he shall be discharged from the prosecution.

(b) In the case of food: First, if any substance or substances have been mixed with it so as to reduce or lower or injuriously affect its quality or strength; second, if an inferior or cheaper substance or substances have been substituted wholly or in part for it; third, if any valuable constituent has been wholly or in part abstracted from it; fourth, if it is an imitation of or is sold under the name of another article; fifth, if it consists wholly or in part of a *deceased*,<sup>1</sup> decomposed, putrid, or rotten animal or vegetable substances, whether manufactured or not; sixth, if it is colored, coated, polished, or powdered whereby damage is concealed, or if it is made to appear better or of greater value than it really is; seventh, if it contains any added poisonous ingredient or any ingredient which may render it injurious to the health of a person consuming it; water, more than five per centum of salt, and less than eighty-three per centum of fat, less than nine per centum of solids not fat, and contains more than eighty-seven and one-half per centum of water; in the case of cream, if it contains less than twenty per centum of butter fat; ninth, in the case of butter or cheese, if it is not made exclusively from milk or cream or both, with or without common salt; the butter, if it contains more than twelve per centum of water, more than five per centum of salt, and less than eighty-three per centum of fat; tenth, in the case of coffee, if it is not composed entirely of the seed of the *Coffea arabica*; eleventh, in the case of lard, if it is not made exclusively from the rendered fat of the healthy hog; twelfth, in the case of tea, if it is not composed entirely of the genuine leaf of the tea plant not exhausted; thirteenth, in the case of all kinds of vinegar, if it contains an acidity equivalent

<sup>1</sup> So printed in statute.

to the presence of less than four per centum of absolute acetic acid; and cider vinegar, if it is not made from the pure apple juice and contains less than one and five-tenths per centum of total solids; fourteenth, in the case of cider, if it is not made from the legitimate product of pure apple juice; in the case of wines and fruit juices, if not made from the pure fruit as represented; and in the case of cider, wines, fruit juices, and malt liquors, if not free from salicylic acid or other preservatives; and in the case of malt liquors, if not free from picric acid, cocculus indicus, colchicine, colocynth, aloes, and wormwood; fifteenth, in the case of glucose, if it contains more than five one-hundredths per centum of ash; sixteenth, in the case of flour, if it is not composed entirely of one single ground cereal; seventeenth, in the case of bread, if there is any addition of alum, sulphate of copper, borax, or sulphate of zinc, or other poisonous or harmful ingredient, and if it contains more than thirty-one per centum of moisture, more than two per centum of ash, and less than six and twenty-five one hundredths per centum of albuminoids; eighteenth, in the case of olive oil, if it is not made exclusively from the olive berry (*Olea europea*), and its specific gravity at fifteen and six-tenths degree centigrade (sixty degrees Fahrenheit) "actual density" to be not more than nine hundred and seventeen one-thousands nor less than nine hundred and fourteen one-thousandths: *Provided*, That an offense shall not be deemed to be committed under this section in the following cases, that is to say, first, where the order calls for an article of food or drug inferior to such standard, or where such difference is made known by being plainly written or printed on the package; second, where the article of food or drug is mixed with any matter or ingredient not injurious to health and not intended fraudulently to increase its bulk, weight, or measure, or conceal its inferior quality, if at the time such article is delivered to the purchaser it is made known to him that such article of food or drug is so mixed.

SEC. 4. That it shall be the duty of the health officer of the District of Columbia, under the direction of the Commissioners of said District, to adopt such measures as may be necessary to facilitate the enforcement hereof, and prepare rules and regulations with regard to the proper method of collecting and examining drugs and articles of food in said District.

SEC. 5. That it shall be the duty of the health officer to investigate a complaint for a violation of any of the provisions of this act on the information of any person who lays before him satisfactory evidence by which to substantiate such complaint.

SEC. 6. That every person offering for sale or delivering to any purchaser any drug or article of food included in the provisions of this act shall furnish to any analyst or other officer or agent of the health department, who shall apply to him for the purpose and shall tender him the value of the same, a sample sufficient for the purpose of analysis of any such drug or article of food which is in his possession.

SEC. 7. That in all cases where any drug or article of food shall be taken as a sample to be examined and analyzed the person making the analysis shall reserve a portion of the sample, which shall be sealed, for a period of thirty days from the time of taking such sample, and in case of complaint the reserved portion alleged to be adulterated shall, upon application, be delivered to the defendant or his attorney.

SEC. 8. That no person shall hinder, obstruct, or in any way interfere with any inspector, analyst, or other person of the health department in the performance of his duty in carrying out the provisions of this act.

SEC. 9. That all prosecutions under this act shall be in the police court of said District, on information brought in the name of the District of Columbia, and on its behalf; and any person or persons violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than five dollars nor more than one hundred dollars.

SEC. 10. That all acts and parts of acts inconsistent with this act be, and the same are hereby, repealed: *Provided*, That nothing in this act contained shall be construed as modifying or repealing any of the provisions of "An act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine," approved August second, eighteen hundred and eighty-six, or of "An act defining cheese, and also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of 'filled cheese,'" approved June sixth, eighteen hundred and ninety-six.

Approved, February 17, 1898.

## APPENDIX S.

## SENATE BILL TO PROTECT THE PUBLIC HEALTH BY REGULATING THE PRODUCTION AND SALE OF MILK, CREAM, AND ICE CREAM IN THE DISTRICT OF COLUMBIA.

[S. 4986, Sixty-first Congress, second session.]

A BILL To protect public health by regulating the production and sale of milk, cream, and ice cream in and for the District of Columbia.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That no person shall (first) produce for sale, hold for sale, offer for sale, or sell, or have in his custody or possession with intent to sell, in the District of Columbia, milk, cream, or ice cream, as such, or milk or cream to be made into ice cream for sale, or (second) bring or send milk, cream, or ice cream into said District for sale as such, or milk or cream to be made into ice cream for sale, unless such milk, cream, or ice cream is pure and wholesome and is produced, manufactured, transported, held, and offered for sale, and sold under sanitary conditions and in a sanitary manner, conforming to the regulations hereinafter authorized; nor unless nor until licensed by the health officer of said District so to do; nor after any license so issued to him has been suspended or revoked and during the continuance of such suspension or revocation.

SEC. 2. That no person shall produce for sale, hold for sale, offer for sale, sell, or have in his custody or possession with intent to sell, in the District of Columbia, any milk, cream, or ice cream, either in or from any store, shop, establishment, or wagon or other conveyance, or in or from any container or receptacle whereon or wherein is any advertisement, sign, label, design, device, trade-mark, trade name, name, or statement relating to such milk, cream, or ice cream, or to any ingredient or substance contained therein, or relating to the inspection, composition, character, purity, origin, test, class, or sanitary condition thereof, which is false or misleading in any particular or in any manner calculated to deceive; nor shall any person in said District in any manner whatsoever falsely represent the inspection, composition, character, purity, origin, test, class, or sanitary condition of any milk, cream, or ice cream which he produces for sale, holds for sale, offers for sale, sells, or has in his custody or possession with intent to sell, or of any ingredient or substance contained therein.

SEC. 3. That no person, either for himself or as the representative, agent, servant, or employee of any other person or of any firm or corporation, shall offer for transportation or send, or receive for transportation or carry, from any State or Territory into the District of Columbia, any milk, cream, or ice cream, for sale in said District, or any milk or cream to be manufactured into ice cream therein for sale, unless the person offering for transportation or sending such milk, cream, or ice cream, or else the person receiving for transportation or carrying the same, is authorized under the provisions of this act to bring or send such milk, cream, or ice cream into said District.

SEC. 4. That it shall be the duty of the health officer of the District of Columbia, and of such agents and employees in the service of the health department as he may designate for that purpose, to enforce the provisions of this act and of all regulations made by authority thereof; and said health officer and agents and employees are hereby authorized, in the performance of the duty aforesaid, to enter and inspect all places where milk, cream, or ice cream is sold or held, offered, or produced for sale in or for the District of Columbia, and to inspect all milk, cream, and ice cream therein, and all cattle, appliances, apparatus, utensils, and materials used in connection therewith, and to board and examine all cars, boats, wagons, and other vehicles, and to stop all wagons and other vehicles for that purpose. No person shall interfere with said health officer or with any agent or employee aforesaid in the performance of his official duty, nor shall any person hinder, prevent, or refuse to permit any inspection or examination aforesaid.

SEC. 5. That for the purposes of this act, and of any regulations made by virtue hereof, any particular milk, cream, or ice cream shall be conclusively presumed to be held and offered for sale, and held in custody or possession with intent to sell, which, whether in bulk or in containers, is mingled with the common stock of milk, cream, or ice cream, as the case may be, kept in or about

any store, shop, establishment, farm, or premises, or any wagon or other vehicle, in, on, or from which such article or articles generally are produced for sale, held for sale, or sold, or held in custody or possession with intent to sell.

SEC. 6. That any person who for himself, or as the employee or agent of another person, or as a member, officer, employee, or agent of a firm or corporation violates or aids in the violation of any of the provisions of this act or of any regulations promulgated by the Commissioners of the District of Columbia under the provisions thereof shall be punished by a fine not exceeding forty dollars, or by imprisonment for not more than twenty days.

SEC. 7. That the Commissioners of the District of Columbia be, and they are hereby, authorized and empowered to make, promulgate, modify, and amend from time to time such regulations as in their judgment may be necessary to fix the classes and standards and the conditions and manner under which milk, cream, and ice cream must be produced, manufactured, transported, held, and offered for sale, and sold, in order to entitle the person, firm, or corporation producing, manufacturing, transporting, holding, or offering for sale or selling the same to receive and to hold a license so to do, and to govern the issue, suspension, and revocation of licenses aforesaid. And in the exercise of the authority conferred by this act and in the execution of the provisions hereof and of such regulations as may be promulgated under its authority said commissioners shall, whenever in their judgment it is expedient so to do, request the assistance of the Secretary of the Treasury and the Secretary of Agriculture, and said Secretaries of the Treasury and of Agriculture are hereby authorized to grant such assistance in so far as they may deem it compatible with the proper discharge of the duties of their respective departments so to do.

SEC. 8. That all prosecutions under this act shall be in the police court of the District of Columbia, upon information signed by the corporation counsel of said District or by one of his assistants.

SEC. 9. That all money heretofore or hereafter appropriated and available, or appropriated and to become available, for the enforcement of "An act to regulate the sale of milk in the District of Columbia, and for other purposes," approved March second, eighteen hundred and ninety-five, be, and the same is hereby, made available for the enforcement of this act and of the regulations promulgated by authority thereof, including the employment of personal services, when ordered in writing by the commissioners.

SEC. 10. That all acts and parts of acts inconsistent with the provisions of this act be, and the same are hereby, repealed: *Provided, however,* That prosecution for anything done or omitted to be done in violations of any such act or part of act prior to the passage of this act may be instituted, and if already instituted shall be continued, after and notwithstanding the passage of this act, and shall be heard and determined as if this act had not been passed.

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## APPENDIX T.

### HOUSE BILL TO PROTECT THE PUBLIC HEALTH BY REGULATING THE PRODUCTION AND SALE OF MILK, CREAM, AND ICE CREAM IN THE DISTRICT OF COLUMBIA.

[H. R. 17506, Sixty-first Congress, second session.]

A BILL To protect public health in the District of Columbia by regulating the production and sale of milk, cream, and ice cream in and for the District of Columbia.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That no person shall, (first) produce for sale, hold for sale, offer for sale, or sell, or have in his custody or possession with intent to sell, in the District of Columbia, milk, cream, or ice cream, as such, or milk or cream to be made into ice cream for sale, or (second) bring or send milk, cream, or ice cream into said District for sale as such, or milk or cream to be made into ice cream for sale, unless such milk, cream, or ice cream is pure and wholesome and is produced, manufactured, transported, held, and offered for sale, and sold under sanitary conditions and in a sanitary manner, conforming to the regulations hereinafter authorized; nor unless nor until

licensed by the health officer of said District so to do; nor after any license so issued to him has been suspended or revoked and during the continuance of such suspension or revocation.

SEC. 2. That no person shall produce for sale, hold for sale, offer for sale, sell, or have in his custody or possession with intent to sell, in the District of Columbia, any milk, cream, or ice cream, either in or from any store, shop, establishment, or wagon or other conveyance, or in or from any container or receptacle whereon or wherein is any advertisement, sign, label, design, device, trade-mark, trade name, name, or statement relating to such milk, cream, or ice cream, or to any ingredient or substance contained therein, or relating to the inspection, composition, character, purity, origin, test, class, or sanitary condition thereof, which is false or misleading in any particular or in any manner calculated to deceive; nor shall any person in said District in any manner whatsoever falsely represent the inspection, composition, character, purity, origin, test, class, or sanitary condition of any milk, cream, or ice cream which he produces for sale, holds for sale, offers for sale, sells, or has in his custody or possession with intent to sell, or of any ingredient or substance contained therein.

SEC. 3. That no person, either for himself or as the representative, agent, servant, or employee of any other person or of any firm or corporation, shall offer for transportation or send, or receive for transportation or carry, from any State or Territory into the District of Columbia, any milk, cream, or ice cream, for sale in said District, or any milk or cream to be manufactured into ice cream therein for sale, unless the person offering for transportation or sending such milk, cream, or ice cream, or else the person receiving for transportation or carrying the same, is authorized under the provisions of this act to bring or send such milk, cream, or ice cream into said District.

SEC. 4. That it shall be the duty of the health officer of the District of Columbia, and of such agents and employees in the service of the health department as he may designate for that purpose, to enforce the provisions of this act and of all regulations made by authority thereof; and said health officer and agents and employees are hereby authorized, in the performance of the duty aforesaid, to enter and inspect all places where milk, cream, or ice cream is sold or held, offered, or produced for sale in or for the District of Columbia, and to inspect all milk, cream, and ice cream therein, and all cattle, appliances, apparatus, utensils, and materials used in connection therewith, and to board and examine all cars, boats, wagons, and other vehicles, and to stop all wagons and other vehicles for that purpose. No person shall interfere with said health officer or with any agent or employee aforesaid in the performance of his official duty, nor shall any person hinder, prevent, or refuse to permit any inspection or examination aforesaid.

SEC. 5. That for the purposes of this act, and of any regulations made by virtue hereof, any particular milk, cream, or ice cream shall be conclusively presumed to be held and offered for sale, and held in custody or possession with intent to sell, which, whether in bulk or in containers, is mingled with the common stock of milk, cream, or ice cream, as the case may be, kept in or about any store, shop, establishment, farm, or premises, or any wagon or other vehicle, in, on, or from which such article or articles generally are produced for sale, held for sale, or sold, or held in custody or possession with intent to sell.

SEC. 6. That any person who for himself, or as the employee or agent of another person, or as a member, officer, employee, or agent of a firm or corporation violates, or aids in the violation of any of the provisions of this act, or of any regulations promulgated by the Commissioners of the District of Columbia under the provisions thereof shall be punished by a fine not exceeding forty dollars, or by imprisonment for not more than twenty days.

SEC. 7. That the Commissioners of the District of Columbia be, and they are hereby, authorized and empowered to make, promulgate, modify, and amend from time to time such regulations as in their judgment may be necessary to fix the classes and standards and the conditions and manner under which milk, cream, and ice cream must be produced, manufactured, transported, held, and offered for sale, and sold, in order to entitle the person, firm, or corporation producing, manufacturing, transporting, holding, or offering for sale or selling the same to receive and to hold a license so to do, and to govern the issue, suspension, and revocation of licenses aforesaid. And in the exercise of the authority conferred by this act and in the execution of the provisions hereof and of such regulations as may be promulgated under its authority said commissioners shall, whenever in their judgment it is expedient so to do, request the assistance of the Secretary of the Treasury and the Secre-

tary of Agriculture, and said Secretaries of the Treasury and of Agriculture are hereby authorized to grant such assistance in so far as they may deem it compatible with the proper discharge of the duties of their respective departments so to do.

SEC. 8. That all prosecutions under this act shall be in the police court of the District of Columbia, upon information signed by the corporation counsel of said District or by one of his assistants.

SEC. 9. That all money heretofore or hereafter appropriated and available, or appropriated and to become available, for the enforcement of "An act to regulate the sale of milk in the District of Columbia, and for other purposes," approved March second, eighteen hundred and ninety-five, be, and the same is hereby, made available for the enforcement of this act and of the regulations promulgated by authority thereof, including the employment of personal services, when ordered in writing by the commissioners.

SEC. 10. That all acts and parts of acts inconsistent with the provisions of this act be, and the same are hereby, repealed: *Provided, however,* That prosecution for anything done or omitted to be done in violations of any such act or part of act prior to the passage of this act may be instituted, and if already instituted shall be continued, after and notwithstanding the passage of this act, and shall be heard and determined as if this act had not been passed.

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## APPENDIX U.

RESOLUTION OFFERED BY MR. LEVER, OF SOUTH CAROLINA, AUTHORIZING THE COMMITTEE ON AGRICULTURE, HOUSE OF REPRESENTATIVES, TO INVESTIGATE TO WHAT EXTENT TUBERCULOSIS IS PREVALENT AMONG DAIRY AND FARM ANIMALS IN THE DISTRICT OF COLUMBIA, ETC.

[H. Res. 605, Sixty-first Congress, second session.]

Whereas it appears from the official reports issued by the Department of Agriculture, particularly during the past two years, that the alarming prevalence of tuberculosis in the human family in all parts of the United States and the District of Columbia and the prevalence of typhoid fever and other diseases which endanger the public health are due to a considerable extent to the consumption of milk and cream obtained from diseased cows and to the consumption of butter produced from milk and cream which contain tubercle bacilli and typhoid bacilli; and

Whereas it is stated in said official reports that typhoid bacilli will remain alive and virulent in butter manufactured from milk infected with such bacilli for a period of at least one hundred and fifty-one days, and that during this period of time these bacilli are ready to multiply whenever placed in suitable environment; that tubercle bacilli may remain alive and virulent in ordinary salted butter fully one hundred and sixty days after its manufacture from milk and cream infected with such bacilli; and further that more than one sample out of every twenty samples of commercial or market milk from various dairies supplying milk to the city of Washington were, by application of the tuberculin test, recently found to be infected with tubercle bacilli, thereby causing great danger to the public health; and

Whereas it is also stated that ten per centum of all dairy cows in the United States are infected with tuberculosis; and

Whereas it is also stated in said official reports that the financial loss which is chargeable to the prevalence of tuberculosis among farm animals amounts to no less than twenty-three million dollars annually and is dangerously on the increase: Therefore be it

*Resolved,* That the Committee on Agriculture of the House of Representatives be, and it hereby is, authorized and directed to investigate and ascertain the condition of milk, cream, cheese, and butter offered for sale or transportation in the District of Columbia; report to the House of Representatives its findings as to the extent to which tuberculosis and other diseases are communicated to the human family by the sale of such infected articles of food, and to what extent tuberculosis is prevalent among farm and dairy animals in the District of Columbia, and report to the House of Representatives the reason for the failure to enforce the pure-food law as it affects butter and butter products in the United States.

## APPENDIX V.

AMENDMENT TO HEALTH ORDINANCES, DISTRICT OF COLUMBIA, SPECIFYING ACTUAL CONTENT FOR MILK BOTTLES, ETC.; PROMULGATED MAY 28, 1906.

EXECUTIVE OFFICE,  
COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
Washington, May 28, 1906.

*Ordered:* That the health ordinances of the District of Columbia be, and they are hereby, amended by adding thereto the following:

ESTABLISHING A LIMIT OF TOLERANCE ON MILK BOTTLES OR JARS.

JULY 29, 1901.

*Ordered:* That the schedule of fees for inspecting and sealing glass bottles or jars used for the distribution or delivery of milk or cream to consumers, adopted June 17, 1901, and suspended July 1 and July 10, 1901, is hereby amended to read as follows, to take effect on and after the 1st of August, 1901:

That the glass bottles or jars used for the distribution or delivery of milk or cream to consumers, that hold, when filled to a level with the bottom of the cap or stopple, not less than 7 ounces and 6 drams and not over 8 ounces and 2 drams for one-half pint measure; not less than 15 ounces and 5 drams and not over 16 ounces and 4 drams for 1 pint; not less than 31 ounces and 4 drams and not over 32 ounces and 4 drams for 1 quart; not less than 47 ounces and 3 drams and not over 48 ounces and 5 drams for 3 pints; not less than 63 ounces and 2 drams and not over 64 ounces and 6 drams for one-half gallon, shall be sealed as measures and that all dealers in milk who use glass bottles or jars for the distribution or delivery of milk or cream to consumers shall be charged a fee of 50 cents per hundred bottles for such inspection and sealing.

## APPENDIX W.

AN ACT PROVIDING FOR LABELING OF MILK VESSELS IN DISTRICT OF COLUMBIA, APPROVED FEBRUARY 27, 1907.

AN ACT To amend section eight hundred and seventy-eight of the Code of Law for the District of Columbia.

[34 Stats., 1006.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section eight hundred and seventy-eight of the Code of Law for the District of Columbia be, and the same is hereby, amended by adding thereto the following:

"SEC. 878a. That the following words shall, in addition to their ordinary meaning, have the meaning herein given: The word 'person' or 'persons,' in sections eight hundred and seventy-eight b, c, d, e, and g, inclusive, shall include 'firms' or 'corporations;'; the word 'vessel' or 'vessels,' in sections eight hundred and seventy-eight b, c, d, and e, shall include 'cans,' 'bottles,' 'siphons,' and 'boxes;'; the word 'mark' or 'marks' shall include 'labels,' 'trade-marks,' and all other methods of distinguishing ownership in vessels, whether printed upon labels or blown into bottles or engraved and impressed upon cans or boxes.

"SEC. 878b. That persons engaged in producing, manufacturing, bottling, or selling milk or cream, or any other lawful beverage composed principally of milk, in vessels, with their name, trade-mark, or other distinctive mark, and the word 'registered' branded, engraved, blown, or otherwise produced thereon, or on which a pasted trade-mark label is put upon which the word 'registered' is also distinctly printed, may file with the clerk of the supreme court of the District of Columbia a description, by facsimile, or a sample of an original package so marked or branded or blown, showing plainly such names and marks thereon, together with their name in full, or their corporate name, and also their place of business in the District of Columbia, and if so filed shall

cause the same to be published for not less than two weeks successively in a daily or weekly newspaper published in the District of Columbia.

"Sec. 878c. That whoever, except the person who shall have filed and published a description of the same as aforesaid, fills with milk or cream, or other beverage, as aforesaid, with intent to sell the same, any vessel so marked and distinguished as aforesaid, the description of which shall have been filed and published as provided in the preceding section, or defaces, erases, covers up, or otherwise removes or conceals any such name or mark as aforesaid, or the word 'registered' thereon, or sells, buys, gives, takes, or otherwise disposes of, or traffics in the same without having purchased the contents thereof from the person whose name is in or upon such vessel, or without the written consent of such person, shall, for the first offense, be punished by a fine of not less than fifty cents for each such vessel, or by imprisonment for not less than ten days nor more than one year, or by both such fine and imprisonment; and for each subsequent offense by a fine of not less than one nor more than five dollars for each such vessel, or by imprisonment for not less than twenty days nor more than one year, or by both such fine and imprisonment.

"Sec. 878d. That the use or possession by any person not engaged in the production or sale of milk or cream or other beverage as aforesaid, except the person who shall so have filed and published a description of the same as aforesaid, of any vessel marked or distinguished as aforesaid, the description of which shall have been filed and published as aforesaid, without purchase of the contents thereof from, or the written consent of, the person who shall so have filed and published the said description, shall be prima facie evidence of the unlawful use, possession of, or traffic in, such vessel, and the person so using or in possession of the same, except the person who shall so have filed and published the said description as aforesaid, shall be punished as in the next preceding section provided.

"Sec. 878e. That upon complaint of any person who has complied with section eight hundred and seventy-eight b, or of his agent, to the police court of the District of Columbia, or one of the judges thereof, that such person, or agent, has reason to believe, and does believe, that any person within the District of Columbia is guilty of the violation of any provision of this act, the said court or judge may issue a search warrant to discover and obtain such vessels as aforesaid and their contents, and may also cause to be brought before the said court or judge the person so believed to be guilty, or his agent or employee, in whose possession or upon whose wagon or premises any such vessel or vessels may be found; and any such person, agent, or employee found guilty of a violation of any of the provisions of this act shall be punished as aforesaid, and the said court or judge shall also order the property taken upon any such search warrant to be delivered to its owner.

"Sec. 878f. That the clerk of the supreme court of the District of Columbia is hereby authorized to make regulations and prescribe forms for the filing of labels, trade-marks, or other distinctive marks under the provisions of the foregoing amendments to section eight hundred and seventy-eight.

"Sec. 878g. That nothing in the foregoing amendments to section eight hundred and seventy-eight shall prevent or restrain any person who is the legal owner of a trade-mark or label from proceeding in an action of tort against any person found guilty of violating any subsection of section eight hundred and seventy-eight."

Approved, February 27, 1907.

## APPENDIX X.

EXCERPT FROM DISTRICT OF COLUMBIA APPROPRIATION ACT INHIBITING HEALTH DEPARTMENT EMPLOYEES FROM SERVING DAIRYMEN OR DAIRY FARMERS OR MANUFACTURERS OF OR DEALERS IN FOODS AND DRUGS, APPROVED MARCH 2, 1907.

[34 Stat., 1119.]

*Provided*, That hereafter no officer or employee of the health department shall, during his continuance in office, serve in his private capacity, for fee, gift, or reward, any person licensed to keep or maintain a dairy or dairy farm

in said District or to bring or to send milk into said District, or any person who has applied or is about to apply for such license, or any manufacturer or dealer in foods, drugs, or disinfectants, or similar materials: *Provided further*, That every place where milk is sold shall be deemed a dairy under the law for purposes of inspection. (Approved, March 2, 1907.)

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## APPENDIX Y.

### ORDERS RESTRICTING SALE OF MILK IN EXECUTIVE DEPARTMENTS.

Special order.]

DEPARTMENT OF AGRICULTURE,  
OFFICE OF THE SECRETARY,  
Washington, D. C., October 14, 1910.

*To the chiefs of bureaus, offices, and independent divisions:*

In order that no milk containing extraneous matter, raw milk from cows not known to be free of tuberculosis, or milk of unknown origin may be sold within certain buildings occupied by the Department of Agriculture in Washington, D. C., it is hereby ordered that no milk shall be sold within any building occupied by the Department of Agriculture which is not equal to the classification as defined in Bureau of Animal Industry Circular 114.

The determinations as to the standards of such milk shall be made by the Dairy Division, Bureau of Animal Industry.

Officers of the various bureaus and divisions in which milk is used will see that this order is enforced.

Effective October 25, 1910.

JAMES WILSON,  
*Secretary of Agriculture.*

Attest:

C. C. CLARK, *Chief Clerk.*

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OFFICE OF SUPERINTENDENT,  
STATE, WAR, AND NAVY DEPARTMENT BUILDING,  
Washington, January 20, 1911.

Mr. J. LOUIS WILLIGE,  
*Chairman Milk Committee,*  
*Washington Chamber of Commerce, Washington, D. C.*

DEAR SIR: In response to your request by telephone this morning I am quoting below my circular letter of December 13, 1910, governing the sale of milk in this building. Copies of this letter were supplied to the chief clerks of the State, War, and Navy Departments.

"OFFICE OF SUPERINTENDENT,  
STATE, WAR, AND NAVY DEPARTMENT BUILDING,  
Washington, December 13, 1910.

SIR: I have the honor to invite your attention to the fact that the commission in charge of this building has decided that no milk shall be sold in the buildings under this office unless it is equal to the sanitary standard and complies with the classification established by the Bureau of Animal Industry, Department of Agriculture.

In order to comply with these instructions, watchmen will be ordered to permit the delivery of milk only by persons having a permit from this office. These orders will be enforced on January 1, 1911, and thereafter. Arrangement has been made with the Department of Agriculture to examine and classify samples of milk proposed to be furnished, and to make from time to time necessary analysis of milk actually delivered.

You are requested to notify the employees of your department of these facts, and to inform them that dealers desiring to supply milk should communicate with Mr. Ernest Kelly, Dairy Division, Bureau of Animal Industry, Department of Agriculture, with reference to the examination of samples of milk to be furnished.

A number of copies of Special Order of October 14, 1910, and of extract from Circular 114, Bureau of Animal Industry, Department of Agriculture, are inclosed for your information."

Very respectfully,

U. S. GRANT, 3d,  
*First Lieutenant, Corps of Engineers, Superintendent.*

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WAR DEPARTMENT,  
*Washington, December 13, 1910.*

SIR: Referring to previous correspondence on the subject, I have the honor to quote for your information the following order, issued December 12, 1910, by the department concerning the sale of milk in the buildings under its jurisdiction in this city:

"It is directed by the Secretary of War that on and after January 2, 1911, no dealer will be permitted to sell milk to employees of the War Department in the State, War, and Navy Department Building, and in the outside buildings under the jurisdiction of this department, unless he shall show as his authority therefor a 'milk permit' issued by the superintendent of the State, War, and Navy Department Building, or the superintendent of the outside buildings, Capt. M. R. Thorp."

This action has been taken in the interests of public health, and milk permits will be issued only by the officials named to such dealers as have fully complied with the requirements of the Department of Agriculture governing sanitary milk."

Very respectfully,

ROBERT SHAW OLIVER,  
*Assistant Secretary of War.*

Mr. J. LOUIS WILLIGE,  
*Chairman Special Committee,*  
*Washington Chamber of Commerce, Washington, D. C.*

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NAVY DEPARTMENT,  
*Washington, November 18, 1910.*

SIR: Referring to your letter No. 121463, of November 8, 1910, recommending the issuance of an order prohibiting the sale of milk within any building occupied by the Navy Department which is not equal to the classification as defined in Bureau of Animal Industry Circular No. 114, a transcript of which is printed on the back of special order issued by the Secretary of Agriculture, copy of which was inclosed with your letter, the department incloses herewith a list of milk dealers furnishing milk to the personnel of the bureaus and offices of the Navy Department. The department desires that you communicate with these dealers and state that it is the department's intention to publish for the information of employees a list of dealers in milk whose milk comes up to the required test, and that if they so desire, the department will test their milk unless it has already been tested by competent authority.

Very respectfully,

BEEKMAN WINTHROP,  
*Acting Secretary of the Navy.*

The SURGEON GENERAL, UNITED STATES NAVY,  
*Navy Department.*

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LIST OF MILK DEALERS FURNISHING MILK TO THE PERSONNEL OF THE BUREAUS AND OFFICES OF THE NAVY DEPARTMENT.

Baltimore & Washington White Cross Milk Co. (Inc.), Ninth and N Streets NW., Washington.

H. L. Alden, 211 Tenth Street SW., Washington, D. C.

Geo. M. Oyster, 1116 Connecticut Avenue NW., Washington, D. C.

Walker-Gordon Laboratory of Washington, D. C., 1020 Connecticut Avenue NW., Washington, D. C.

Dulin's Dairy, 1021 Twentieth Street NW., Washington, D. C.

George A. Wise & Bro., 3310 R Street NW., Washington, D. C.

Special order.]

DEPARTMENT OF THE INTERIOR,  
Washington, November 5, 1910.*To the chiefs of bureaus, offices, and independent divisions:*

In order that no milk containing extraneous matter, raw milk from cows not known to be free of tuberculosis, or milk of unknown origin may be sold within certain buildings occupied by the Department of the Interior in Washington, D. C., it is hereby ordered that no milk shall be sold within any building occupied by the Department of the Interior which is not equal to the classification as defined in Bureau of Animal Industry, Department of Agriculture, Circular 114.

The determinations as to the standards of such milk shall be made by the Dairy Division, Bureau of Animal Industry, and no person or company will be permitted to sell milk in any of the buildings under this department unless a permit is obtained from the chief clerk of this department, countersigned by the Chief of the Dairy Division, Bureau of Animal Industry, Department of Agriculture.

Officers of the various bureaus and divisions in which milk is used will see that this order is enforced.

Effective November 16, 1910.

R. A. BALLINGER,  
*Secretary of the Interior.*

Attest:

CLEMENT S. UCKER, *Chief Clerk.*

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MILK PERMIT.

DEPARTMENT OF THE INTERIOR,  
OFFICE OF THE SECRETARY,  
November 8, 1910.

Admit \_\_\_\_\_ to buildings and grounds occupied by the Department of the Interior for the purpose of selling milk. This permit is valid until November 30, 1910, but may be revoked at any time for failure to comply with special departmental order in relation to classification of milk.

\_\_\_\_\_  
*Acting Chief Clerk.*

[Indorsement on stub:]

\_\_\_\_\_  
*Chief, Dairy Div., B. A. I., Dept. of Agriculture.*

RULES GOVERNING THE SALE OF MILK IN BUILDINGS OF THE DEPARTMENT OF COMMERCE AND LABOR.

DEPARTMENT OF COMMERCE AND LABOR,  
OFFICE OF THE SECRETARY,  
Washington, December 1, 1910.

*To officers and employees of Department of Commerce and Labor in Washington, D. C.:*

In order that no milk containing extraneous matter, raw milk from cows not known to be free from tuberculosis, or milk of unknown origin may be sold in buildings or parts of buildings under the jurisdiction of the department in Washington, it is hereby ordered that no milk shall be sold in any such buildings or parts of buildings that is not equal to the classification as defined in Circular No. 114 of the Bureau of Animal Industry, Department of Agriculture, a transcript from which is printed on the reverse side of this circular.

The standard of such milk shall be determined by the Dairy Division, Bureau of Animal Industry; and no person or company shall be permitted to sell milk in any of the buildings or parts of buildings above mentioned without a permit from the chief clerk of the department, countersigned by the Chief of the Dairy Division, Bureau of Animal Industry, Department of Agriculture.

Officers in charge of buildings in which milk is delivered will see that this order is enforced and that no milk is sold therein except under permit as above provided for.

This order shall be effective beginning December 15, 1910.

CHARLES NAGEL, *Secretary.*

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APPENDIX Z.

CORRESPONDENCE WITH OFFICIALS OF EXECUTIVE DEPARTMENTS AND INDEPENDENT GOVERNMENT BUREAUS IN WASHINGTON, D. C., RELATING TO ISSUANCE OF ORDERS REGULATING MILK FURNISHED TO EMPLOYEES AT BUILDINGS.

DECEMBER 3, 1910.

Mr. J. LOUIS WILLIGE,  
*Chairman Special Committee, Chamber of Commerce,  
Washington, D. C.*

SIR: The department acknowledges the receipt of your letter of the 28th instant in which you inquire whether an order is about to be issued by this department in regard to the milk supplied to its employees.

In reply you are informed that the matter referred to is under consideration by the commission in charge of the State, War, and Navy Building. No order has as yet been issued.

I am, sir, your obedient servant,

WM. MCNEIR,  
*Chief Clerk.*

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WAR DEPARTMENT,  
*Washington, November 29, 1910.*

SIR: Referring to your inquiry of 28th instant as to whether the War Department will issue an order providing that milk supplied to its employees during the luncheon hour shall conform to the classification in Circular No. 114, of the Bureau of Animal Industry, Department of Agriculture, I beg to advise you that this matter is now being considered by the department, and when a determination is reached in the premises further advices will be furnished you.

Very respectfully,

ROBERT SHAW OLIVER,  
*Acting Secretary of War.*

I. LOUIS WILLIGE, Esq.,  
*Chairman Special Committee,  
Chamber of Commerce, Washington, D. C.*

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NAVY DEPARTMENT,  
*Washington, December 1, 1910.*

SIR: Replying to your letter of November 28, 1910, the department incloses herewith a copy of its letter of November 18, 1910, to the Surgeon General of the Navy, on the subject of milk furnished by milk dealers to the personnel of bureaus and offices of the Navy Department.

Very respectfully,

BEEKMAN WINTHROP,  
*Assistant Secretary of the Navy.*

The CHAIRMAN SPECIAL COMMITTEE,  
*Washington Chamber of Commerce, Washington, D. C.*

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DEPARTMENT OF THE INTERIOR,  
*Washington, November 30, 1910.*

Mr. J. LOUIS WILLIGE,  
*Chairman Special Committee on Local Milk Situation,  
1202 F Street NW., Washington, D. C.*

SIR: In response to your communication of November 28, 1910, there are inclosed several copies of special order, dated November 5, 1910, governing the

sale of milk in buildings under the control of this department, and several copies of "milk permit" authorizing milk dealers to sell milk within said buildings, from which you will be able to obtain the information requested.

Very respectfully,

FRANK PIERCE, *Acting Secretary.*

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DEPARTMENT OF COMMERCE AND LABOR,  
OFFICE OF THE SECRETARY,  
Washington, November 29, 1910.

Mr. J. LOUIS WILLIGE,  
*Chairman Committee to Investigate Milk Situation,  
Chamber of Commerce, Washington, D. C.*

DEAR SIR: To comply with the request in your letter of the 28th instant, I beg to inclose a copy of a circular this department proposes to issue regulating the sale of milk in buildings occupied by the Department of Commerce and Labor.

Very truly, yours,

CHARLES NAGEL, *Secretary.*

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TREASURY DEPARTMENT,  
Washington, December 8, 1910.

Mr. J. LOUIS WILLIGE,  
*Chairman Special Committee,  
Washington Chamber of Commerce, Washington, D. C.*

SIR: By direction of the Secretary I have to acknowledge the receipt of your letter of November 28, 1910, making inquiry as to whether any regulations have been issued in this department regarding the milk supplied to its employees.

In reply, you are informed that no such instructions have been issued up to the present time. For your information I might state that there are but three dealers supplying milk to this building, their names and the amounts furnished daily being as follows:

	Quarts.
Wallace & Watson, 2306 L Street NW-----	20
Baltimore & Washington White Cross Milk Co., Ninth and N Streets NW_	13
Thompson Dairy, 511 Four-and-a-half Street SW-----	6

Respectfully,

JAMES L. WILMETH, *Chief Clerk.*

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POST OFFICE DEPARTMENT,  
OFFICE OF THE CHIEF CLERK,  
Washington, December 7, 1910.

Mr. J. LOUIS WILLIGE,  
*Chairman Special Committee, Chamber of Commerce, Washington, D. C.*

DEAR SIR: I am directed by the Postmaster General to acknowledge the receipt of your letter of the 28th ultimo, in which you ask to be furnished with copies of such orders as may be issued by this department relative to the sale of milk in buildings under its control.

In reply, I beg to advise you that no orders have been issued on the subject, the department considering it one coming peculiarly under the supervision of the District health authorities.

Very truly, yours,

T. L. WEED, *Chief Clerk.*

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DEPARTMENT OF JUSTICE,  
OFFICE OF THE CHIEF CLERK,  
Washington, November 30, 1910.

Mr. J. LOUIS WILLIGE,  
*The Washington Chamber of Commerce, Washington, D. C.*

DEAR SIR: The department is in receipt of your letter of the 28th instant, requesting to be advised whether it is contemplated to prepare a circular along

the lines of Circular 114 of the Department of Agriculture, with reference to milk supplied to employees in this department during luncheon hour. In reply thereto I beg to inform you that as the quantity of milk taken by the employees of this department amounts to almost nothing, no action in this respect is contemplated.

Respectfully,

O. J. FIELD, *Chief Clerk.*

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SMITHSONIAN INSTITUTION,  
*Washington, December 8, 1910.*

DEAR MR. WILLIGE: In reply to your communication of November 28, with reference to establishing a restrictive standard for the milk supplied to employees at the lunch hour, there has been no order issued by the Institution or its branches in this connection.

Very truly, yours,

C. D. WALCOTT,  
*Secretary.*

MR. J. LOUIS WILLIGE,  
*Chairman Special Committee,  
The Washington Chamber of Commerce, Washington, D. C.*

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OFFICE OF THE PUBLIC PRINTER,  
*Washington, December 1, 1910.*

SIR: This will acknowledge receipt of your communication of the 28th instant, making inquiry as to the rules governing the sale of milk to employees in the Government Printing Office.

In reply, I have the honor to advise that dealers to whom permits are issued by the Public Printer authorizing them to sell milk in the Government Printing Office are first required to furnish satisfactory evidence that they have been authorized by the health department of the District of Columbia to sell milk.

Any deviation from this practice has not up to this time been contemplated.

Respectfully,

SAML. B. DONNELLY,  
*Public Printer.*

J. LOUIS WILLIGE, Esq.,  
*Washington Chamber of Commerce, Washington, D. C.*

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BUILDING AND GROUNDS, LIBRARY OF CONGRESS,  
OFFICE OF THE SUPERINTENDENT,  
*Washington, D. C., January 4, 1911.*

MR. J. LOUIS WILLIGE,  
*Washington Chamber of Commerce, Washington, D. C.*

MY DEAR SIR: Your letter of November 28, 1910, addressed to the Librarian of Congress, on behalf of a special committee of the Washington Chamber of Commerce, on the subject of milk supplied to the Library of Congress employees, was referred to me as the officer in charge of the Library Building.

It is my duty to explain that the delay in my reply has been due somewhat to the unusual nature of the question and uncertainty as to the scope and application of Circular No. 114 of the Bureau of Animal Industry of the Department of Agriculture to which it refers.

Now that I have been able to read it rather carefully, I am prepared to state that I feel quite sure that should the Government departments issue an order regulating the quality of the supply of milk furnished to the lunch rooms and employees in their several buildings the Library of Congress would do likewise, and, furthermore, that should the Department of Agriculture issue such an order the Library of Congress would follow it as far as practicable.

Yours, very truly,

BERNARD R. GREEN, *Superintendent.*

APPENDIX AA.

ORDER GOVERNING MILK USED IN INSTITUTIONS UNDER CONTROL OF DISTRICT GOVERNMENT PROMULGATED NOVEMBER 8, 1910.

COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
EXECUTIVE DEPARTMENT,  
Washington, November 8, 1910.

*Ordered*, That the purchase of milk by the District of Columbia for use in institutions under its control is limited to milk that has been properly pasteurized or that has come from tuberculin-tested herds.

By order:

WILLIAM TINDALL,  
*Secretary Board of Commissioners, District of Columbia.*

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APPENDIX AB.

ORDER OF DISTRICT COMMISSIONERS FOR COMPULSORY TUBERCULIN TESTING OF CATTLE WITHIN DISTRICT OF COLUMBIA, PROMULGATED NOVEMBER 27, 1909, TOGETHER WITH AMENDMENT OF MARCH 5, 1910.

UNITED STATES DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.

ORDER OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE SUPPRESSION AND PREVENTION OF TUBERCULOSIS IN CATTLE.

EXECUTIVE OFFICE,  
COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
Washington, November 26, 1909.

*Ordered*: The Commissioners of the District of Columbia having learned that tuberculosis, a communicable disease, prevails among the cattle in the District of Columbia and adjacent States, do hereby, pursuant to law, authorize and direct the following measures for the prompt suppression and to prevent the spread of bovine tuberculosis within the District of Columbia and to adjoining States:

SECTION 1. It is hereby ordered that no cattle shall, in any manner, be removed from the District of Columbia except upon written permission from the Chief of the Bureau of Animal Industry or the health officer of the District of Columbia, which removal shall only be granted for cattle which have successfully passed an official tuberculin test, or are for immediate slaughter at an establishment at which United States meat inspection is maintained.

SEC. 2. Any person, firm, or corporation desiring to bring any cattle into the District of Columbia, except as provided in section 3, paragraph (c), shall first make application and obtain a permit from the Chief of the Bureau of Animal Industry or from the health officer of the District of Columbia. The said application shall be in writing, stating the number, sex, and the age of the cattle, whether over or under 6 months old, the exact place, date, and time at which it is desired to enter said cattle, and their destination within the District of Columbia, together with a declaration showing clearly the purpose for which the cattle are desired to be entered, whether for immediate slaughter, feeding, or breeding purposes, or for milk production.

SEC. 3. (a) Cattle offered for entry into the District of Columbia must be accompanied by a permit, as provided in section 2, and must be identified by an official veterinarian of the Bureau of Animal Industry or of the health department of the District of Columbia, and must be appropriately tagged before entrance is permitted, except as provided in paragraph (c) of this section.

(b) Cattle over 6 months old, for purposes other than immediate slaughter, unless accompanied by a satisfactory certificate of tuberculin test by a veterinary inspector of the Bureau of Animal Industry or an official veterinarian of the health department of the District of Columbia or of the State from which

brought, must be immediately taken after identification, as provided in paragraph (a) of this section, to a place designated by the Chief of the Bureau of Animal Industry or health officer of the District of Columbia, and there quarantined apart from all other cattle until officially tuberculin tested and disposed of in accordance with these regulations: *Provided*, That no indemnity shall be allowed for such cattle as shall be slaughtered on account of their being deemed to be tuberculous. When accompanied by certificate of tuberculin test, as herein provided, the said certificate must show the place and the date, within thirty days of being offered for entry, of inspection and tuberculin testing, also temperature chart, description of the animal or animals, age, markings, and tag numbers, if tagged.

(c) Cattle for immediate slaughter may enter the District of Columbia if tagged in accordance with paragraph (a) and without the tuberculin test, on condition that the tag therein provided for shall remain attached to the hide until removed in the presence of an employee of the Bureau of Animal Industry or of the health department of the District of Columbia, to either of whom it shall be delivered. The owner of the animal at the time of slaughter is hereby required to notify the Chief of the Bureau of Animal Industry or the health officer of the District of Columbia, stating the place where the hides will be found. If shipped in cars and consigned direct to an establishment having United States meat inspection, cattle for immediate slaughter may enter the District of Columbia without complying with section 2 and section 3, paragraph (a): *Provided, however*, That the consignee shall keep a complete record of each animal received, date of receipt, its place of origin, railroads traversed, name of shipper, and butcher class to which each animal belongs, and shall report the same before the slaughter of any such animals to the Chief of the Bureau of Animal Industry through the veterinary inspector stationed at that establishment.

(d) Cattle under 6 months old for purposes other than immediate slaughter, when not accompanied by certificates as indicated in paragraph (b), may be brought into the District of Columbia as provided in paragraph (a), but said cattle must be accompanied by affidavits by the breeder or feeder and by the owner or shipper, said affidavits to state that tuberculosis has not been known to exist on the premises, during the six months immediately preceding the offer for entry, upon which said animals have been kept.

SEC. 4. Cattle over 6 months old already within the District of Columbia shall be inspected and tuberculin tested by a veterinary inspector of the Bureau of Animal Industry or of the health department of the District of Columbia. Cattle under 6 months old shall, in the same manner, be inspected, and when deemed necessary shall be tuberculin tested, said inspection and tuberculin testing to be repeated annually, or at such times as the Chief of the Bureau of Animal Industry or the health officer of the District of Columbia may direct. All such cattle shall be officially tagged "U. S., B. A. I.," with a serial number, or "U. S., B. A. I., Reacted," with a serial number.

SEC. 5. All cattle already within the District of Columbia which are deemed to be tuberculous, either as a result of physical examination or the tuberculin test, shall be slaughtered within a time and at a place designated by the Chief of the Bureau of Animal Industry or the health officer of the District of Columbia, and shall be subject to official post-mortem inspection, and the carcass of any such animal shall be disposed of according to the meat-inspection regulations of the Bureau of Animal Industry. All such cattle shall be appraised before being slaughtered, the owners to be indemnified, as hereinafter provided, from any available appropriation made by Congress for the Bureau of Animal Industry of the United States Department of Agriculture for carrying out the provisions of the act of May 29, 1884, except as specified in section 8 of these regulations: *Provided*, That no liability shall be incurred under these regulations by the United States Department of Agriculture in excess of the funds available from the aforesaid appropriation of Congress, and whenever the Chief of the Bureau of Animal Industry shall deem it necessary or advisable, because of the lack of funds for the aforesaid purpose, he shall notify the health officer of the District of Columbia to that effect, and thereafter no liabilities shall accrue against the United States on account of any act done or permitted under these regulations.

SEC. 6. (a) The health officer of the District of Columbia shall designate or request the Chief of the Bureau of Animal Industry to designate an appraiser, who shall appraise each animal within five days prior to the date of slaughter, basing the amount upon the class and market value of the animal at the time of the appraisal, whether for breeding purposes or for meat or milk production.

Animals reacting to the tuberculin test but not exhibiting any physical evidence of tuberculosis shall be appraised without considering the presence of a diseased condition, but animals exhibiting any physical evidence of tuberculosis shall be appraised as diseased animals. The amount of appraisal shall not in any case exceed the sum of seventy-five dollars for a purebred and registered animal, or the sum of fifty dollars for a grade or nonregistered animal. If the amount of appraisal of any animal, as determined by the appraiser designated, is not satisfactory to the owner or owners of such animal, a written notice of such fact, setting forth the reasons for complaint, shall be forwarded upon the day of appraisal to the health officer of the District of Columbia. The amount of the appraisal shall then be determined by arbitrators, one to be appointed by the health officer of the District of Columbia or the Chief of the Bureau of Animal Industry and one by the owner or owners of the animal or animals. If the said arbitrators are not able to agree as to the amount of appraisal, a third arbitrator shall be appointed by them, whose decision shall be final. Arbitrators shall be paid at a rate of compensation not to exceed five dollars per diem and necessary expenses. Compensation for the arbitrator appointed by the owner, and the third arbitrator, if appointed, shall be paid from the fund of the United States Department of Agriculture if the decision made is against the arbitrator appointed by the health officer or the Chief of the Bureau of Animal Industry, but if the decision is in favor of such arbitrator the owner shall pay the compensation of the arbitrator appointed by him, and the third arbitrator, if appointed.

(b) Following the appraisal of animals, in accordance with paragraph (a) of this section, the amount of reimbursement shall be determined by the results of post-mortem inspection according to the following rules:

*Rule 1.* If any animal is found, upon post-mortem inspection, not to be affected with tuberculosis, the carcass and other edible portions shall be passed for food, and the owner shall sell the same, including all accompanying parts, for a reasonable price, which price shall be deducted from the amount of appraisal, and the balance, if any, thus remaining, shall be paid from any fund available for that purpose.

*Rule 2.* If any animal is found, upon post-mortem inspection, to be affected with tuberculosis, and the lesions are such that the carcass and parts of the carcass are passed for food, the owner shall sell the same, including all accompanying parts, for a reasonable price, which price shall be deducted from eighty per centum of the amount of the appraisal, and the balance, if any, thus remaining shall be paid from any fund available for that purpose.

*Rule 3.* If any animal, upon post-mortem inspection, is condemned for offal, the owner shall sell the hide for a reasonable price, which price shall be deducted from forty per centum of the amount of the appraisal, and the balance, if any, thus remaining shall be paid from any fund available for that purpose.

Sec. 7. Any premises upon which there have been kept animals affected with tuberculosis shall be disinfected promptly after the removal of such animals, and in a manner satisfactory to the Chief of the Bureau of Animal Industry or the health officer of the District of Columbia, said disinfection to be at the expense of the owner or owners of the premises or of the owner of the animals.

Sec. 8. Any owner, shipper, or common carrier bringing any cattle into the District of Columbia in violation of these regulations will be liable to prosecution, and the cattle shall be immediately removed, at the owner's expense, from the District of Columbia. Such cattle, however, may remain in the District of Columbia if inspected and tuberculin tested under the following conditions: The owner or owners shall first sign an agreement providing for the inspection and tuberculin test by a veterinary inspector of the Bureau of Animal Industry or of the health department of the District of Columbia, and if any one or more of the said animals should then be deemed tuberculous, that he or they will cause such animals to be slaughtered in accordance with the specifications of section five of these regulations; and further, that no claim for reimbursement for any loss which might be thus sustained will ever be made against the United States Department of Agriculture, or any other branch of the United States Government, or the District of Columbia, or any officer or department thereof.

Sec. 9. Any person violating any of these regulations, or entering cattle by fraudulent means, or using false or fraudulent tags, or interfering in any way with the work of any official, or using any false or fraudulent means to enable any cattle to pass the tuberculin test, shall be punished by a fine of not more than forty dollars nor less than five dollars.

The foregoing regulations shall go into effect upon their approval by the Secretary of Agriculture.

HENRY B. F. MACFARLAND,  
HENRY L. WEST,  
WILLIAM V. JUDSON,

*Commissioners of the District of Columbia.*

Approved, November 27, 1909.

JAMES WILSON,  
*Secretary of Agriculture.*

NOTE.—The States of Maryland and Virginia require tuberculin test for dairy and neat cattle entering from other States.

UNITED STATES DEPARTMENT OF AGRICULTURE,

BUREAU OF ANIMAL INDUSTRY.

AMENDMENT TO ORDER OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA FOR THE SUPPRESSION AND PREVENTION OF TUBERCULOSIS IN CATTLE.

EXECUTIVE OFFICE,  
COMMISSIONERS OF THE DISTRICT OF COLUMBIA,  
*Washington, March 5, 1910.*

*Ordered,* That paragraph (c) of section 3 of the order of the Commissioners of the District of Columbia of November 26, 1909, for the suppression and prevention of the spread of bovine tuberculosis within the District of Columbia and to adjoining States, is hereby amended to read as follows:

“(c) Cattle for immediate slaughter may enter the District of Columbia if tagged in accordance with paragraph (a) and without the tuberculin test, on condition that the tag therein provided for shall remain attached to the hide until removed in the presence of an employee of the Bureau of Animal Industry or of the health department of the District of Columbia, to either of whom it shall be delivered. The owner of the animal at the time of slaughter is hereby required to notify the Chief of the Bureau of Animal Industry or the health officer of the District of Columbia, stating the place where the hides will be found, except that cattle under six months old, castrated cattle, and cattle shipped in cars consigned direct to an establishment having United States meat inspection, may enter the District of Columbia for immediate slaughter without complying with section 2 and section 3, paragraph (a): *Provided, however,* That the consignee at any official establishment shall keep a complete record of each animal received, date of receipt, its place of origin, railroads traversed, name of shipper, and butcher class to which each animal belongs, and shall report the same before the slaughter of any such animals to the Chief of the Bureau of Animal Industry through the veterinary inspector stationed at that establishment.”

The foregoing amendment shall go into effect upon its approval by the Secretary of Agriculture.

Approved.

CUNO H. RUDOLPH,  
JOHN A. JOHNSTON,  
W. V. JUDSON,

*Commissioners of the District of Columbia.*

Approved March 8, 1910.

JAMES WILSON,  
*Secretary of Agriculture.*

APPENDIX AC.

REPORT OF THE INTERNATIONAL COMMISSION ON THE CONTROL OF BOVINE TUBERCULOSIS.

MEMBERS.

Senator W. C. Edwards, Ottawa, Canada, member of the Canadian Parliament and one of the most extensive live-stock breeders in the Dominion.

J. J. Ferguson, Chicago, Ill., chief of the animal husbandry work of Swift & Co.

J. W. Flavelle, Toronto, Canada, head of one of the large packing companies of Canada.

W. D. Hoard, Fort Atkinson, Wis., editor Hoard's Dairyman, and former governor of Wisconsin.

Dr. C. A. Hodgetts, Toronto, Canada, health officer of the Province of Ontario.

Dr. J. N. Hurty, Indianapolis, Ind., secretary of the Indiana State Board of Health.

Dr. J. R. Mohler, Washington, D. C., Chief of the Pathological Division of the Bureau of Animal Industry of the Department of Agriculture.

Dr. V. A. Moore, Ithaca, N. Y., professor of pathology of Cornell University.

Dr. M. P. Ravenel, Madison, Wis., professor of bacteriology, University of Wisconsin.

Dr. M. H. Reynolds, St. Paul, Minn., professor of veterinary science, University of Minnesota.

Dr. E. C. Schroeder, Washington, D. C., superintendent of the Bethesda (Md.) Experiment Station of the Department of Agriculture.

T. W. Tomlinson, Denver, Colo., secretary of the American National Live Stock Association.

Dr. F. Torrance, Winnipeg, Canada, professor of veterinary science, University of Manitoba.

Dr. J. G. Rutherford, Ottawa, Canada, veterinary director general of Canada.

First meeting, Buffalo, N. Y., December 13 and 14, 1909; second meeting, Detroit, Mich., March 1 and 2, 1910; third meeting, Ottawa, Canada, May 19, 20, and 21, 1910; fourth meeting, Madison, Wis., June 27 and 28, 1910.

By the American Veterinary Medical Association, in annual meeting assembled, at Chicago, Ill., in the month of September, in the year 1909, the following gentlemen were constituted an international commission to study the methods of the control of bovine tuberculosis and to submit a report to the association on the occasion of its next annual meeting: J. G. Rutherford, Leonard Pearson, V. A. Moore, Hon. W. D. Hoard, Frederick Torrance, E. C. Schroeder, M. H. Reynolds, Hon. W. C. Edwards, C. A. Hodgetts, M. D., J. R. Mohler, Louis F. Swift, and J. W. Flavelle.

The commission met in Buffalo, N. Y., on the 15th day of December, 1909, and elected as chairman Dr. J. G. Rutherford, of Ottawa, Canada, and as secretary Dr. M. H. Reynolds, of St. Paul, Minn.

Owing to the death of Dr. Leonard Pearson and the inability to act of Mr. Louis F. Swift, the president appointed in the stead of these gentlemen, respectively, Dr. M. P. Ravenel, of Madison, Wis., and Mr. T. W. Tomlinson, of Denver, Colo. Later, at the request of the commission, the president appointed Mr. J. J. Ferguson, of Chicago, Ill., as representative of the United States packing industry, and Dr. J. N. Hurty, of Indianapolis, Ind., as representative of the medical health officers of the United States.

#### *The President of the American Veterinary Medical Association:*

Owing to the great economic and sanitary significance of animal tuberculosis to the live-stock industry of America and the many and varied factors which must of necessity be accounted with in formulating successful measures for its eradication, the American Veterinary Medical Association, at its meeting in Chicago in September, 1909, appointed the international commission on the control of bovine tuberculosis. The commission was instructed to study the problem of tuberculosis among cattle and to report at the next meeting of the association upon reasonable and economically practicable methods or systems to be recommended to both officials and live-stock owners for eradicating this great scourge of domesticated animals.

It is recognized that tuberculosis is widely prevalent among cattle and other animals, and that the frequency with which this great evil occurs is increasing rather than declining. As tuberculosis is one of the strictly preventable infections, there is good ground for the belief that through the formulation and enforcement of proper regulations the disease may eventually be entirely suppressed.

The commission has held four meetings, as follows: Buffalo, N. Y., December 13 and 14, 1909; Detroit, Mich., March 1 and 2, 1910; Ottawa, Canada, May 19, 20, and 21, 1910; Madison, Wis., June 27 and 28, 1910, all of which were well attended, very few of the members having on any occasion been absent. The commission begs to present as a result of its labors the following report, which,

although brief, will, on examination, be found to comprise the principal points essential to the promulgation of a comprehensive and practical policy, such as may reasonably be adopted by any governmental body interested in the control of bovine tuberculosis.

It is quite unnecessary, in view of the extensive knowledge already possessed by all who are familiar with the efforts which have hitherto been made to secure control of bovine tuberculosis, to dwell at any length upon the importance of the subject or upon the conditions which led to the formation of the commission.

In view of the personnel of the commission as selected by the American Veterinary Medical Association, and of the fact that so much information on the subject has been made available through the work of similar bodies in other countries and the researches of scientific and practical men in America and elsewhere, the commission has not deemed it necessary to take any evidence either from expert witnesses or others.

The members fully understood that the purpose which their appointment was intended to serve was less the acquisition of new knowledge regarding bovine tuberculosis than the careful study of the knowledge already available and of the thoughts and opinions of those most entitled to speak with authority on the subject.

The conclusions reached in this report are therefore simply the outcome of an earnest and thoughtful consideration of the various modern aspects and phases of the problem, with the object of crystallizing public opinion and so clearing the way for legislative action.

They realized also that they could deal with fundamental principles only and that the details of any policy which they might outline must in each case be worked out by the duly authorized and responsible representatives of the community immediately concerned.

They nevertheless deemed it essential to study closely the history of the various efforts hitherto made by such countries throughout the world as have attempted to legislate on the subject.

This naturally led to the gradual elimination of all methods other than such as might reasonably be adopted by any community desiring in full light of present-day knowledge to undertake the control of bovine tuberculosis.

It was felt, in view of the prevalence of the disease, especially in some localities and among certain classes of cattle, the difficulty of providing a sufficient number of trained officials and the large economic questions involved, to say nothing of the enormous expenditure, that it would be unwise, for the present at least, to seriously discuss a policy of universal compulsory testing and slaughter.

Such a policy might perhaps be adopted with advantage by a small community or one in which the disease existed to a very limited extent, but, speaking generally, especially in view of past experiences in this line, it was thought better to omit it entirely from the recommendations of the commission.

All other methods of dealing with bovine tuberculosis which have been recommended or tried in various communities were thoroughly discussed, with the object of discarding weak points and adopting such features as might be deemed worthy of a place in the official findings of the commission.

Every phase of the subject was in this way fully and freely considered, it being thought best to cover the whole ground as completely as possible before coming to a definite decision on any one point.

In order to still further minimize the risk of omitting from the deliberations of the commission any phase of the question four committees were appointed at the first meeting to deal, respectively, with:

- (1) Education and legislation.
- (2) Location of tuberculosis.
- (3) Dissemination.
- (4) Disposition of tuberculous animals.

The appointment of these committees proved to be of the greatest possible value in concentrating the energies of the various members on those branches of the subject with which they were most familiar, and their reports presented at subsequent meetings enabled the commission to reach satisfactory conclusions much more rapidly than would otherwise have been the case.

As a means of furnishing information as to the reasons for these conclusions and the manner in which they were reached, the commission would recommend that the reports of the committees should be published as an appendix to this report.

The commission recognizing after careful study that the tuberculin test is the fundamental factor in any policy having for its object the control of

bovine tuberculosis, decided that a pronouncement to that effect should properly occupy a foremost place.

Based on the information contained in the reports of its committees and on such other information as was brought out in the general discussions of the commission, the following resolutions were adopted for presentation to the American Veterinary Medical Association.

RESOLUTION 1.—*Dissemination.*

As a general policy to be observed all contact between tuberculous and healthy cattle and between healthy cattle and stables, cars, etc., which may contain living tubercle bacilli should be prevented. To accomplish this, the following specific recommendations are made:

1. There should be no sale or exchange of animals affected with tuberculosis except for immediate slaughter or for breeding purposes under official supervision.

2. That the managements of live-stock shows should give preference to cattle known to be free from tuberculosis, either by providing special classes for such cattle or in some other practical way, and should also take every precaution to prevent contact between such animals and those not known to be free from disease.

3. All live-stock shippers should take every precaution to see that cars furnished are thoroughly cleansed and disinfected before use.

RESOLUTION 2.—*Tuberculin test.*

1. That tuberculin, properly used, is an accurate and reliable diagnostic agent for the detection of active tuberculosis.

2. That tuberculin may not produce a reaction under the following conditions:

(a) When the disease is in a period of incubation.

(b) When the progress of the disease is arrested.

(c) When the disease is extensively generalized.

The last condition is relatively rare and may usually be detected by physical examination.

3. On account of the period of incubation and the fact that arrested cases may sooner or later become active, all exposed animals should be retested at intervals of six months to one year.

4. That the tuberculin test should not be applied to any animal having a temperature higher than normal.

5. That any animal having given one distinct reaction to tuberculin should thereafter be regarded as tuberculous.

6. That the subcutaneous injection of tuberculin is the only method of using tuberculin for the detection of tuberculosis in cattle which can be recommended at the present time.

7. That tuberculin has no injurious effect on healthy cattle.

RESOLUTION 3.—*Evidence from tuberculin test.*

That a positive reaction to tuberculin in any properly conducted test, official or otherwise, in any animal in any herd shall be considered evidence sufficient upon which to declare the herd to be infected.

RESOLUTION 4.—*Compulsory notification.*

That this commission recommends the passage of legislation providing for the compulsory notification by owners and by veterinarians of the existence of tuberculosis in a herd, whether such existence be made known by detection of clinical cases or by the tuberculin test.

RESOLUTION 5.—*Location through slaughter.*

This commission recognizes that the discovery of tuberculosis in animals slaughtered for food purposes furnishes one of the best possible means of locating the disease on the farm, and therefore recommends the adoption of some system of marking, for purposes of identification, all cattle 3 years old and over shipped for slaughter.

As tuberculosis of hogs is almost invariably due to bovine infection, this recommendation should also be made to apply to hogs of any age shipped for slaughter.

It is further recommended that the discovery of tuberculosis in animals coming under Government inspection should be used whenever identification is possible as a means of locating infected herds and premises. All such cases should be reported to the proper authorities for control action.

*RESOLUTION 6.—Disposition of tuberculous animals—The commission plan.*

1. As a general policy in the eradication of tuberculosis the separation of healthy and diseased animals and the construction of a healthy herd are recommended.

In order to accomplish this the following recommendations are made:

(1) If the herd is found to be extensively infected, as shown by the tuberculin test or clinical examination, even the apparently healthy animals in it should be regarded with suspicion until they have been separated from the reacting animals for at least three months.

If, after the expiration of this time, they do not react to the tuberculin test, they may be considered healthy and dealt with accordingly.

It is recommended that a herd extensively infected should not be treated by the method of general separation, but that the construction of a new herd from the offspring only is advisable.

(2) If the herd is found, by either or both of the above methods, to contain a relatively small proportion of diseased animals separation of the diseased animals from the healthy animals and the construction of a sound herd from the healthy animals, and the offspring of both, is advocated.

As a working basis in carrying out these principles, we advise:

(a) That herds containing 50 per cent or more of diseased animals be treated as coming under section 1.

(b) That herds containing under 15 per cent of diseased animals be treated as coming under section 2.

(c) That herds falling between these figures be graded according to the option of the owner.

(d) That it shall be the prerogative of the owner to reject either plan and have his herd dealt with by removal and slaughter of diseased animals, with or without compensation, according to the public policy in operation.

2. That when by any means the officials properly charged with the control of tuberculosis become aware of its existence in a herd to which a policy of slaughter and compensation can not reasonably be applied, such herd must be dealt with by the owner, under Government supervision, on the principle of the separation of all sound animals from those affected. Such separation must be effected by treating the whole herd as diseased, and rearing the calves separately, either on pasteurized milk or the milk of healthy cows, or, when the number of those affected is so small as to warrant such a course, by the application to the whole herd, from time to time, under official supervision, of the tuberculin test, and the entire segregation of all animals found to react.

In the event of any owner refusing or neglecting to adopt either of the above methods, his entire herd to be closely quarantined and sales therefrom to be entirely prohibited.

3. That a policy of compensation be recommended as useful and usually necessary as a temporary measure.

4. That, when slaughter is necessary, in order to avoid economic loss, every effort should be made to utilize as far as possible the meat of such animals as may be found fit for food, on being slaughtered under competent inspection.

5. The details of commission plan will be found fully set forth in the appendix to this report.

*RESOLUTION 7.—Prevention.*

1. That, with the object of preventing the spread of infection, persons buying cattle for breeding purposes or milk production should, except when such purchases are made from disease-free herds which have been tested by a properly qualified person, purchase only subject to the tuberculin test. In order to assist in the proper carrying out of this suggestion the commission recommends that official authorities should adopt such regulations as will prevent the entry to their respective territories of cattle for breeding purposes or milk production unless accompanied by satisfactory tuberculin-test charts.

2. That all milk and milk by-products used as food should be properly pasteurized unless derived from cows known to be free from tuberculosis.

RESOLUTION 8.—*Control of tuberculin test.*

That this commission recommends the passage of legislation which will prevent the sale, distribution, or use of tuberculin by any persons other than those acting with the full knowledge or under the direction of official authorities.

RESOLUTION 9.—*Education.*

As a clear knowledge of the cause and character of tuberculosis among animals, the modes of dissemination and its significance as an economic and as a public-health problem underlie an intelligent adherence to the principles that must be observed in all efforts for eradication, as well as the establishment of proper cooperation in the great work between physicians, veterinarians, livestock owners, legislators, and the public generally, it is recommended that a widespread campaign of education be undertaken. To accomplish this end it is recommended that first of all a simple pamphlet on bovine tuberculosis be written, in which the language used shall be of such character that every person of average intelligence shall be able to read it without being mystified by technical terms or phrases. This pamphlet should be published with the indorsement of the American Veterinary Medical Association and the special indorsement and consequent authority of the International Commission on Bovine Tuberculosis Control.

RESOLUTION 10.—*Publicity.*

In concluding its work the commission desires especially to appeal to the press—metropolitan, agricultural, and local—to join in the work of extending as much as possible among the people the conclusions here arrived at. The vital importance of the life of farm animals to the welfare of all classes of society needs no argument in its support. The aim and sole purpose which has actuated this commission has been to arrive at the soundest conclusions possible in the light of the best knowledge obtainable.

RESOLUTION 11.—*Legislation.*

It is recommended that legislation regarding the control and eradication of tuberculosis among domestic animals be made uniform; that the laws of the United States and Canada and other American countries for the admission into America of animals from without be made stringent and as much alike as possible; and that the laws governing the interstate and interprovincial movement of cattle and that between different American countries be harmonized.

The laws governing interstate and interprovincial movement of cattle should be of such character that every State and every Province will be free in its eradication work from unnecessary difficulties due to the existence of the disease in other States and Provinces.

Legislation is especially required to prevent the various frauds which interfere with the satisfactory use of tuberculin as a diagnostic agent for tuberculosis, as well as for official supervision over all tuberculin sold to be used by veterinarians and others.

RESOLUTION 12.—*Sanitation.*

In the eradication of tuberculosis it should be kept in mind that, in addition to protecting animals against exposure to tubercle bacilli, it is desirable to make them as resistant to infection as possible. This can be done by stabling them in clean, disinfected, and properly ventilated and lighted barns, giving them abundant clean water and nutritious food, a sufficient amount of daily exercise in the open air, and attending generally to those conditions which are well known to contribute to the health of animals.

The daily removal of manure from stables and water-tight floors and good drainage in stables are urgently recommended.

Young stock particularly should be raised as hardy as possible, and should be accustomed to liberal exercise and living in the open.

RESOLUTION 13.—*Immunization.*

That as none of the various methods for the immunization of animals against tuberculosis have passed sufficiently beyond the experimental stage the commission is unable to indorse any of these for practical use at the present time.

RESOLUTION 14.—*Animal tuberculosis and public health.*

While the members recognize that the subject with which this commission is primarily intended to deal is the control and eradication of tuberculosis among animals as an economic problem they can not feel satisfied without declaring their recognition of the fact that tuberculosis among animals is also an important public-health problem. Considered as such, the eradication of tuberculosis among animals should have the approval and support of all those persons who are interested in curtailing human suffering and prolonging human life.

RESOLUTION 15.—*General statement.*

The members of the commission wish it to be clearly understood that they recognize the limitations of a report necessarily based on actual and not on theoretical conditions. They fully realize that in the event of the policy of which their recommendations form the framework, being anywhere adopted even in its entirety, much greater benefit will be derived, at least for some time, from its educative than from its executive features.

The control, to say nothing of the eradication of bovine tuberculosis, is impossible of achievement, without the hearty cooperation of the men who are actually engaged in the cattle industry. In order to secure this cooperation it will doubtless be necessary in most communities to carry on an active and prolonged educational campaign.

It is apparent that in the dissemination of practical and reliable information regarding the disease it will be possible to employ a very large variety of methods. Many of these methods, such as bulletins, lectures, and actual demonstrations of disease, having already been found valuable will doubtless continue to be largely used.

It must not be forgotten, however, that in this, as in any other educative process, a measure of disciplinary control is essential to success.

Needless to say such control can be secured only by the passage of legislation which, while clear and comprehensive, must at the same time be sufficiently conservative to avoid exciting alarm or arousing antagonism on the part of owners especially of valuable herds.

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.

Provided, therefore, that these qualities, combined with integrity, thoroughness, and determination, are available for administrative purposes the members of the commission are convinced that the enforcement of a law based on their recommendations will prove to be by far the most powerful and effective educational agency which could possibly be employed.

In concluding its report the commission would suggest that the association should make such provision as may be necessary to carry on the work, either by continuing the commission as at present constituted or with such changes in the personnel as may be considered desirable.

W. C. EDWARDS.

J. J. FERGUSON.

J. W. FLAVELLE.

W. D. HOARD.

C. A. HODGETTS.

J. N. HURTY.

J. R. MOHLER.

V. A. MOORE.

M. P. RAVENEL.

E. C. SCHROEDER.

T. W. TOMLINSON.

F. TORRANCE.

J. G. RUTHERFORD, *Chairman.*M. H. REYNOLDS, *Secretary.*

## APPENDIX AD.

## RESOLUTIONS ON PASTEURIZATION OF MILK ADOPTED BY THE NATIONAL ASSOCIATION FOR THE STUDY AND PREVENTION OF TUBERCULOSIS, AT ANNUAL MEETING HELD MAY 2 AND 3, 1910.

1. *Resolved*, That a thorough, efficient, and continuous official supervision of dairies and herds and of the milk from the dairy to the consumer is of the first importance in securing a clean and pure milk supply, which is essential to public health.

2. *Resolved*, That the production and handling of milk under such satisfactory sanitary conditions as to insure its complete reliability (i. e., the production of what is known as certified milk) at the present time unfortunately increases its cost to such an extent as to make the use of such milk for general consumption impracticable.

3. *Resolved*, That the efficient pasteurization of the general milk supply (excepting certified milk) when supplementing dairy inspection and applied to milk from inspected dairies and done under official supervision is desirable for the destruction of the ordinary micro organisms of fermentation and putrefaction and as an additional protection against possible infection by typhoid fever, scarlet fever, diphtheria, tuberculosis, and possibly some other specific infectious disease.

4. *Resolved*, That pasteurization of milk for sale should not be permitted except under official supervision and on conditions definitely prescribed by competent sanitary authorities; and should not be permitted as a method for the preservation of old or dirty milk.

5. *Resolved*, That milk intended for infant feeding should be considered apart from that intended for general consumption; and should be certified milk when obtainable.

6. *Resolved*, That in the opinion of this association it has been proven, apparently, that a small percentage of the cases of nonpulmonary human tuberculosis, especially tuberculosis of the lymph nodes in children under 5 years of age, is due to infection by tubercle bacilli of bovine origin.

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## APPENDIX AE.

### RESOLUTIONS ADOPTED BY BOARD OF DIRECTORS, ASSOCIATION FOR PREVENTION OF TUBERCULOSIS, DISTRICT OF COLUMBIA, DECEMBER 27, 1910.

At a meeting of the board of directors of the Association for the Prevention of Tuberculosis, held December 27, 1910, the following resolutions, presented by Dr. George M. Kober and seconded by Mr. Emile Berliner and Dr. G. Lloyd Magruder, were unanimously adopted.

Whereas it has been shown by indisputable evidence that numerous epidemics of typhoid fever, scarlet fever, diphtheria, and various throat diseases have been traced to contaminated dairy products, also that a considerable proportion of the cases of tuberculosis occurring in children under 5 years of age is the result of infection with the bovine tubercle bacillus, and that the mortality among infants fed upon cow's milk is very high: Therefore be it

*Resolved*, That the United States Congress be requested to investigate the relation of dairy products to the public health with a view of enacting remedial legislation; be it also

*Resolved*, That in the opinion of this association the tax of 10 per cent upon oleomargarine is an unjust discrimination against a wholesome article of food.

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## APPENDIX AF.

### LIST OF STATES AND TERRITORIES REQUIRING THE TUBERCULIN TESTING OF DAIRY AND BREEDING CATTLE AS A QUALIFICATION FOR ENTRANCE.

Arkansas: State live-stock laws issued in 1910.

Alabama: Regulations live-stock sanitary board, act of 1909.

Arizona: Regulations, based on act approved March 16, 1905.

Colorado (except exhibition): Proclamation of August 15, 1909.

Delaware: Act of May 1, 1909.

District of Columbia: Order of commissioners of November 27, 1909.

Hawaii: Act of December 31, 1909.

Idaho: Proclamation of January 2, 1910.

Indiana: May be made in discretion of State veterinarian, act of 1909.

Iowa (registered dairy and breeding cattle): Act approved August, 1907.

Kansas: Act of 1909.  
 Kentucky: Governor's proclamation, 1909.  
 Maine (pure bred and grade dairy cattle).  
 Maryland: Act of 1908.  
 Massachusetts: Act of 1903.  
 Michigan: Act of 1909.  
 Minnesota (except exhibition): Act of 1907.  
 Mississippi: Acts of 1908 and 1910.  
 Missouri (except exhibition): Proclamation of governor, 1910, on act of 1899.  
 Montana (except exhibition): Regulations of sanitary board, January 1, 1907.  
 Nebraska: Regulations of August, 1909.  
 New Hampshire (except grazing): Board of cattle commissioners.  
 New Jersey: Act of 1899.  
 New Mexico (and again after three months): Act of 1909.  
 New York: Act of 1908.  
 North Carolina: Regulations issued December 1, 1909.  
 North Dakota: Proclamation December 2, 1908, on act of 1907.  
 Oklahoma: Proclamation, 1909.  
 Oregon: Act of 1909.  
 Pennsylvania: Act of 1898.  
 South Carolina (except exhibition): Act of 1908.  
 South Dakota: Act of 1909.  
 Tennessee: Act of 1909.  
 Utah: Act March, 1909.  
 Vermont: (?) When deemed necessary.  
 Virginia: Proclamation of governor of May, 1909.  
 Washington (except exhibition).  
 Wisconsin (except exhibition): Act of 1909.  
 Wyoming: Proclamation, April, 1909, in force to April, 1910.  
 Louisiana: Regulation live-stock sanitary board, July 20, 1910, act of 1908.  
 Texas: Proclamation of governor, effective April 1, 1910.  
 Total, 41.

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## APPENDIX AG.

### LIST OF STATES PROVIDING INDEMNITY FOR CATTLE REACTING UNDER TUBERCULIN TEST.

Connecticut: Animals ordered slaughtered are appraised and full value of appraisal is paid.  
 District of Columbia: Appraisal and slaughter.  
 Florida: State health officer may require slaughter, in which case payment may be made not to exceed \$50.  
 Indiana: Reimbursement not to exceed the sum of \$25.  
 Kansas: Appraisal and slaughter.  
 Maine: Appraised not to exceed \$50 for grade stock or \$100 for pure-bred cattle. Reimbursement at rate of 50 per cent.  
 Massachusetts: Appraised at a sum not to exceed \$40.  
 Michigan: Appraisal is made by the commission and the owners receive 50 per cent of the value of the animals, not exceeding \$50.  
 Minnesota: Appraisal not to exceed \$35 per head, except in case of pure-bred animals, when the maximum shall not exceed \$75.  
 Montana: Provisions are made for the appraising and for the reimbursement of animals which are slaughtered under the direction of the State veterinarian.  
 Nebraska: Sold, subject to post-mortem inspection, only to such establishments where Federal inspection is maintained.  
 New Hampshire: One-half of appraised value.  
 New Jersey: Payment three-fourths of appraised value, which is not to exceed \$40 in grade and \$100 in registered cattle.  
 New Mexico: Animals slaughtered on account of communicable diseases are subject to appraisal not exceeding \$100 for pedigreed stock and \$60 for an animal not pedigreed, and reimbursement is made.

New York: Maximum appraisal \$75. Reimbursement based upon extent of lesions found—80 per cent of appraised value if lesions permit passing for food; 50 per cent if generalized tuberculosis.

Pennsylvania: Maximum limit of appraisal for a bovine of common stock, \$40; for a pure-bred or registered bovine, \$70. Amount of appraisement not to exceed two-thirds actual value.

Rhode Island: If in the State three months, appraised not to exceed \$50 for native cattle, \$75 for grade, and \$100 for registered cattle. Payment is made at rate of one-half appraised value, except in case of errors in diagnosis, when the full appraised value is paid.

South Carolina: If owned and kept within the State for one year preceding their slaughter, value of carcass deducted from actual cash value of animal (living) and three-fourths of remainder is paid by State, not to exceed \$35.

Tennessee: State live-stock inspector is authorized to require the slaughter of all animals affected with communicable disease, reimbursement to be made by the county.

Vermont: Appraised not to exceed \$50, and reimbursement made upon 75 per cent of the appraisal. No compensation when reacting animals retained for breeding purposes are slaughtered. Milch cows shipped from Vermont into the State of Massachusetts and which react to the tuberculin test in the latter State are paid for by Vermont.

Wisconsin: Appraised not to exceed \$50 and payment upon two-thirds of value.

Virginia: Appropriation exhausted.

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## APPENDIX AH.

### LIST OF STATES PROVIDING FOR THE TUBERCULIN TESTING OF CATTLE WITHIN THE STATE.

Connecticut: The tuberculin test is not required in any case except upon recommendation of the commissioner.

District of Columbia: Order of commissioners.

Illinois: Upon agreement.

Kansas: Suspicious cases may be tuberculin tested.

Maine: All pure-bred cattle which are sold within the State must be tuberculin tested before being delivered to the purchaser.

Massachusetts: Upon consent of owner.

Minnesota: Sale of pure-bred cattle prohibited unless accompanied by a certificate of health, including a satisfactory tuberculin-test chart.

Missouri: Test is granted free to owners of permanent herds of cattle.

Montana: If tuberculosis is found to exist in a herd of cattle, an official tuberculin test may be applied to the entire herd.

Nebraska: All cattle bought at public market or stock yards in the State of Nebraska to be used for dairy purposes or breeding cattle eligible to registry in the State of Nebraska must be held in quarantine and pass a satisfactory tuberculin test before being permitted to be removed.

New Hampshire: Upon agreement.

New Mexico: All cattle connected with the milk supply of incorporated towns or cities shall be tuberculin tested.

New York: Upon agreement.

Ohio: Upon agreement.

Oregon: Annual test to be applied to all cows supplying milk, cream, skim milk, or buttermilk to inmates of all State institutions.

Pennsylvania: Tests applied subject to signed agreement.

Utah: Annual test of every cow used in the dairy business within the State of Utah.

Vermont: Only when it is deemed necessary.

Virginia: Upon agreement.

West Virginia: A consulting veterinarian shall examine and, if he deem it necessary, shall apply the tuberculin test once yearly to all pure-bred herds consisting of 20 or more cattle within the State which are kept for the purpose of producing animals for breeding purposes and to be sold to the public as such.

Wisconsin: Unlawful to sell or otherwise transfer any bull, cow, or heifer of the bovine family, over 6 months old, for other than temporary feeding purposes, or to be exported from the State or slaughtered, unless tuberculin tested within two years.

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## APPENDIX AI.

COMMUNICATION FROM GEN. GEORGE M. STERNBERG, DATED OCTOBER 9, 1907, CONCERNING PRACTICABILITY OF SHIPPING MILK IN CANS AT LOW TEMPERATURE.

OCTOBER 9, 1907.

MY DEAR DR. MAGRUDER: While at the Jamestown Exposition as a member of the jury of awards I was especially interested in the model dairy exhibited by the Virginia Polytechnic Institute (Blacksburg, Va.), under the direction of Prof. William Saunders. The milk used within the exposition grounds is all supplied by this dairy and all shipped from Blacksburg, which, I understand, is about 300 miles distant. This milk is pasteurized and refrigerated before being shipped, and is shipped in tin cans having a felt jacket. It is quite cold when it arrives, and, indeed, has ice in it from the refrigeration practiced before shipping. I was glad to know that it is quite practicable to ship milk a long distance without the use of refrigerator cars, maintaining it at so low a temperature that bacteria will not develop in it. I have no doubt you can obtain full information with reference to this matter by writing to Prof. Saunders, or, better still, by paying a visit to his model dairy at the exposition.

Very sincerely, yours,

GEO. M. STERNBERG.

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## APPENDIX AJ.

COMMUNICATION FROM CHIEF OF UNITED STATES WEATHER BUREAU, DATED DECEMBER 29, 1906, CONCERNING THE FORMATION OF NATURAL ICE DURING WINTER SEASONS IN VICINITY OF WASHINGTON, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE,  
CENTRAL OFFICE OF THE WEATHER BUREAU,  
*Washington, D. C., December 29, 1906.*

Dr. GEORGE L. MAGRUDER,  
*No. 4 Jackson Place NW., Washington, D. C.*

DEAR SIR: In regard to the formation of natural ice in this vicinity during the winter season I beg to say that on examining the records of daily minimum temperatures in this city for the last 30 years I find but one winter, viz, that of 1889-90, during which ice could not have been gathered from ponds in this vicinity. The winter of 1889-90 was by far the warmest that has been experienced in the last 50 years. The mean daily temperature for the month of January, 1890, was nearly 4° above freezing; for February, 3° above, and for December, 1889, it was 4° above. In ordinary winters there is no reason why a fair crop of ice from 4 to 8 inches in thickness can not be harvested. The tendency among farmers and others who gather their own ice is to wait until the ice attains a thickness of about 8 inches, and thus sometimes fail to gather a crop, since in warm open winters ice rarely forms a greater thickness than 3 to 4 inches. Last winter, it may be remembered, was mild and open, and there was some fear expressed of a failure in the ice crop. Notwithstanding the open season, ice formed to a thickness of 3 to 4 inches in this vicinity, and a fair crop was harvested. In order to insure a crop each year, it is imperative that an artificial pond be created if no natural one is in existence, since failure will occasionally be met if dependence for an ice supply be wholly placed upon running streams.

Very truly, yours,

WILLIS L. MOORE,  
*Chief United States Weather Bureau.*

## APPENDIX AK.

REPORT BY UNITED STATES CONSUL T. H. NORTON OF ADDRESS BY PROF. HEMPEL ON TREATMENT OF MILK BEFORE GERMAN ASSOCIATION OF SCIENTISTS AND PHYSICIANS.

## GERMAN MILK HANDLING.

## SCIENTIFIC DISCUSSION OF HOW PURER PRODUCT MAY BE ATTAINED.

Consul T. H. Norton, reporting from Chemnitz, says that the most important address on the protection of health at the seventy-ninth annual meeting of the German Association of Scientists and Physicians, held at Dresden in September, was that on the "Treatment of milk" by Prof. Hempel. A part of the consul's summary follows:

The importance of the question in Germany is evident, for the latest statistical data show that the Empire produces annually 5,020,000,000 gallons of cow's milk, valued at \$405,000,000, and 15,850,000 gallons of goat's milk. Comparison may aptly be made with Germany's annual production of pig iron, valued at \$232,500,000, or her annual coal output, valued at \$404,600,000.

It is a serious question, in view of the brilliant successes in the field of serum-therapy, whether we should not abandon entirely the current methods of treating milk by heating, so as to destroy possible germ growth, in favor of a process based upon the introduction of protective bacterial agencies, capable of neutralizing or nullifying the action of disease germs, if present.

It is, however, beyond all dispute that milk from healthy animals, collected under conditions of scrupulous cleanliness, is a better and safer food than milk which has been heated to the point at which germ life is destroyed.

## IMPROVEMENT IN TRANSPORTATION.

Intimately connected with the attainment of the hygienic dairy ideal is the problem of the transportation of milk. The larger the size of a city, the longer must be the average haul of its milk supplies, the greater the possibilities of deterioration. Furthermore, in most German cities admirably constructed dairy stables, with every possible adjunct for cleanliness and ventilation, have been erected at great expense. Their original value and their maintenance, with the higher urban charges for labor, fodder, bedding, etc., all involve a very marked addition to the normal cost of milk produced in the country districts, and constitute a tax, levied for the purpose of delivering fresh milk with the least loss of time, to the consumer.

A change to more healthful and economic methods involves the distinct organization of milk traffic on the German railways on such a basis that well-cooled milk shall be transported in refrigerator cars attached to express trains. It likewise presupposes the proper agencies for the distribution, under similar temperature conditions, of such milk to consumers after reaching a city. Neither of these conditions exists as yet in Germany. The excellent arrangements for insuring cleanliness in urban dairies have not yet been supplemented by provision for preserving milk at a low temperature until it passes into the consumer's possession, often a half day, and even an entire day, after leaving the cow.

Dr. Hempel concludes that the only satisfactory solution of the milk problem in Germany is to be reached by governmental requirements and inspection at each stage along the following lines:

## FUNDAMENTAL RULES.

"First. Dairy cows must be absolutely free from tuberculosis and be subject to frequent examination and tests by competent inspectors.

"Second. They must pass the day, when the weather permits, in the open air and in pastures.

"Third. They must have an abundance of good fodder, be under good care, and be cleaned each day.

"Fourth. Milking should take place in a special milking room, kept scrupulously clean. A milker careless about personal cleanliness would respond to the stimulus of such an environment.

"Fifth. Udders should be carefully and thoroughly washed with pure water immediately before milking and dried with clean towels.

"Sixth. Milk, as soon as collected from a cow, should be rapidly cooled to a point but little above that of freezing water. In summer ice or refrigerating apparatus must be used. In winter running cold water, in pipes or the like, can be employed for the purpose.

"Seventh. Milk must be kept at this low temperature during transportation and until delivered to consumers, who then become responsible for the continuance of the conditions described until the liquid is required as an article of food."

The address closed with a forcible plea for the installation on all railways of refrigerator cars, first, to meet the needs of the milk traffic, and, second, to facilitate the transportation of fresh meats, fish, fruits, flowers, etc. In connection with this brief summary of Dr. Hempel's strong presentation of the present status of the milk problem in Germany a few comments may be made.

#### PROBLEMS TO BE SOLVED.

The question of the satisfactory transportation of milk by rail for long distances has been fairly well solved in the United States, wherever milk cars, constructed after the model of those used by the well-known Walker-Gordon Co., have been introduced. Greater distances have necessarily stimulated American ingenuity to a more prompt solution of existing problems in all the phases of transportation than has been the case in Europe.

From a personal examination of urban dairy management in Germany I am convinced that but little remains to be done there in the matter of cleanliness, although probably the Danish practice in this respect could serve even still better as a model. It is undeniable, however, that much missionary work must be done in the United States to bring about adequate recognition on the part of the public and its representatives of the tremendous importance of carrying out fully the new fundamental rules so clearly and succinctly enunciated by the famous German chemist.

Legislative action in the United States can probably not go beyond prescribing regulations for the manner in which milk shall be collected, transported, and delivered. There still remains a serious question as to the conditions under which milk is kept before being used in households too poor to buy ice or too ignorant to use it intelligently. Especially is it important in cities and during the heated term. Philanthropic effort has endeavored to lessen dangers in this connection by furnishing sterilized milk at cost price. It is now generally recognized that other and more serious dangers may be incurred in resorting to sterilization by heat.

#### ADVANTAGES OF FROZEN MILK.

Can not Dr. Hempel's thesis be carried a step further? Why not transport and deliver milk in the frozen condition? Exhaustive experiments have shown conclusively that pure milk, when frozen, preserves its original properties unchanged for weeks. Frozen specimens kept for over a month in a refrigerating room showed on thawing absolutely no alteration in taste, while the fact of a considerable diminution in the number of bacteria present was clearly established. Important also is the circumstance that while frozen the cream remains evenly diffused throughout the solidified mass, which is not the case when milk is kept at a low temperature in the liquid state. To attain such results it is essential that pure, fresh milk, as soon as collected from an animal, should rapidly be cooled to the freezing point. Dirty and contaminated milk, as well as milk in which the lactic fermentation has begun, after being frozen curdles upon melting.

To effectively meet the prevalent conditions in the tenement districts of cities or the needs of infants when carried on journeys, or even the requirements of a ship's commissariat, fresh milk could be frozen in the proper containers by submerging them in brine chilled far below the melting point of ice. When the milk has not only been frozen, but cooled still further to the temperature of the surrounding liquid, the flasks or other containers can be removed, inclosed in felt protectors, and conveyed to the consumers. Frozen milk prepared under such conditions will remain in the solid form for a day or more before the temperature of the entire mass can rise to the melting point. An analogous state is that of ice harvested and housed during a very cold season. As is

commonly known, its keeping qualities are far superior to those of ice gathered during a mild winter.

The economic realization of such a project would involve the establishment of small refrigerating plants in connection with dairies of some size, or of larger plants, preferably adjacent to railway stations, able to chill the commercial milk supply of an entire district when brought to the place of shipment after previously being cooled to the melting point of ice.

Refrigerating cars are obviously unnecessary for the transportation of milk in this form, unless unusually long distances are to be traversed. The comparatively small cost of freezing and chilling the milk supply of a city would be more than offset by economy in transportation, by the utilization of remote and inexpensive pasturage, and by the removal of one of the greatest causes of infant mortality.

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## APPENDIX AL.

COMMUNICATION ADDRESSED TO MR. D. S. HORTON, REQUESTING INFORMATION CONCERNING COST OF INSTALLATION OF PLANT FOR PASTEURIZING DISTRICT MILK SUPPLY.

DECEMBER 3, 1910.

Mr. D. S. HORTON,  
*Secretary Sheffield Farms, Slawson Decker Co.,  
New York City.*

DEAR SIR: The special committee of the Washington Chamber of Commerce appointed to investigate the present milk situation in the District of Columbia desires to trespass further upon your courtesy with the request that you will kindly advise it, if practicable, of the approximate cost of the large pasteurizing plant which, it is understood, has recently been installed in New York City by your company. It is wished to ascertain with some degree of accuracy, if possible, what would be the cost of a plant with sufficient capacity to pasteurize the entire milk supply of Washington City, which is understood to amount to practically 20,000 gallons per day. Of course the cost of building and, indeed, the cost of equipment may vary to some extent here as compared with New York City, but the information would at least serve as an indication of what might be expected to be the cost of a plant with that capacity installed in this city.

Any indication as to the approximate cost of operating such a plant (maintenance and labor), if furnishable, would also be welcomed by our committee.

Thanking you in advance for your courtesy, I am,

Very truly, yours, \_\_\_\_\_, *Chairman.*

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## APPENDIX AM.

COMMUNICATION FROM MR. L. S. HORTON, GIVING ESTIMATE OF COST OF ADEQUATE PLANT FOR PASTEURIZING MILK SUPPLY FOR DISTRICT OF COLUMBIA.

SHEFFIELD FARMS-SLAWSON DECKER Co.,  
*New York, December 12, 1910.*

Mr. J. LOUIS WILLIGE,  
*Willige, Gibbs & Daniel, Washington, D. C.*

MY DEAR MR. WILLIGE: Your letter was handed to me by my son, and he stated that he had had some communications with parties in Washington on the milk question, but wished me to answer your letter. It is rather a difficult question to answer in order to give you any really positive knowledge of what you are seeking.

First, I will inform you of our ideas, and possibly it may be of some benefit to you. It is needless for me to say that I have for many years advocated scientific pasteurization of milk, and to confirm my ideas I have just returned from a trip abroad, where I visited eight different countries, and there was not one city of 200,000 inhabitants that I visited, including Italy, Denmark, and Holland, where they were not pasteurizing a great portion, and in some cities practically all of the milk that they received. I am also pleased to state that

where pasteurization is rigidly carried out they have not been visited with the epidemic of typhoid and scarlet fever for many years, caused through milk. We are at the present time building the second largest pasteurizing plant in this city. The one now in the course of construction, which possibly will be done in three months longer, has a capacity of pasteurizing 100,000 quarts of milk in 6 hours and making 100 tons of ice in 24 hours, besides cooling all the milk that comes in the plant. Ice should be looked upon as more or less of a by-product that can be manufactured by large milk-pasteurizing plants and breweries. To carry on either you certainly have to have a certain amount of refrigeration, and you practically have to keep them going night and day. By adding more units to your refrigerating than you require for the milk business it keeps everybody employed for the 24 hours, and with all conditions favorable, ice at \$1.80 per ton, delivered to the dealer, would net a plant of these conditions \$1 per ton net, which will go a long way toward paying the interest on the whole investment.

Now, as to building one in Washington, I will just recommend a few things to consider first. Be sure and get on the railroad, so that you can switch the milk and the coal and what other articles you need direct into your plant. Be sure and have plenty of good, cold water. I would recommend artesian wells. The colder the water is the less amount of refrigeration it requires to cool the milk and also lessens the expense of manufacturing ice. If you could buy a good-sized plot of ground for \$50,000, it would cost you to put up the proper kind of a building \$175,000, and for your machinery of all descriptions, both ice, electricity, and milk machinery, possibly \$150,000. I should think with the proper machinery installed, and as Washington is a great consumer of ice, that you could make enough on your ice to pay at least 4 per cent on the whole investment, and all it would cost you for the pasteurization, particularly if you did not bottle it all, would be a very trifling sum.

If I can be of any service to you, and you visit my office, I will show you the plans that we have laid down in this new operation.

If you should decide to build such a plant it would be good judgment to visit several plants to get the most economical and scientific methods of handling the milk, as there can be great economics worked out by so doing with proper construction.

Yours, very respectfully,

LOTON HORTON.

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## APPENDIX AN.

### PRIVATE PASTEURIZING PLANTS IN OPERATION IN DISTRICT OF COLUMBIA.

Pasteurizing plants are at present operated in connection with the Washington milk supply by George M. Oyster, jr., J. J. Bowles, W. A. Simpson, the Belmont Dairy Co., J. W. Gregg, and the Nathan Straus Laboratory (in the District of Columbia), the Baltimore & Washington White Cross Milk Co. (at Frederick, Md.), the Tri-State Sanitary Milk Co. (at Cumberland, Md.), and the International Milk Products Co. (at Cooperstown, N. Y.); also by the following establishments which ship only cream, so far as is known, to the District of Columbia: The Chapin-Sacks Co. (Buckeystown, Md., and Woodstock, Va.) and the Rosemary Creamery Co. (Adams, N. Y.).

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## APPENDIX AO.

### AGREEMENT BETWEEN MEDICAL MILK COMMISSION OF ESSEX COUNTY, N. J., AND STEPHEN FRANCISCO, DATED MAY 19, 1893, FOR FURNISHING CERTIFIED MILK.

### COPY OF THE AGREEMENT BETWEEN THE MEDICAL MILK COMMISSION OF ESSEX COUNTY, N. J., AND STEPHEN FRANCISCO, OF CALDWELL, N. J., DATED MAY 19, 1893.

The following agreement, made this 19th day of May, 1893, between Henry L. Coit, M. D., of Newark, N. J.; Theron Y. Sutphen, M. D., of Newark, N. J.; William B. Graves, M. D., of East Orange, N. J.; L. Eugene Hollister, M. D.,

of Newark, N. J.; Joseph W. Stickler, M. D., of Orange, N. J.; and James S. Brown, M. D., of Montclair, N. J., parties of the first part, and Stephen Francisco, of Caldwell, N. J., party of the second part: Witnesseth as follows, that the party of the second part doth hereby bind himself to a fulfillment of the provisions of this contract for and in consideration of the benefits hereinafter named by the parties of the first part.

Furthermore, the following-named persons, Frank A. Wilkinson, of Newark, N. J.; Isaac Lane, of Caldwell, N. J.; and William Bush, of Caldwell, N. J., all acquaintances of the party of the second part, hereby affix their signatures to this agreement, attest to the honor of the party of the second part, and become sureties for the execution of this agreement.

1. The party of the second part doth hereby agree to conduct such parts of his dairy as may be hereinafter named, collect and handle its products in conformity with the following code of requirements, for and in consideration of the promised indorsement of the parties of the first part, as hereinafter indicated. The milk thus produced shall be known as certified milk, shall be designed especially for clinical purposes, and when at any time the demand shall be greater than the supply and is required by a physician, either for infant feeding or the diet of the sick, it is hereby agreed that such shall be the preferred purchaser.

2. The party of the second part further agrees to pay for chemical and bacteriological examinations of the aforesaid certified milk at such times as in the judgment of the parties of the first part is desirable.

3. He also agrees to defray the cost of a bimonthly inspection of his dairy stock, or oftener, if necessary, by a competent and approved veterinarian, all of which persons, namely, the chemist, the bacteriologist, and the veterinary surgeon, shall be chosen by the parties of the first part, to whom they shall render their reports in writing.

4. It is expressly understood and agreed that the party of the second part shall not pay more than the sum of \$500 in any one year for the services of chemist, bacteriologist, and veterinary surgeon, and the party of the first part shall limit the expense of such service to that amount. It is furthermore agreed that the party of the second part, on receipt of a certified copy of the reports of the experts, shall mail to the persons indicated by the parties of the first part, and not to others, a duplicate printed copy of the aforesaid reports bearing the signatures of the experts and the names of the physicians, the same to be issued at such intervals as in the judgment of the parties of the first part is desirable; also that the necessary expenditures for printing and circulation be met in the same way as herein provided for expert examinations.

#### LOCATION OF LANDS.

5. It is hereby understood and agreed that the lands used by the owners, agents, or assigns of the dairy conducted by the party of the second part and employed for pasturage, or any lands that may be hereafter acquired for such purposes, or such lands as may be used for the cultivation of hay or fodder, shall be subject to the approval of the parties of the first part.

#### BUILDINGS.

6. It is also understood and agreed that the buildings, such as stables, creamery, dairy house, and spring house, shall be constructed after the most approved style of architecture, in so far as construction may affect the health of the dairy stock or the character and conditions of the milk.

7. That the buildings used for the housing of the animals shall be situated on elevated grounds and capable of being properly drained.

8. Said buildings to be sheltered from cold winds, lighted, and ventilated according to approved hygienic methods. The buildings shall be constructed so as to favor the prompt and easy removal of waste products.

9. The apartments used for the storage of either feed or fodder shall be removed from possible contamination by stable waste or animal odors.

10. All buildings shall, in addition to healthful location, approved construction, and proper ventilation, be kept free from animal or vegetable matter in a state or process of decomposition or decay and always free from accumulations of dust or mold.

THE WATER SUPPLY.

11. The dairy shall be supplied with an abundance of pure water.
12. No water from shallow wells or springs holding surface drainage shall be used for watering stock, cooling milk, or cleaning vessels.
13. Nor shall any well or spring be located within 300 feet of the stable.

SURROUNDINGS.

14. It is further understood and agreed that the immediate surroundings of the buildings shall be kept in a condition of cleanliness and order. There shall not be allowed to accumulate in the vicinity any loose dirt, rubbish, or decayed vegetable or animal matter, or animal waste.

15. Nor shall there be within 300 yards of any building any constantly wet or marshy ground or stagnant pools of water.

16. Nor shall there be kept within 300 yards of any building used for dairy purposes any fowl, hogs, horses, or other live stock.

17. It is hereby understood and agreed that the following unhealthful conditions shall be a sufficient reason to exclude any animal from the herd used for any purpose in the aforesaid dairy: Any animal that is judged by a competent observer to suffer from tuberculosis, even though the disease be localized or latent.

18. Any animal with fever. Any animal suffering from septic absorption or other disease, followed or associated with parturition.

19. Any animal suffering from mammitis or mammary abscess.

20. Any animal with persistent diarrhea or any other abnormal physical condition which could in any way be detrimental to the character of the milk.

21. It is furthermore agreed that when an animal shall be found by a competent observer to be in a state of ill health, prejudicial either to the other animals in the herd or to human health, the same shall be removed immediately and, if necessary, shall be killed.

22. It is also understood and agreed that the party of the second part shall exclude from the herd used for producing certified milk, immediately after discovery, any animal subject to the following conditions: Any animal that was bred through consanguinity within a period of three generations.

23. And from this time forth any animal of those bred by the party of the second part used for producing certified milk that was not as a heifer kept sterile during its first 27 months.

24. Any phenomenal milker, except that glandular disease or tuberculosis has first been excluded by a competent observer.

25. It is furthermore agreed that if at any time it is desired by the parties of the first part that a different breed of milch cows should be substituted for the one in use, in order that the standards of quality in the milk may be raised, the party of the second part will endeavor to carry the same into effect.

HOUSING AND CARE.

26. It is furthermore agreed that the dairy stock employed in the production of certified milk shall be properly sheltered from the influences of weather and climate prejudicial to their health, also that the animals shall be kept clean, groomed every day, and treated kindly at all times.

27. The waste products of the stable shall be removed so frequently, and the stable floor so thoroughly cleaned, that the same shall be as free as possible from animal odors.

28. It is also agreed that no milch cow shall be used for dairy purposes while in a state of excitement, either as a result or during the period of estrus, or which has been made nervous either by beating, whipping, kicking, prodding, or running.

FEEDING.

29. It is hereby understood and agreed that the methods of feeding the cows furnishing the certified milk shall be subject to the approval of the parties of the first part. The feed and fodder shall consist only of nutritious and wholesome materials, such as grass, clover and timothy hay, whole grain, or the entire result of the grist. No materials shall be employed which are or may become injurious to the health of the animals. There shall not be fed at any time or in

any quantity, either alone or mixed with other feed or fodder, hulls, screenings, wet or dry brewer's grains, sour ensilage, or any waste by-product in the treatment of grain, low marsh grass, or any of the questionable or exhausted feeds or fodders employed either to increase the milking capacity of the animal or that will produce an impoverished milk or that will impart to it unnatural odors or flavors. Nor shall the cows be allowed to eat green or worm-eaten fruit, poisonous weeds, or to drink poisonous or stagnant water.

#### COLLECTING AND HANDLING.

30. It is furthermore understood and agreed that the cows from which is obtained certified milk shall be milked only in a clean building and not in an ily ventilated stable containing foul odors and bad air.

31. No animal furnishing certified milk shall be milked until the udder shall first have been cleaned in a manner approved by the parties of the first part.

32. No person shall be allowed to draw the milk who has not within 15 minutes of the milking first washed his or her hands, using soap and nailbrush, and afterwards thoroughly rinsing the hands in clean water.

33. The person or persons engaged in milking shall also be dressed in clean overclothes.

34. No person shall be allowed to draw the milk who has been engaged with the care of horses in the same clothing or without first washing his hands.

35. No milk shall be represented as certified milk that is not received from the udder into vessels and from these into cooling cans, both of which are perfectly clean and dry, having been cleansed and heated at a temperature adequate to effect complete sterilization since the last milking, and have been kept inverted in a clean, dry, and odorless atmosphere.

36. No milk shall be represented as certified milk that has not been passed through a sieve of wire or other cloth, either while milking or immediately thereafter, having not less than 100 meshes to the linear inch.

37. No milk shall be represented as certified milk that does not consist of the entire contents of the udder at each milking, including the fore milk, middlings, and strippings.

38. No milk shall be represented as certified milk that has been drawn from the animal at abnormal hours, such as midnight or noon, nor from any animal for a period of nine weeks before calving, or that has not been separated for nine days after parturition.

39. No milk shall be represented as certified milk which has been exposed to the emanation or infection of any form of communicable disease, either in the person or persons handling the milk or by accidental contamination in cleaning milk containers or by the association of any person engaged in handling the milk with person or persons sick of contagious disease.

#### PREPARATION FOR SHIPMENT.

40. It is hereby understood and agreed that all milk represented as certified milk shall receive every known detail of care that will promote its keeping qualities and favor its safe transportation.

41. That the milk on being drawn from the cow shall be treated by ice or clean, cold water in motion, and proper aeration, in order, first, to remove its animal heat, and second, to reduce its temperature to a point not above 50° nor below 40° F., said temperature to be acquired within 45 minutes after milking and maintained within the above limits while held for shipment, during its transportation, and until it is delivered to the purchaser.

42. That the cooling of the milk shall not be conducted in the same building in which it is drawn, nor in an atmosphere containing dust or tainted with animal odors.

43. That all the foregoing provisions concerning the cleansing and condition of vessels or utensils shall be complied with in the said cooling process.

44. It is furthermore agreed that no milk shall be represented as certified milk that has been changed or reduced in any way by the addition of water or any solid or liquid substance, in or out of solution, or the subtraction or removal, in any manner, of any part thereof.

45. It is hereby understood and agreed that all milk to be represented as certified milk shall be packed in flint glass quart jars immediately after it is cooled.

46. Said jars to be of pattern approved by the parties of the first part.

47. It is furthermore agreed that the bottles or jars, before being used, shall be cleaned by hand, separately, with the aid of hot water, alkaline soaps,

rotating brush, and steam, and that they shall be rinsed in two separate baths of clean, hot water and then thoroughly dried and kept inverted until used, without covers, in a clean, dry atmosphere free from odors.

48. It is agreed that the jars shall be filled by a method approved by the parties of the first part.

49. That they shall be sealed after all air has been excluded by the most approved device for closing them.

50. The bottles after being filled shall be labeled across the cap, bearing the words "Certified Milk," with the name of the dairyman, together with the date of milking.

51. It is furthermore agreed that no milk shall be sold as certified milk that is more than 3 hours old when bottled nor more than 24 hours old when delivered.

#### TRANSPORTATION AND DELIVERY.

52. It is hereby understood and agreed that the transportation and distribution of all milk represented as certified milk shall be conducted by the party of the second part, either in person or by persons employed by him.

53. That in transit the milk shall not be exposed to any of the foregoing prohibitory conditions.

54. That it shall not be subjected to agitation.

55. That it shall not be exposed to the heat of the sun.

56. That the delivery wagons shall be so constructed that the required temperature of the milk may be maintained during transit.

57. That before the wagons are filled for shipment the body, the trays, and compartments shall be flushed with boiling water.

58. It is furthermore agreed that the distributing agents shall, during the transfer of the milk from the dairy to the purchaser, be subject to the following restrictions, namely, that they shall use no tobacco.

59. That they shall take no intoxicating drinks.

60. That they shall not collect the empty containers nor receive money or milk checks from houses in which an infectious or contagious disease is known to exist.

61. It is also hereby agreed that the collection of empty bottles from places where infectious or contagious disease is known to exist shall be made by other persons than those employed to deliver the milk.

62. That these collections be made with wagons not employed in the distribution of the milk.

63. That before these empty bottles shall be returned to the dairy they shall be carried to a separate building and first be subjected to the process of cleaning bottles indicated in a former clause of this contract.

64. It is hereby understood and agreed that if any further precautions or changes in method calculated to improve the quality of milk or guard the same from impurities or dangers is desired, that the party of the second part will cheerfully be governed by such additional rules and regulations as may be laid down by the parties of the first part.

65. It is understood and agreed by the party of the second part, the same binding the owners, agents, or assigns of the aforesaid dairy, that the product known as certified milk shall be under the following restrictions in its sale, namely, that until the amount required within the boundaries of Essex County shall first be supplied it shall not be sold beyond these limits, except that the parties of the first part shall give their consent.

66. It is furthermore agreed by the party of the second part, the same binding the owners, agents, or assigns of the aforesaid dairy, that in the event of a failure to comply with any or all of the requirements of the foregoing contract the party of the first part shall reserve the right to withdraw from the contract and publish the fact in such manner as they deem best.

67. Finally, it is understood and agreed that nothing in this contract shall prevent the abrogation of any of the provisions of the same by the parties of the first part, provided that it shall be done for the purpose of substituting other provisions designed to promote the objects of their organization.

68. It is further understood and agreed by and between the parties hereto that the party of the second part shall be at liberty to cancel this agreement by giving two months' notice in writing of his desire to do so in case of inability for any reason to comply with the terms of the same.

In witness whereof the said parties have hereunto set their hands the day and year first above written.

## APPENDIX AP.

## FORMULÆ FOR MODIFIED MILK DISTRIBUTED BY NATHAN STRAUS PASTEURIZED MILK LABORATORY, WASHINGTON, D. C.

Formula by Dr. A. R. Green for first to fourth week:

- $\frac{3}{4}$  ounce of 16 per cent cream.
- 3 ounces of full milk.
- 19 ounces of water.
- $1\frac{1}{4}$  ounces of limewater.
- $1\frac{1}{2}$  ounces of milk sugar.

This mixture fills eight bottles, each to contain 3 ounces. Feed two and one-half hours apart.

Formula by Prof. R. G. Freeman for first to third month:

- $1\frac{1}{2}$  ounces of 16 per cent cream.
- 3 ounces of full milk.
- 13 ounces of water.
- $\frac{1}{2}$  ounce of limewater.
- 1 ounce of milk sugar.

This mixture fills six bottles, each to contain 3 ounces. Feed three hours apart.

Formula by Prof. R. G. Freeman for second to sixth month:

- 18 ounces of full milk.
- $16\frac{1}{2}$  ounces of water.
- $1\frac{1}{2}$  ounces of limewater.
- $1\frac{1}{2}$  ounces of milk sugar.

This mixture fills six bottles, each to contain 6 ounces. Feed three hours apart.

Formula by Prof. A. Jacobi for third to seventh month:

- 18 ounces of full milk.
- 18 ounces of barley water.
- 1 ounce of cane sugar.
- 20 grains of table salt (less than one-fourth teaspoonful).

This mixture fills six bottles, each to contain 6 ounces. Feed three hours apart.

Formula by Dr. A. F. Hess for seventh to ninth month:

- 32 ounces of full milk.
- 16 ounces of barley water.
- 2 ounces of milk sugar.

This mixture fills six bottles, each to contain 8 ounces. Feed three hours apart.

After ninth month: Full pasteurized milk, 8 ounces every four hours.

To make one quart of oat or barley water: Boil 2 tablespoonfuls of the flour in a quart of water until it is reduced to half the quantity; then add sufficient water to make up the quart.

## APPENDIX AQ.

## REPORT OF SPECIAL COMMITTEE APPOINTED BY DISTRICT COMMISSIONERS ON DISPOSAL OF STRAUS PASTEURIZING LABORATORY, WASHINGTON, D. C.

DECEMBER 7, 1910.

The DISTRICT COMMISSIONERS.

GENTLEMEN: The committee appointed by you "to investigate the practicability of continuing the Straus pasteurization plant," after full discussion and due deliberation, reports as follows:

In our opinion the pasteurization plant established in this city through the generosity and public spirit of Mr. Nathan Straus has served a most useful purpose in presenting prominently before the public the dangers of impure and raw milk as a food, especially for infants. The present plant should, in the judgment of the committee, be continued in operation by Mr. Straus or some

other philanthropic agency until such time as provision may be made for furnishing an ample and safe supply of pasteurized and modified milk through commercial channels under the direct supervision of the District health department.

In the judgment of the committee it is not practicable for the District government to undertake the management of such plant, which at all events could not be done without special authority from Congress and an appropriation made for the purpose.

It occurs to the committee that the proposal of Mr. Straus offers a splendid opportunity for the conduct of investigations under the Department of Agriculture or the Public Health and Marine-Hospital Service, with a view to making a practical demonstration of the value of pasteurized and modified milk as food for infants. The authoritative settlement of this question would be of immense value not only to our community, but to the entire country.

In the event that for any reason it is not possible to have the operations of the Straus Laboratory continue, it is believed by the committee that existing agencies, such as the Diet Kitchen, the Citizens' Relief Association, the Associated Charities, and the Instructive Visiting Nurse Society, should be encouraged by the contribution of additional funds to continue the splendid work which is now being done by them. The activities of these charitable agencies are being exerted not only in directing and furnishing proper food for infant feeding among the poorer classes, but also in disseminating information generally with regard to the proper care of infants. It is recognized in this connection that these agencies should exercise scrupulous care in restricting the distribution of free infant food to such families as are not pecuniarily able to pay for it. The milk dispensaries now in operation under existing auspices should be generously supported by the public in enlarging their existing stations, and in increasing the number of depots from which milk may be dispensed.

The committee is impressed with the great desirability of securing prompt and adequate legislation, as recommended by the District Commissioners, for providing a clean, pure, and wholesome milk supply for the Nation's capital. Pending the enactment of such legislation, the committee strongly recommends that the District authorities insist that the inmates of foundling asylums, hospitals, and other charitable institutions, wholly or in part supported by public funds, be supplied with milk coming within the classifications recommended by the Washington milk conference appointed by the District Commissioners in 1907. For this purpose the health officer should be required, as a result of inspection, to publish a list of dairies from which the milk supply is drawn, giving the average rating of each dairy, the chemical composition, and the bacterial content of the samples. It is understood that this information is already in the possession of the health department, but provision is not made at present for its publication.

The committee avails itself of this opportunity to express its hearty approval of the recommendation recently made by the health officer for the appointment of a corps of six visiting nurses for the public schools, whose duty it shall be to give instruction with regard to the physical well-being of the children in their homes, and during the summer months to give special attention to the prevention of infant mortality.

Respectfully submitted.

GEORGE M. STERNBERG, *Chairman.*

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## APPENDIX AR.

### BILL TO AUTHORIZE THE ACCEPTANCE BY THE UNITED STATES OF THE GIFT OF THE NATHAN STRAUS PASTEURIZED-MILK LABORATORY.

**A BILL** To authorize the acceptance by the United States of the gift of the Nathan Straus Pasteurized Milk Laboratory.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Treasury be, and he is hereby, authorized and directed to accept from Nathan Straus, in behalf of the United States, the Nathan Straus Pasteurized Milk Laboratory, established by said Nathan Straus in May, nineteen hundred and ten, and since

said date operated at his expense at thirteen hundred and nineteen H Street northwest, Washington, District of Columbia; and the sum of fifteen thousand dollars, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available and to continue available until and including June thirtieth, nineteen hundred and twelve, for the maintenance of said laboratory, employment of personal services, rent, hire, or purchase, and maintenance of means of transportation, supplies, and all other necessary incidental and contingent expenses, to be expended, with the approval of the Secretary of the Treasury, under the supervision and control of the Surgeon General of the Public Health and Marine-Hospital Service, for the purpose of demonstrating, with the cooperation of the health office of the District of Columbia, the practical utility of infants' milk depots in the reduction of infant mortality.

## APPENDIX AS.

### REPORT OF DISPENSARY, SETTLEMENT HOUSE, SOUTHWEST WASHINGTON, FROM APRIL 13 TO OCTOBER 1, 1908.

Appalled at the high infant mortality in Southwest Washington and the poor health which many infants and children in this section experienced, and believing that some effort should be made to correct this, a few of those interested planned a dispensary to which infants and young children could be brought for treatment in the event of their becoming ill. The narrowness of this idea, however, soon became apparent, and it was realized that the dispensary had a more important work to do, namely, that of prophylaxis. In other words, while the dispensary should aim to cure, its greatest endeavor should be to prevent illness.

In canvassing the situation it was found that the great majority of infant deaths were caused by improper food, wrong feeding methods, and carelessness or lack of knowledge in the handling and preparation of infant foods. Immediately the dispensary was discovered to have a still more important and wider function to perform than either curing or prophylaxis—that of education.

The question of ways and means then arose. It was necessary to have money and it was also necessary to have cooperation. An appeal was made to the Washington Diet Kitchen to help with the food question. The response made was of the most generous nature. Not only did they agree to furnish milk practically ad libitum, but they also agreed that the milk so furnished should be modified in any way the dispensary physician might direct, so that each infant needing artificial food could get that most adapted to its needs. The Instructive Visiting Nurses' Association was next appealed to, with the result that one of their nurses was instructed to visit the dispensary twice a week. The different relief organizations of the city expressed their interest and promised their help should any of the cases coming to the dispensary require it.

It is hardly necessary to say that the Neighborhood House gave the movement its most enthusiastic and hearty support, feeling, as it did, that the people connected with the house would be those who would most surely benefit by it. The house agreed to shelter the dispensary until the fall.

It was a matter of little difficulty to raise the money necessary to install the dispensary. Appeals were made to a number of people, and in every instance were answered in the most generous manner, gifts of money, cribs, linen, children's clothes, scales, and many other useful and necessary articles being received.

But, although highly encouraged by the enthusiastic way in which the idea had been received by those to whom it had been communicated, it was not without some doubts and misgivings that on the 13th of April the dispensary was opened. How would the dispensary be received by the neighborhood was the question. The idea was an entirely new one. Would it be met by confidence or distrust? Would our little craft, launched with so much care and love, be swallowed up by some huge wave of disapproval, or would it weather every storm?

It took the two weeks remaining in April for the neighborhood and the dispensary to become acquainted with each other. During these two weeks 8

visits were made to the dispensary—5 new cases and 3 return visits. Eight visits, while not many, was considered a fair start. The sign attracted attention during this time and the people became acquainted with the fact that clean and pure milk would be dispensed at a low rate—1 cent a feeding—and that treatment and medicine were equally reasonable, namely, 10 cents for either. During May the attendance showed some improvement, 26 new patients coming, with 37 return visits. During this month 6 infants were for one reason or another put upon modified milk. But in June the attendance took a big jump, 55 new cases being treated, with 127 return visits, and 12 more infants put on milk. The confidence in the success of the institution rose proportionally, but it was not until the returns for July were in, showing a total attendance of 251—61 new cases and 190 return visits—that the organization began to realize that its early doubts and fears were unfounded and that the dispensary was really making a success. The succeeding two months only served to confirm this. August gave a total attendance of 214—47 new cases and 167 return visits—and September, 239—67 new cases and 172 return visits.

But with the phenomenal and unprecedented success came the realization of new duties and new responsibilities. It was discovered that while the dispensary had had as its object the curing or relieving of suffering in sick children, the prevention of disease amongst them, and the education of their parents in matters pertaining to infant hygiene and infant feeding, it was not only fulfilling these objects, but was capable of and actually was performing functions which, if not of greater, were at least of equal, importance. Through this channel many people were brought to Neighborhood House who had never been there before, to become acquainted with and take advantage of its many opportunities. Also, people in other sections of the city were awakening to the fact that infant life in this Capital City had long been neglected and allowed to go to waste, and many were beginning to see the necessity of remedying this neglect and putting a stop to the waste. And with all this came a still greater realization, that of the weakness of the dispensary organization. With these many problems to meet and solve came the necessity for help. The P. E. O. organization in this city seemed to be the ideal organization to shoulder this greater work, because it seemed that their ideals stood more for work of this kind than those of any other organization. An appeal was therefore made to them.

It was received with the same enthusiasm and generosity with which all other appeals had been received, with the result that an organization was formed to carry forward and expand the work the smaller organization had begun. This organization began work October 1. It absorbed the parent organization and invited to join with it the Washington Diet Kitchen, the Instructive Visiting Nurses' Association, the Associated Charities, and Neighborhood House. May it have success. The work it has to do is immense, but every success obtained is worth many times the effort that will be put forth. The educational work is especially important, for lack of knowledge is at the bottom of many of the evils that children suffer, lack of knowledge of what constitutes proper food, proper clothing, and proper hygiene, many sad cases of epilepsy and hysteria being traceable directly to neglect of this latter.

This report would be incomplete did it not deal with a few, a very few, statistics.

From the middle of April, when it was first opened, until the 1st of October, when it passed into the hands of the new organization, a period of five and one-half months, there were treated in the dispensary 261 infants and children. The total of return visits made to the dispensary was 696. The total attendance, 957. Three deaths occurred, making the death rate a little over 1 per cent. Search of the health-office records showed a total death rate in 1907 in southwest Washington of children of 10 years of age or under to be 50. During this year, 1908, only 29 children have died in the southwest, 10 years of age or under, although this year was considered one of the most fatal to children that we have ever experienced. May not the dispensary through its furnishing of clean pure milk take some credit to itself for this tremendous reduction in mortality?

Forty-one babies received modified milk.

The cost of equipping and running the dispensary for the five months was about \$400.

These figures demand no comment; they speak for themselves.

During the latter part of the summer a roof garden built on the roof of the dispensary building was opened for the use of small children, and many, on bright days, took advantage of this auxiliary.

The dispensary clinic is in charge of a physician, who is present at the dispensary daily, except Sundays and holidays, for about two hours. In May, when the work began to get heavy, a neighborhood woman was employed to help with the children and distribute the milk. Later in the summer the need for more professional service was felt, and an arrangement was made with the Instructive Visiting Nurses' Association by which the dispensary had the entire use of the services of a nurse for three months. This nurse, in addition to helping in the clinic, visited cases needing attention outside of dispensary hours.

Appended to this report is a copy of the constitution of the present organization, the separate reports for the five months, and a copy of a circular distributed to mothers in southwest Washington, giving some simple and plain instructions in the care of infants.

Would it be amiss, in closing, to strike a more personal note?

The writer wishes to bear witness to and express his great appreciation of the untiring efforts of his two associates [Mrs. J. P. S. Neligh and Miss Eugenia Bray] on the original board of management of the dispensary. Without their wise counsel, their never-failing patience, and ready encouragement in the face of adversities, and their ever willingness to take upon their own shoulders the greatest burden of the work, the dispensary could never have had an existence, the great work it is to-day doing would never have been begun, all our efforts, indeed, would have come to naught.

Respectfully submitted.

WM. J. FRENCH.

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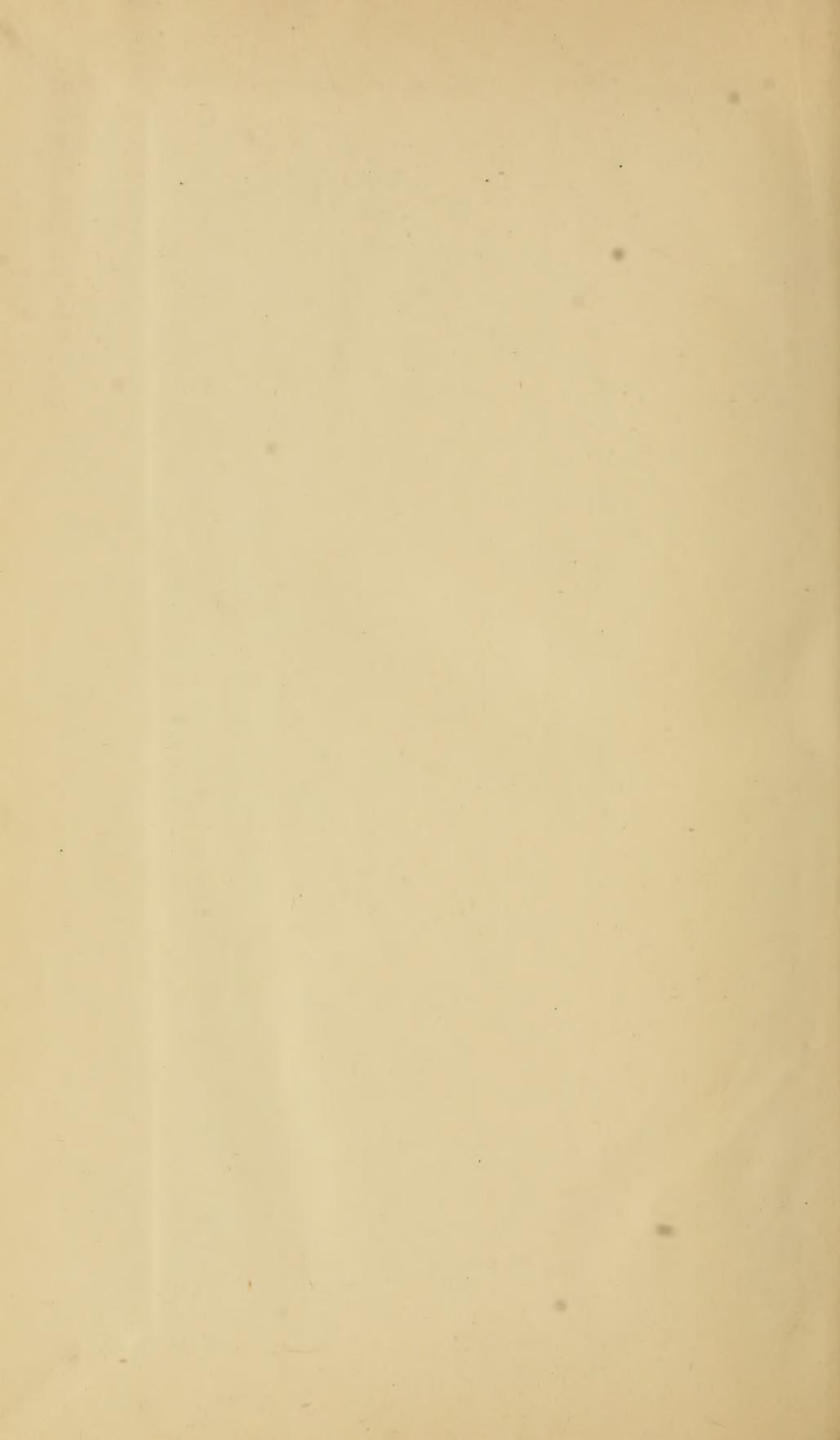
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