

**The action of the Health Department in relation to pulmonary tuberculosis and the scope and purpose of the measures recently adopted for its prevention : a report of the Board of Health of the City of New York to Hon. William L. Strong, Mayor of the City of New York.**

### **Contributors**

New York (N.Y.). Board of Health.  
Royal College of Surgeons of England

### **Publication/Creation**

Albany : Wynkoop Hallenbeck Crawford, printers, 1897.

### **Persistent URL**

<https://wellcomecollection.org/works/jaw8524x>

### **Provider**

Royal College of Surgeons

### **License and attribution**

This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>

(12.)

THE ACTION OF THE HEALTH DEPARTMENT  
IN RELATION TO  
PULMONARY TUBERCULOSIS

AND

THE SCOPE AND PURPOSE OF THE MEASURES RE-  
CENTLY ADOPTED FOR ITS PREVENTION.

---

A REPORT

OF THE

BOARD OF HEALTH

OF THE

CITY OF NEW YORK

TO

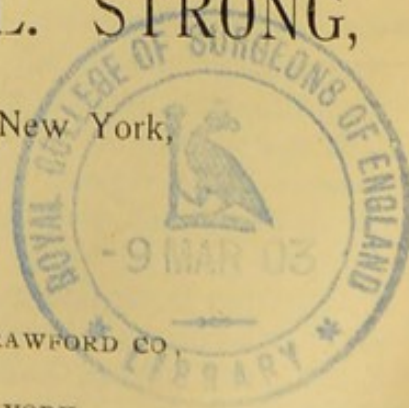
HON. WILLIAM L. STRONG,

Mayor of the City of New York,

---

WYNKOOP HALLENBECK CRAWFORD CO.,  
PRINTERS,  
ALBANY AND NEW YORK,

1897



THE NEW YORK

BOARD OF HEALTH

REPORT

FOR THE YEAR

1890

NEW YORK

1891

PRINTED BY



CHARLES G. WILSON,  
PRESIDENT.  
GEORGE B. FOWLER, M.D.,  
COMMISSIONER.

HEALTH DEPARTMENT,  
CENTRE, ELM, WHITE AND FRANKLIN  
STREETS,  
CRIMINAL COURT BUILDING,

NEW YORK, October 8, 1897.

Hon. WILLIAM L. STRONG, *Mayor of the City of New York*:

SIR: I have the honor to forward to you a condensed statement of the history of the action of the Health Department in relation to pulmonary tuberculosis, and the scope and purpose of the measures recently adopted for its prevention.

The first official action of the Health Department of the City of New York in relation to pulmonary tuberculosis was taken in 1889, when a resolution was passed by the Board of Health asking the consulting pathologists of the Department for a report on the causation and prevention of pulmonary tuberculosis. A communication on this subject was prepared by Drs. T. Mitchell Prudden, Henry P. Loomis and Hermann M. Biggs, and submitted to the Board, in which special emphasis was laid upon the following facts:

First—That tuberculosis is a distinctly preventable disease.

Second—That it is not directly inherited.

Third—That it is acquired by the direct transmission of the tubercle bacillus from the sick to the well, usually by means of the dried and pulverized sputum floating as dust in the air.

The measures then suggested for the prevention of the spread of tuberculosis were: First, the security of the public against tubercular meat and milk, attained by a system of rigid official inspection of cattle. Second, the dissemination among the people of the knowledge that every tubercular person may be a source of actual danger to his associates, if the discharges from the lungs are not immediately destroyed or rendered harmless. Third, the careful disinfection of rooms and hospital wards that are occupied, or have been occupied, by phthisical patients.

After consultation with numerous prominent physicians in New York, it was finally decided by the Board of Health that the medical profession and the people were not yet prepared for the adoption of any



definite measures looking to the prevention of this disease, although the Board felt convinced that the views expressed in regard to the nature of pulmonary tuberculosis were correct, and that the measures suggested were wholly justified by the facts. It was, therefore, determined to at first perfect the system of meat and milk inspection, and in addition to adopt the second suggestion; namely, the dissemination of knowledge among the people in regard to the nature of tuberculosis. Circulars of information on this subject were prepared and widely distributed, and certain measures were adopted in regard to the recording of houses in which tubercular patients had died.

No further action was taken by the Health Department until 1893, when a further communication was received from Dr. Hermann M. Biggs, the Pathologist and Director of the Bacteriological Laboratories, containing certain recommendations, which were adopted by the Board of Health on February 13, 1894, and which, under resolutions of the Board, were then put into effect. Circulars describing the measures adopted were prepared and forwarded to every physician in New York City, and circulars for the information of consumptives and those living with them were also prepared and printed in English, German, Italian and Hebrew, for distribution among the poor living in the tenement-house districts. From twenty to thirty thousand of these latter circulars have been distributed each year since that time.

The circular of information to physicians follows. This describes the measures followed by the Health Department in relation to this disease up to the beginning of 1896:

#### CIRCULAR OF INFORMATION TO PHYSICIANS,

*Regarding the Measures Adopted by the Board of Health for the Prevention of Tuberculosis in the City of New York.*

*Health Department, Criminal Court Building, Centre, White, Elm and Franklin Streets.*

*Dated February 15, 1894.*

The communicability of pulmonary tuberculosis has been so thoroughly established, and is now so generally recognized by the medical profession throughout the world, that the Board of Health of New York City has taken active steps looking toward its prevention in this city, and has adopted the following preliminary measures:

First—The Department will hereafter register the name, address, sex and age of every person suffering from tuberculosis in this city, so far as such information can be obtained, and respectfully requests that hereafter all physicians forward such information on the postal cards usually employed for reporting cases of contagious diseases. This information will be solely for the use of the Department, and in no case will visits be made to such persons by the inspectors of the Department, nor will the Department assume any sanitary surveillance of such patients, unless the person resides in a tenement-house, boarding-house or hotel, or unless the attending physician requests that an inspection of the premises be made; and in no case where the person resides in a tenement-house, boarding-house or hotel, will any action be taken if the physician requests that no visits be made by inspectors, and is willing himself to deliver circulars of information, or to furnish such equivalent information as is required to prevent the communication of the disease to others.



Second—Where the Department obtains knowledge of the existence of cases of pulmonary consumption, residing in tenement-houses, boarding-houses or hotels (unless the case has been reported by a physician and he requests that no visits be made), inspectors will visit the premises and family, will leave circulars for information, and instruct the person suffering from consumption and the family as to the measures which should be taken to guard against the spread of the disease, and, if it is considered necessary, will make such recommendations for the cleansing or renovation of the apartment as may be required to render it free from infectious matter.

Third—In all cases where it comes to the knowledge of the Department that premises which have been occupied by a consumptive have been vacated by death or removal, an inspector will visit the premises and direct the removal of infected articles, such as carpets, rugs, bedding, etc., for disinfection, and will make such written recommendations to the Board as to the cleansing and renovation of the apartment as may be required. An order embodying these recommendations will then be issued to the owner of the premises, and compliance with this order will be enforced. No persons other than those there residing at the time will be allowed to occupy such apartments until the order of the Board has been complied with. Infected articles, such as carpets, rugs, etc., will be removed by the Department, disinfected and returned, without charge to the owner.

Fourth—For the prevention and treatment of pulmonary tuberculosis it becomes of vital importance that a positive diagnosis shall be made at the earliest possible moment; and that the value of bacteriological examinations of the sputa for this purpose may be at the service of physicians in all cases not under treatment in hospitals, the Department is prepared to make such bacteriological examinations for diagnosis, if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, stoppered bottles, accompanied by the name, age, sex and address of the patient, duration of the disease, and the name and address of the attending physician. Bottles for collecting such sputa, with blank forms to be filled in, can be obtained at any of the drug stores now used as stations for the distribution and collection of serum tubes for diphtheria cultures. After the sputum has been obtained, if the bottle, with the accompanying slip filled out, is left at any one of these stations, it will be collected by the Department, examined microscopically, and a report of the examination forwarded to the attending physician free of charge.

Fifth—The *authorities of all public institutions*, such as hospitals, dispensaries, asylums, prisons, homes, etc., are required to furnish to the Department the name, sex, age, occupation and last address of every consumptive coming under observation within seven days of such time.

It is the earnest wish of the Board of Health that all practicing physicians in this city co-operate with the Board in an earnest and determined effort to restrict the ravages of this, the most prevalent and formidable disease with which we have to deal.

---

During the first year (1894), after the beginning of this work, 4,166 cases of tuberculosis were reported to the Health Department; during the second year (1895), 5,824 cases, and during the third year (1897), 8,334 cases. The premises in tenement-house districts where these cases lived, and also the premises where deaths from tuberculosis occurred, the latter numbering each year nearly 6,000 (the cases and deaths together during these three years amounting to more than 35,000), have, so far as has been possible with the force of Inspectors at hand, been inspected; consumptives and their families in the tenement-house districts have been instructed as to the precautions necessary, and where premises which have been occupied by consumptives have been vacated by death or removal and the conditions seemed to require it, these premises have been placarded to prevent reoccupation, and orders have been issued upon the owners requiring their renovation.

It has seemed to the Department that very great progress has been made in this matter during these years, and in certain of the tenement-house districts of the city information in regard to the nature of pulmo-



nary consumption, the method of its transmission and the means to be taken for its prevention, have been widely disseminated. It is reported by the Inspectors that the communicable nature of the disease is generally understood by the more intelligent tenement-house population, and more or less efficient precautions are now being observed in more than one-half of the cases when the first inspections are made.

Great obstacles have been met in the transaction of this work, owing to the lack of facilities for the care of those persons suffering with pulmonary tuberculosis, who, because of their ignorance or poverty, or the peculiar nature of their occupation, are especially dangerous sources of infection to other persons; and also owing to the fact that as the work was carried on under resolutions of the Board of Health and not under a provision of the Sanitary Code, the recommendations and requirements could not be legally enforced.

Many cases are constantly being reported by the Inspectors where persons in the poorest circumstances, or under the most unfavorable hygienic conditions, suffering with advanced pulmonary tuberculosis, persistently ignore or neglect the simple and obviously necessary precautions for preventing the spread of this disease, and thus constantly and for months and years expose many other persons to infection. These cases occur particularly in the densely populated tenement-house districts, in crowded, poorly ventilated work shops and sweat shops, and among the more ignorant and, for the most part, foreign-born population. In these cases the Department has been powerless to interfere, excepting in the matter of instruction. It had no power to enforce its regulations and no hospital to which such cases could be removed. In addition, some of the public institutions, treating only charitable patients, persistently refused or neglected to report cases of tuberculosis, although their attention had been repeatedly directed to the resolution of the Department in this regard.

After three years of this work, it seemed to the Board of Health that the time had arrived when still further action should be taken, and certain recommendations made in a communication, received from the Consulting Pathologist and the Director of the Bacteriological Laboratories on January 11, 1897, were adopted. These recommendations were as follows:

"First—That such action shall be taken by the Board of Health as seems necessary and proper to at once secure the provision of hospital accommodations, under its charge, for the care of the poor suffering from pulmonary tuberculosis, who, as active sources of danger to the community, may properly come under its supervision.

"Second—That an amendment be made to the Sanitary Code declaring that tuberculosis be officially considered a communicable disease, and formulating regulations under which its sanitary surveillance shall be exercised.

"Third—That all institutions in this city which admit and treat cases of pulmonary tuberculosis be subjected to regular and systematic inspection by officials of this Board, and that specific regulations be established for the conduct of such institutions, in accord with the proposed amendment of the Sanitary Code.

"Fourth—That the scope of the measures designed for the education of the people in regard to the nature of pulmonary tuberculosis, and the methods to be taken for its prevention, be enlarged, and a closer sanitary supervision be maintained over individuals suffering from this disease in the densely populated tenement districts and in the crowded workshops and public buildings of this city."



To put these recommendations so far as possible into operation, the following amendment to the Sanitary Code was adopted on January 19, 1897:

"Section 225. That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in this city to report to the Sanitary Bureau, in writing, the name, age, sex, occupation and address of every person having such disease who has been attended by, or who has come under the observation of such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent or physician of each and every public or private institution or dispensary in this city, to report to the Sanitary Bureau in writing, or to cause such report to be made by some proper and competent person, the name, age, sex, occupation and last address of every person afflicted with this disease who is in their care, or who has come under their observation, within one week of such time. It shall be the duty of every person sick with this disease and of every person in attendance upon any one sick with this disease, and of the authorities of public and private institutions or dispensaries, to observe and enforce all the sanitary rules and regulations of the Board of Health for preventing the spread of pulmonary tuberculosis."

The purpose of the Department in adopting the recommendations and the amendment to the Sanitary Code as they appear above, was .

First—To extend and to give legal force to the measures which had already been in operation under the resolutions of the Board of Health for three years.

Second—To increase the information of the Health Department in regard to the extent and the dissemination of pulmonary tuberculosis in the City, and

Third—To provide, if possible, a hospital (which, as was distinctly stated in the communication, should not in any way encroach on the province of those already caring for patients suffering from this disease), for the accommodation of the poor "suffering from pulmonary tuberculosis, who, as active sources of danger to the community, may properly come under its supervision."

It has not been the policy of the Health Department in the past, nor is it its purpose in the future, to inspect or interfere in any way with those cases of pulmonary tuberculosis occurring among the higher classes of the community, especially those dwelling in private houses, which are not active sources of danger to others. It has been stated again and again by this Department in its various communications that the sole source of danger in pulmonary tuberculosis is the sputum, and that if this be properly destroyed a consumptive may be "free of danger to his most intimate associates."

It is the desire and the purpose of the Board of Health, so far as lies in its power, to substitute in the public mind an intelligent conception of the nature of pulmonary tuberculosis, and the means by which it is transmitted, namely, the sputum, for the ignorance and unreasoning fear which often exist with regard to it.

It will be noted from the history of the action of the Department with regard to this disease, that the provisions of the Sanitary Code recently adopted do not represent any hasty or inconsiderate action; but that they



embody the final and logical result of continued progressive efforts which began in 1889, at the instance of Dr. J. D. Bryant, then Commissioner of Health.

Reference should be made finally to the efforts of the Department looking toward the prevention of tuberculosis, as transmitted from animals to human beings, in the development and establishment of a rigid supervision over the milk supply of New York City, and in the adoption of measures during the past year to subject all milch cows coming within its jurisdiction (about 4,000 in number) to the tuberculin test for the detection of tuberculosis. A rigid examination already exists for the detection of tuberculosis in animals slaughtered for food.

The statistics of the Health Department in regard to the tubercular diseases show that there has been a steady and continuous fall in the death-rate from these diseases for a series of years, altogether amounting during the past fifteen years to more than thirty per cent., and it is the firm conviction of the Board of Health that by the intelligent enforcement of proper measures, this disease may be restricted in a few years to far narrower limits, and that the enforcement of these measures will in nowise work a serious hardship to the unfortunate sufferers from it.

A careful study has been made under the supervision of Dr. Hermann M. Biggs, Pathologist and Director of the Bacteriological Laboratories, of the distribution of tuberculosis in the Fourth and Sixth Wards of this city during the last three years. The results of this study are also incorporated in the appendix to this communication.

The precise scope and character of the measures under the recent amendment to the Sanitary Code are described in the following circular:

#### CIRCULAR OF INFORMATION TO PHYSICIANS

*Regarding the Measures Adopted by the Board of Health for the Restriction and Prevention of Tuberculosis in the City of New York.*

It is well known to the physicians of the City of New York that for a number of years the Health Department has been earnestly engaged in the study of tuberculosis, the most wide-spread and fatal disease occurring in this city, and in the initiation of such measures for the curtailment of its ravages as seemed practicable and imperative.

From the beginning of this work the Board of Health has recognized the fact that, while tuberculosis is unquestionably a communicable disease, yet the liability to its transmission may be so greatly diminished by simple precautions as to sharply separate it from those diseases properly classed as contagious. It is to be remembered that, while tuberculosis is always the result of direct infection, yet it is far less readily communicated than such diseases as small-pox, scarlatina, etc., and that if proper sanitary conditions can be secured in each case, there is little danger of the transmission of the disease to others. The sanitary supervision of this disease should, therefore, be considered largely on the merits of individual cases and conditions, or of classes of cases and conditions.

Thus in its "Circular of Information for Consumptives and those living with them," the Health Department has emphasized these facts: That a person suffering from consumption may, if his sputum be properly cared for, pursue his usual avocations without endangering others; that the disease is often curable, and that early recognition greatly enhances the chances for recovery. As this relatively innocuous character of pulmonary tuberculosis is absolutely dependent upon the intelligent observation of simple and obvious measures for the disposal of the



sputum, the earlier efforts of the Board were largely either educational or directed to the collection of knowledge regarding such cases, or groups of cases, as seemed to constitute the most serious menace to the welfare of the public.

On February 13th, 1894, the Board of Health passed a series of resolutions designed to assist in the accomplishment of its aims in the suppression of tuberculosis. One of these resolutions involved the reporting of certain classes of cases of tuberculosis, and, in compliance with it, 4,166 cases were reported in 1894, 5,818 in 1895, and 8,344 in 1896, and the Department was enabled, without opposition and without the imposition of hardship upon individuals, to extend its educational influence and to protect a large number of persons from risks, which, without such measures, must inevitably have led to further serious spread of the disease.

In order to more firmly establish and to extend the work carried on under the measures above mentioned, on January 19th, 1897, the following amendment to the Sanitary Code was adopted by the Board of Health:

*"Sec. 225.—That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in this city to report to the Sanitary Bureau, in writing, the name, age, sex, occupation and address of every person having such disease who has been attended to by, or who has come under the observation of, such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent or physician, of each and every public or private institution or dispensary in this city, to report to the Sanitary Bureau, in writing, or to cause such report to be made by some proper and competent person, the name, age, sex, occupation and last address of every person afflicted with this disease, who is in their care or who has come under their observation within one week of such time. It shall be the duty of every person sick with this disease, and of the authorities of public and private institutions or dispensaries, to observe and enforce all the sanitary rules and regulations of the Board of Health for preventing the spread of pulmonary tuberculosis."*

This section of the Sanitary Code, in effect, gives legal force to the measures which had been provisionally adopted by the Board under resolutions three years earlier. It will be noted that in this section of the Sanitary Code, pulmonary tuberculosis is classed as an "infectious and communicable disease, dangerous to the public health," and is not grouped with the contagious diseases.

The following circular of information to physicians regarding the measures adopted by the Board for the restriction of this disease, was originally published in 1894, and was then forwarded to every physician practicing in this city. It is now re-issued by the Department, after being slightly modified to correspond with the provisions of the above amendment. It describes, in sufficient detail for the information of physicians, the purpose of the Health Board and the scope of its work in relation to tuberculosis. The circular follows:

"The communicability of pulmonary tuberculosis has been so thoroughly established, and is now so generally recognized by the medical profession throughout the world, that the Board of Health of New York City has determined to take active steps looking toward its prevention in this city, and has adopted the following measures:

"First—The Health Department will hereafter register the name, address, sex and age of every person suffering from tuberculosis in this city, so far as such information can be obtained, and will require that all physicians furnish such information to the Sanitary Bureau, as provided in the above section of the Sanitary Code (postal cards for reporting cases of tuberculosis will be forwarded on application). This information is solely for record, and in no instance will visits be made to such persons by the inspectors of the Department, nor will the Health Department assume any sanitary surveillance of such cases, unless the person resides in a tenement house or lodging house (unless in other cases the attending physician requests that an inspection of the premises be made). In no case where the person resides in a tenement house or lodging house will any action be taken, if the physician requests that no visits be made by inspectors, and is willing himself to deliver circulars of information, or to furnish such equivalent information as is required to prevent the communication of the disease to others.

"Second—When the Health Department obtains knowledge of the existence of cases of pulmonary consumption residing in tenement houses or lodging houses (unless the case has been reported by a physician and he requests that no visits be made) inspectors will visit the premises and family, will leave circulars of information and instruct the person suffering from consumption, or the family, as to the measures which should be taken to guard against the spread of the disease, and, if it is considered necessary, will make such recommendations for the cleansing or renovation of the apartment as may be required to free it from infectious material.



"Third—In cases in which it comes to the knowledge of the Health Department that rooms or apartments in tenement houses, lodging houses, etc., which have been occupied by a consumptive, have been vacated by death or removal, an inspector will visit the premises, and, when necessary, will direct the removal of infected articles, such as carpets, rugs, bedding, etc., for disinfection, and will make such written recommendations to the Board as may be required regarding the cleansing and renovation of the rooms or apartments. An order embodying these recommendations will then be issued on the owner of the premises, and compliance with this order will be enforced. No persons other than those there residing at the time will be allowed to occupy such rooms or apartments until the order of the Board has been complied with. Infected articles, such as carpets, rugs, etc., will, when necessary, be removed by the Health Department, disinfected and returned without charge to the owner.

"Fourth—For the prevention and successful treatment of pulmonary tuberculosis, it is of vital importance that a positive diagnosis be made at the earliest possible moment. In order that the assistance afforded by bacteriological examinations of the sputa may be at the command of physicians in all cases, *not under treatment in hospitals*, the Health Department is prepared to make such bacteriological examination, if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, *well-stoppered* bottles, accompanied by a blank giving the name, age, sex and address of the patient, the duration of the disease, and the name and address of the attending physician. Bottles for collecting the sputa, with blank forms to be filled in, can be obtained at any of the drug stores now used as stations for the distribution and collection of serum tubes for diphtheria cultures. After the sputum has been obtained, if the bottle, with the accompanying blank filled out, be left at any of these stations, it will be collected by the Health Department, the sputum examined microscopically, and a report of the examination forwarded to the attending physician free of charge. The information regarding cases of pulmonary tuberculosis, obtained by the Health Department through such bacteriological examinations of sputum, is solely for registration, and cases of pulmonary tuberculosis thus reported will not be visited by inspectors of the Health Department, nor will circulars be forwarded to them, without the special request of the attending physician.

"Fifth—The authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., are required to furnish to the Health Department the name, sex, age, occupation and last address of every consumptive coming under observation within seven days of such time. The premises occupied by all persons reported by the authorities of public institutions as suffering with pulmonary tuberculosis will be visited by inspectors of the Health Department, and such action taken as seems necessary.

"Sixth—The authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., will hereafter be required to furnish to the Health Department the name, sex, age, occupation, last address, and duration of residence in the institution of every inmate suffering from consumption, who is discharged from the institution, previous to or on the day of such discharge."

It is the earnest wish of the Board of Health that all practicing physicians in this city cooperate with the Board in an intelligent and sustained effort to restrict the ravages of this, the most prevalent and formidable disease with which we have to deal.

It has been considered desirable in this connection that the various communications and circulars in relation to this disease which have been issued by the Health Department from time to time should be appended, and also that certain other matter bearing upon the extent and communicability of pulmonary tuberculosis should be preserved for convenience of reference.

Respectfully submitted,

CHARLES G. WILSON,

*President.*



COMMUNICATIONS TO THE BOARD OF HEALTH AND CIRCULARS  
ISSUED BY THE BOARD IN RELATION TO  
PULMONARY TUBERCULOSIS.

---

*Communication Relating to the Causation and Prevention of Pulmonary Tuberculosis, Received from the Consulting Pathologists of the Department in Response to the Following Resolution of the Board of Health, Dated October, 1889.*

"Resolved, That Drs. T. M. Prudden, H. M. Biggs and H. P. Loomis, the Pathologists of this Department, be and are hereby requested to formulate a brief and comprehensive statement regarding the contagiousness of tuberculosis in man, stating therein the evidence of the same and recommending, in the briefest possible manner practicable, the simplest means of protection from its influence."

*Communication.*

The disease known as tuberculosis, and, when affecting the lungs, as pulmonary tuberculosis (consumption), is very common in the human being and in certain of the domestic animals, especially cattle. About one-fourth of all deaths occurring in the human being during adult life is caused by it, and nearly one-half of the entire population at some time in life acquires it. The disease is the same in nature in animals and in man, and has the same cause.

It has been proven beyond a doubt that a living germ, called the tubercle bacillus, is the cause and the only cause of tuberculosis. It does not seem necessary to state the facts upon which this assertion is based, for the observation first made by Robert Koch in 1882 has been confirmed so often and so completely, that it now constitutes one of the most absolutely demonstrated facts in medicine.

Tuberculosis may affect any organ of the body, but most frequently first involves the lungs. When the living germs find their way into the body they multiply there, if favorable conditions for their growth exist, and produce small new growths or nodules (tubercles) which tend to soften. The discharges from these softened tubercles, containing the living germs, are thrown off from the body. In pulmonary tuberculosis these germs constitute, in part, the expectoration. The germs thus thrown off do not grow outside the living, or animal body, except under artificial conditions, although they may retain their vitality and virulence for long periods of time even when thoroughly dried. As tuberculosis can only result from the action of these germs, it follows from what has just been said, that when the disease is acquired, it must result from re-



ceiving into the body the living germs that have come from some other human being, or animal, affected with the disease.

It has been abundantly established that the disease may be transmitted by meat or milk from tubercular animals. The milk glands in milch cows often become affected with the disease when their lungs are involved, and the milk from such animals may contain the living germs, and is capable of producing the disease. Among stall-fed dairy cows 20 or 30 per cent. are sometimes found to be affected with the disease. Tubercular animals are also frequently killed for food; their flesh sometimes contains the germs, and if not thoroughly cooked is capable of transmitting the disease. Boiling the milk or thoroughly cooking the meat destroys the germs. Although the meat and milk from tubercular animals constitute actual and important sources of danger, the disease is acquired, as a rule, through its communication from man to man.

Tuberculosis is commonly produced in the lungs (which are the organs most frequently affected) by breathing air in which the living germs are suspended as dust. The material which is coughed up, sometimes in large quantities, by persons suffering from consumption contains these germs, often in enormous numbers. This material when expectorated frequently lodges in places where it afterward dries, as on the streets, floors, carpets, clothing, handkerchiefs, etc. After drying, in one way or another, it is very apt to become pulverized and float in the air as dust.

It has been shown experimentally that dust collected from the most varied points, in hospital wards, asylums, prisons, private houses, etc., where consumptive patients are present, or have been present, is capable of producing tuberculosis in animals when used for their inoculation. Such dust may retain for weeks its power of producing the disease. On the other hand, dust collected from rooms in institutions or houses that have not been occupied by tubercular patients does not produce the disease when used for the inoculation of animals.

These observations show that where there are cases of pulmonary tuberculosis, under ordinary conditions, the dust surrounding them often contains the tubercle bacilli, and persons inhaling the air in which this dust is suspended may be taking in the living germs. It should, however, be distinctly understood that the breath of tuberculosis patients, and the moist sputum, received in proper cups, are not elements of danger, but only the dried and pulverized sputum. The breath and moist sputum are free from danger, because the germs are not dislodged from moist surfaces by currents of air. If all discharges were destroyed at the time of exit from the body, the greatest danger of communication from man to man would be removed.

It then follows, from what has been said, that tuberculosis is a distinctly preventable disease.

It is a well-known fact that some persons, and especially the members of certain families, are particularly liable to tuberculosis, and this liability can be transmitted from parents to children. So marked and so frequent



is this liability, and so frequent is the development of the disease in particular families, that the affection has long been considered hereditary. We now know that tuberculosis can only be caused by the entrance of the germ into the body, and that this transmitted liability simply renders the individual a more easy prey to the germs when once they have gained entrance.

The frequent occurrence of several cases of pulmonary tuberculosis in a family is, then, to be explained, not on the supposition that the disease itself has been inherited, but that it has been produced after birth by transmission directly from some affected individual. Where the parents are affected with tuberculosis the children from the earliest moments of life are exposed to the disease under the most favorable conditions for its transmission, for not only is the dust of the house likely to contain the bacilli, but the relationship also between parents and children, especially between mother and child, are of that close and intimate nature especially favorable for the transmission by direct contact.

If, then, tuberculosis is not inherited, the question of prevention resolves itself, principally, into the avoidance of tubercular meat and milk, and the destruction of the discharges, especially the sputum, of tubercular individuals. As to the first means of communication, those measures of prevention alone answer the requirements which embrace the governmental inspection of dairy cows and of animals slaughtered for food, and the rigid exclusion and destruction of all those found to be tubercular.

For the removal of the second means of communication—*i.e.*, the sputum of tubercular individuals—the problem is simple when the patients are confined to their rooms or houses; then wooden or pasteboard cups with covers should always be at hand for the reception of the sputum. These cups are supported in simple racks, and at least once daily, or more frequently if necessary, should be removed from the racks and thrown with their contents into the fire.

The disposition of the expectoration of persons who are not confined to their rooms or homes is a far more difficult problem. The expectoration certainly should not be discharged on the street, and the only practical means for its collection seems to be in handkerchiefs, which, when soiled, should at the earliest possible moment be soaked in a solution of five per cent. of carbolic acid and then boiled and washed. Handkerchiefs thus soiled are exceedingly dangerous factors in distributing tubercle bacilli; for when the sputum becomes dry it is easily separated in flakes from the cloth, and then soon becomes pulverized and suspended as dust.

It becomes evident, from what has been said, that the means which will most certainly prevent the spread of this disease from one individual to another, are those of scrupulous cleanliness regarding the sputum. These means lie largely within the power of the affected individual. It is, furthermore, to be remembered that consumption is not always, as was formerly supposed, a fatal disease, but that it is, in very many cases, a distinctly curable affection.



An individual who is well on the road to recovery may, if he does not with the greatest care destroy his sputum, diminish greatly his chances of recovery by self-inoculation.

While the greatest danger of the spread of the disease from the sick to the well is in private houses and in hospitals, yet, if this danger is thoroughly appreciated, it is for the most part quite under control, through the immediate destruction of the sputum and the enforcement of habits of cleanliness. But in places of public assembly, such as churches and theatres, particularly the latter, the conditions are different, and safety would seem to depend largely upon a dilution and partial removal of the floating and, possibly, dangerous dust by means of adequate ventilation.

Rooms in private houses and hospital wards that are occupied by phthisical patients should from time to time be thoroughly cleaned and disinfected; and this should always be done after they are vacated, before they are again occupied by other individuals.

Steamship companies should be obliged to furnish separate apartments for consumptive persons, so that no person in the exigencies of travel need be forced to share his room with one who might be a source of active danger to him.

We desire especially to emphasize the following facts:

- 1st. That tuberculosis is a distinctly preventable disease.
- 2d. That it is not directly inherited; and—
- 3d. That it is acquired by the direct transmission of the tubercle bacillus from the sick to the healthy, usually by means of the dried and pulverized sputum floating as dust in the air.

The measures, then, which are suggested for the prevention of the spread of tuberculosis are:

- 1st. The security of the public against tubercular meat and milk, attained by a system of rigid official inspection of cattle.
- 2d. The dissemination among the people of the knowledge that every tubercular person may be a source of actual danger to his associates, if the discharges from the lungs are not immediately destroyed or rendered harmless; and—
- 3d. The careful disinfection of rooms and hospital wards that are occupied, or have been occupied, by phthisical patients.

(Signed.)

HERMANN M. BIGGS, M.D.,  
T. MITCHELL PRUDDEN, M.D.,  
HENRY P. LOOMIS, M.D.,

*Pathologists to the New York City*

*Health Department.*



COMMUNICATION RECEIVED NOV. 28TH, 1893,

*From Hermann M. Biggs, M.D., Chief Inspector of Pathology, Bacteriology and Disinfection.*

NEW YORK, Nov. 28th, 1893.

Hon. CHAS. G. WILSON, *President* :

SIR—The most common and fatal disease which prevails in New York is both communicable and preventable. In 1892 more than six thousand deaths were reported to the New York City Health Department as due to tuberculosis. While this condition of affairs and its great significance has long been recognized by the Board of Health, owing to various considerations well known to those familiar with tuberculosis, this disease has not, up to this time, come under the official sanitary surveillance of the Department.

In 1889 the Board of Health requested its pathologists to formulate a brief statement regarding the communicability of tuberculosis and the best means for its restriction. In compliance with this request, a report on the nature and prevention of tuberculosis was made. The chief purpose of the Board then was the dissemination of the knowledge of the communicability of tuberculosis and the education of the people as to the preventable character of this disease. The report of the pathologists, and circulars based upon it, detailing measures of prevention, were then published and widely circulated by the Department.

In the Annual Report of the New York City Health Department for 1892, you have presented an analysis of the mortality tables of pulmonary diseases, showing the distribution, the ratio of increase and decrease in wards, relation to density of population, etc., of pneumonia, tuberculosis and bronchitis, which has brought out many important facts regarding the spread of these diseases, and especially of tuberculosis, and afforded many suggestions as to their sanitary surveillance and investigation.

The time, it seems to me, has now arrived when it becomes the duty of all sanitary authorities to assume a more aggressive attitude toward this, the most widely prevalent and fatal disease to which the human race is subject, and I desire to present to the Board for its consideration certain suggestions as to definite means which should be *at once* taken to prevent and restrict tuberculosis.

It may not be amiss, in order to bring out more forcibly the immediate necessity of such a course, to recount some of the known and now generally accepted facts regarding the nature of this disease. The disease known as tuberculosis may affect any organ or tissue of the body. When it affects the lungs it is called pulmonary tuberculosis, or consumption. In this form it causes about one-fourth of all deaths occurring in the human being during adult life, and more than one-half of the entire adult population at some time in life acquires it. It has been proven, beyond a doubt, that a living germ called the tubercle bacillus is the cause, and the only cause, of tuberculosis. When these germs find their way into the body they may multiply there, if favorable conditions for their growth exist, and produce small, new growths or nodules (tubercles), which tend to soften. The discharges from these softened tubercles, containing the living germs, are thrown off from the body. In pulmonary tuberculosis, the expectoration contains the germs, often in enormous numbers. It has been shown that many millions of tubercle bacilli may be discharged, under certain conditions, by one person suffering from tuberculosis, in the course of twenty-four hours. The germs thus thrown off do not grow outside the living human or animal body except under artificial conditions, but they may retain their vitality and virulence for long periods, even when thoroughly dried. As tuberculosis can only result from the action of these germs, it follows, from what has been said, that when the disease is acquired it must result from receiving into the body the living germs that have come from some other human being or animal affected with the disease—in other words, it cannot occur except by *direct communication* from some other individual or animal suffering from tuberculosis.

While the meat and milk of tubercular cattle may be important sources of danger, yet the disease is acquired as a rule through its communication direct from man to man. The expectoration of tubercular persons frequently lodges in places where it afterward dries, as on handkerchiefs, clothing, carpets, floors, the streets, and so on. After drying, it is very apt in one way or another to become pulverized and float in the air as dust. Pulmonary tuberculosis or consumption (the most common form of the disease) is usually produced by breathing air in which the living germs are suspended as dust. It has been shown, experimentally, that dust collected from the most varied points in hospital wards, asylums, prisons, hotel bedrooms, private houses, etc., where consumptive patients have lived, is capable of producing the disease. Such dust may retain for weeks, and even for months, its power of causing the disease, and persons inhaling the air in which this dust is suspended breathe in the living germs. It should, however, be distinctly understood that the breath of tubercular patients and



the moist sputum received in proper cups, are not elements of danger; but only the dried and pulverized sputum. The breath and moist sputum are free from danger, because the germs are not dislodged from moist surfaces by currents of air. If all discharges were destroyed at the time of their exit, by far the greatest danger of communication from man to man would be removed.

It is a well-known fact that some persons, and especially the members of some families, are particularly liable to tuberculosis. So marked and so frequent is the development of the disease in certain families that the infection has long been considered hereditary. We now know that the disease itself is very rarely hereditary; but that there is inherited a liability to the disease, which renders the individual a more easy prey to the living germs when once they have gained an entrance.

Where the parents are affected with tuberculosis, the children, from the earliest moments of life, are exposed to the disease under the most favorable conditions for its transmission, for not only is the dust of the house likely to contain the bacilli, but the relation also between parents and children, especially between mother and child, are of that close and intimate nature especially favorable for transmission by direct contact. The frequent occurrence of several cases of pulmonary tuberculosis in a family is, then, not to be explained on the supposition that the disease itself has been inherited, but that it has been produced after birth by transmission direct from some other individual.

It follows from what has been said that tuberculosis is a communicable disease, and is distinctly preventable. The means which are most certain to prevent its spread from one individual to another are those of scrupulous cleanliness regarding the sputum. These means are largely within the control of the affected individual. It should be constantly kept in mind that it is the sputum, and the sputum alone, which is commonly the important agent in its transmission.

It is furthermore to be remembered that consumption is not always, or even generally, as was formerly supposed, a fatal disease, but that in a very large proportion of cases, if recognized early, it is a distinctly curable affection. An individual who is well on the road to recovery may, if he does not with the greatest care destroy his sputum, diminish by self-inoculation his chance of recovery.

The following facts should be especially emphasized:

First—That tuberculosis is a communicable disease, and is distinctly preventable.

Second—It is acquired by the direct transmission of the tubercle bacilli from the sick to the well, usually by means of the dried and pulverized sputum floating as dust in the air.

Third—It can be largely prevented by simple and easily applied measures of cleanliness and disinfection.

The time has arrived when the knowledge concerning the causation, extension and prevention of pulmonary tuberculosis is sufficiently definite to make possible the adoption of important practical measures for its restriction; yet these measures must at present differ in many respects from the more summary proceedings justified in other more readily transmitted diseases, more properly called contagious; for it is to be remembered, that while tuberculosis is always the result of infection, yet it is far less readily communicated than some contagious diseases, and, with proper precautions, victims of this disease may, without endangering others, pursue their usual avocations.

I would therefore recommend:

First—That there be systematically disseminated among the people, by means of circulars, publications, etc., the knowledge that every tubercular person may be a source of actual danger to his associates, and his own chances of recovery may be diminished, if the discharges from the lungs are not immediately destroyed or rendered harmless.

Second—That all public institutions, such as asylums, homes, hospitals, dispensaries, etc., be required to transmit to the Board of Health the names and addresses of all persons suffering from pulmonary tuberculosis, within seven days of the time when such person first came under observation.

Third—That special inspectors be assigned to duty for the investigation of this disease, and whenever the Department has become aware of the existence of families or premises where tuberculosis exists, or has recently existed (as in case of death or removal), it shall be the duty of these inspectors to visit such premises, deliver proper circulars and give suitable information to the persons residing there, and take such specific measures of disinfection as are required in each case.

Fourth—That the Board urge upon hospital authorities the importance of separation, so far as possible in the hospitals of this city, of persons suffering from pulmonary tuberculosis from those affected with other diseases, and urge that proper wards be set apart for the treatment of this disease.



Fifth—That the Department of Charities and Correction of this city be requested to provide a hospital, to be known as "The Consumptive Hospital," to be used for the exclusive treatment of this disease, and that, so far as practicable, all inmates of the various institutions under its care, suffering from tuberculosis, be transferred to this hospital.

Sixth—That the Health Department undertake the bacteriological examination of the sputum for diagnosis in every case of pulmonary disease of doubtful character in private dwellings, boarding-houses or tenement-houses, where the physician in attendance desires that this should be done. This procedure to be carried out with a view of obtaining definite knowledge upon which the proper sanitary surveillance of those suffering from tuberculosis can be based.

Seventh—That all physicians practising their profession in this city be requested to notify this Board of all cases of pulmonary tuberculosis coming under their professional care.

For the proper performance of the preliminary work as detailed above, a special corps of medical inspectors should be provided, whose duties should be entirely confined to work connected with the investigation of tuberculosis, and the carrying out of the means to be taken for its prevention.

Finally, in urging the adoption of the recommendations of this report, or some similar ones, I would add that there is, it seems to me, a wide-spread feeling among the medical profession and the laity that some efficient means should be at once taken to prevent the great and unnecessary loss of human life caused by consumption, and that it is imperative that sanitary authorities adopt such measures as science has shown to be practicable and efficient in controlling the ravages of this disease.

It is my belief that the New York City Board of Health, which has so often achieved such notable success in the management and control of other contagious diseases, should take the lead in this matter and adopt measures to meet this new and urgent demand upon its resources.

Respectfully submitted,

HERMANN M. BIGGS, M. D.,

*Chief Inspector of Pathology, Bacteriology and Disinfection.*

The above communication was referred to the Sanitary Committee, at a meeting of the Board of Health, held December 6th, 1893, and the said Committee reported as follows:

HEALTH DEPARTMENT,  
NO. 301 MOTT STREET,  
NEW YORK, December 13, 1893. }

Hon. CHARLES G. WILSON, *President*:

SIR—The report of Dr. Hermann M. Biggs, the Bacteriologist of this Department, relative to tuberculosis, is, in the opinion of the Chairman of the Sanitary Committee, timely and well advised. The subject is well summed up in the three facts relative to the disease set forth on page 2, to wit:

First—Tuberculosis is a communicable disease and is distinctly preventable. Second—It is acquired by direct transmission of the tubercle bacilli from the sick to the well, usually by means of the dry and pulverized sputum floating as dust in the air. Third—It can be largely prevented by simple and easily applied measures of cleanliness and disinfection.

The following recommendations, based upon the foregoing premises, are approved and offered to the Board for its consideration:

First—That a circular be prepared for distribution among the people, setting forth the danger of transmission of tuberculosis, and the fact that the discharges from the lungs of tuberculous patients are not only dangerous to others, but also to the patient afflicted, and also setting forth the danger of expectorating in places where the sputum is liable to be dried and carried by the air in the form of dust.

Second—That physicians and other persons, to whom the knowledge of the existence of a case of tuberculosis may come, be requested to report to this Department the name, sex, age and address of every such case within seven days of the time when such sick person came under observation.

Third—That the medical sanitary inspectors shall, as a part of their duty, investigate cases of the disease reported, and, if requested, take specimens of the sputa in doubtful cases for diagnostic purposes, the same as is done in cases of diphtheria. These specimens shall be transmitted to the Division of Bacteriology for examination, and the Division of Bacteriology should be properly equipped for such examinations, for the purpose of obtaining definite knowledge upon which the proper sanitary surveillance of those suffering from tuberculosis can be based. Upon the verification of the diagnosis, the inspector shall visit the physician reporting each case and request him to fully instruct his patient, and the persons with



whom he is in contact, concerning the nature of the disease and the danger of its transmission. If the case be reported by laymen, or if the physician prefers that the inspector should assume the aforesaid duty, then the inspector shall personally perform the service.

Fourth—The following preamble and resolutions should be adopted and sent to each of the general hospitals and to the Commissioners of Charities and Correction:

WHEREAS, Tuberculosis is a communicable disease and is distinctly preventable; and,

WHEREAS, It is acquired by the direct transmission of the tubercle bacilli from the sick to the well, usually by means of the dried and pulverized sputum floating as dust in the air; and,

WHEREAS, It can be largely prevented by simple and easily applied measures of cleanliness and disinfection, and, to an extent, by segregation of those suffering from it; be it

*Resolved*, That this Board urge upon hospital authorities of the City of New York the importance of separation, as far as possible in the hospitals of this city, of persons suffering from pulmonary tuberculosis from those affected with other diseases, and urge that proper wards be set apart for the exclusive treatment of this disease; and be it further

*Resolved*, That the Commissioners of Charities and Correction be recommended to take such steps as will enable them to have and control a hospital, to be known as the "Consumptive Hospital," to be used for the exclusive treatment of this disease, and that, as far as practicable, all inmates of the institutions under their care suffering from tuberculosis be transferred to this hospital.

Fifth—It is recommended that the disinfecting corps disinfect places where evidences of infection from tuberculosis exist, whenever in the opinion of the Chief Inspector of Contagious Diseases it shall be necessary.

Sixth—It is recommended that suitable receptacles (cuspidors) be provided and properly cared for in all places where persons are brought together, or caused to congregate for any purpose, especially in factory buildings.

Respectfully submitted,

CYRUS EDSON, M.D.,

*Chairman of the Sanitary Committee.*

The above report was approved and adopted by the Board of Health at a meeting held November 13, 1893.

COMMUNICATION RECEIVED JANUARY 24, 1894,

*From Hermann M. Biggs, M. D., Chief Inspector of Pathology, Bacteriology and Disinfection.*

HEALTH DEPARTMENT,

NO. 301 MOTT STREET,

NEW YORK, January 24, 1894.

Hon. CHARLES G. WILSON, *President*:

SIR—I have the honor to recommend that the Board take such action as shall be required to authorize the employment of the following measures for the sanitary surveillance of pulmonary tuberculosis:

First—That circulars of information be forwarded to all practising physicians in this city.

Second—That the authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., be required to forward to the Department the name, last address, age and sex of every consumptive person coming under observation, within seven days of such time.

Third—That medical sanitary inspectors detailed for this work visit the premises in all cases, unless otherwise ordered, when the Department obtains knowledge of the existence of cases of pulmonary tuberculosis, and distribute circulars and instruct the consumptive and the family as to the measures to be taken to prevent the dissemination of the disease, and, if required, give such directions and advice as shall seem necessary for the cleansing or renovation of the apartment to render it free from infectious material.

Fourth—That medical sanitary inspectors also visit all premises which have been occupied by consumptive patients and vacated either by death or removal, and shall direct as to the removal of infected articles for disinfection by the Department, and shall forward written recommendations as to the cleansing and renovation of the premises. On the basis of these recommendations an order shall be issued by the Board on the owner of the premises with directions as to their renovation, notifying him that the Board will not allow the premises to be occupied by any other persons than those living there at the time, until the order has been complied with. At the same time the following placard, with the name and address filled in, shall be furnished to a sanitary inspector to be pasted upon the door of the apartment:



## HEALTH DEPARTMENT.

No. 301 Mott Street, New York.

## NOTICE.

Consumption is a communicable disease. This apartment has been occupied by a consumptive, and has thus become infected. It must not be occupied by persons other than those now residing here until an order of the Board of Health, directing that it be cleansed and renovated, has been complied with.

Name of occupant.....

Floor.....No. ....Street.

This notice must not be removed until the order of the Board of Health has been complied with.  
By order,

Fifth—That suitable arrangements be made by the Department for the collection and microscopical examination of the sputa for diagnosis of persons thought to be suffering from pulmonary tuberculosis, where the name, address, age and sex of such person, and the name and address of the attending physician, accompany the specimens of sputa for record.

Sixth—That the Department issue circulars from time to time covering all the various phases of the question of tuberculosis and its prevention, for the education of the people in regard to these matters.

Respectfully submitted,

HERMANN M. BIGGS, M. D.,

*Chief Inspector of Pathology, Bacteriology and Disinfection.*

The above report was referred to the Sanitary Committee, and at a meeting of the Board of Health held February 13th it was, on motion of the Chairman, approved and adopted, and the circulars of information were ordered printed.

## CIRCULAR OF INFORMATION TO PHYSICIANS

*Regarding the Measures Adopted by the Board of Health for the Prevention of Tuberculosis in the City of New York.*

*Health Department, Criminal Court Building, Centre, White, Elm, and Franklin Streets.  
Dated February 15, 1894.*

The communicability of pulmonary tuberculosis has been so thoroughly established, and is now so generally recognized by the medical profession throughout the world, that the Board of Health of New York City has taken active steps looking toward its prevention in this city, and has adopted the following preliminary measures:

First—The Department will hereafter register the name, address, sex and age of every person suffering from tuberculosis in this city, so far as such information can be obtained, and respectfully requests that hereafter all physicians forward such information on the postal cards ordinarily employed for reporting cases of contagious diseases. This information will be solely for the use of the Department, and in no case will visits be made to such persons by the inspectors of the Department, nor will the Department assume any sanitary surveillance of such patients, unless the person resides in a tenement-house, boarding-house or hotel, or unless the attending physician requests that an inspection of the premises be made; and in no case where the person resides in a tenement-house, boarding-house or hotel, will any action be taken if the physician



requests that no visits be made by inspectors, and is willing himself to deliver circulars of information, or furnish such equivalent information as is required to prevent the communication of the disease to others.

Second—Where the Department obtains knowledge of the existence of cases of pulmonary consumption residing in tenement-houses, boarding houses or hotels (unless the case has been reported by a physician and he requests that no visits be made), inspectors will visit the premises and family, will leave circulars of information, and instruct the person suffering from consumption and the family as to the measures which should be taken to guard against the spread of the disease, and, if it is considered necessary, will make such recommendations for the cleansing or renovation of the apartment as may be required to render it free from infectious matter.

Third—In all cases where it comes to the knowledge of the Department that premises which have been occupied by a consumptive have been vacated by death or removal, an inspector will visit the premises and direct the removal of infected articles, such as carpets, rugs, bedding, etc., for disinfection, and will make such written recommendations to the Board as to the cleansing and renovation of the apartment as may be required. An order embodying these recommendations will then be issued to the owner of the premises, and compliance with this order will be enforced. No other person than those there residing at the time will be allowed to occupy such apartments until the order of the Board has been complied with. Infected articles, such as carpets, rugs, etc., will be removed by the Department, disinfected and returned, without charge to the owner.

Fourth—For the prevention and treatment of pulmonary tuberculosis, it becomes of vital importance that a positive diagnosis shall be made at the earliest possible moment; and that the value of bacteriological examinations of the sputa for this purpose may be at the service of physicians in all cases not under treatment in hospitals, the Department is prepared to make such bacteriological examinations for diagnosis, if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, stoppered bottles, accompanied by the name, age, sex and address of the patient, duration of the disease, and the name and address of the attending physician. Bottles for collecting such sputa, with blank forms to be filled in, can be obtained at any of the drug stores now used as stations for the distribution and collection of serum tubes for diphtheria cultures. After the sputum has been obtained, if the bottle, with the accompanying slip filled out, is left at any one of these stations, it will be collected by the Department, examined microscopically, and a report of the examination forwarded to the attending physician free of charge.

Fifth—The *authorities of all public institutions*, such as hospitals, dispensaries, asylums, prisons, homes, etc., are required to furnish to the Department the name, sex, age, occupation and last address of every consumptive coming under observation within seven days of such time.

It is the earnest wish of the Board of Health that all practicing physicians in this city co-operate with the Board in an earnest and determined effort to restrict the ravages of this, the most prevalent and formidable disease with which we have to deal.

By order of the Board of Health,

CHARLES G. WILSON, *President*.

EMMONS CLARK, *Secretary*.

## INFORMATION FOR CONSUMPTIVES AND THOSE LIVING WITH THEM.

*Health Department, Criminal Court Building, Centre, White, Elm and Franklin Streets,  
New York.*

Consumption is a disease of the lungs, which is taken from others, and is not simply caused by colds. A cold may make it easier to take the disease. It is caused by germs, which usually enter the body with the air breathed. The matter which consumptives cough or spit up contains these germs in great numbers—frequently millions are discharged in a single day. This matter, spit upon the floor, wall or elsewhere, dries, and is apt to become powdered and float in the air as dust. The dust contains the germs, and thus they enter the body with the air breathed. The breath of a consumptive does not contain the germs, and will not produce the disease. A well person catches the disease from a consumptive only by in some way taking in the matter coughed up by the consumptive.

Consumption can often be cured if its nature be recognized early, and if proper means be taken for its treatment. *In a majority of cases it is not a fatal disease.*

It is not dangerous for persons to live with a consumptive, if the matter coughed up by the consumptive be at once thoroughly destroyed. This matter should not be spit upon the floor, carpet, stove, wall or street, or anywhere except into a cup kept for that purpose. The cup should contain water so that the matter will not dry, or better, when possible, the cup should



contain carbolic acid in a five per cent. watery solution (six teaspoonfuls in a pint of water). This kills the germs. The cup should be emptied into the closet at least twice a day, and carefully washed with boiling water.

Great care should be taken by consumptives to prevent their hands, face and clothing from becoming soiled with the matter coughed up. If they do become thus soiled, they should be at once washed with soap and hot water. When consumptives are away from home, the matter coughed up should be received on cloths (or in paper cups made for this purpose), which should be at once burned on returning home. If handkerchiefs be used (worthless cloths, which can be at once burned, are far better), they should be boiled for at least half an hour in water by themselves before being washed. The use of cloths and handkerchiefs to receive the matter coughed up should be avoided as much as possible, because it readily dries on these, becomes separated and scattered into the air. Hence, *when possible, the matter should be received into cups*. Paper cups are better than ordinary cups, as they with their contents may be burned up after being used. A cheap and convenient form of paper cup for this purpose may be purchased at many drug stores.

It is better for a consumptive to sleep alone, and all his personal clothes and bed clothing should be boiled for at least one-half an hour separately from the clothing belonging to other people.

Whenever a person is thought to be suffering from consumption, the name and address should be sent at once to the Health Department, on a postal card, with the statement of this fact. A medical inspector from the Health Department will then call and examine the person to see if he have consumption, providing he has no physician, and, if necessary, will give proper directions to prevent others from catching the disease.

If the matter coughed up be properly destroyed, a person suffering from consumption may frequently not only do his usual work without giving the disease to others, but may also thus improve his own condition and his chances of getting well.

Rooms which have been occupied by consumptives should be thoroughly cleaned, scrubbed, whitewashed, painted or papered before they are again occupied. Carpets, rugs, bedding, etc., from rooms which have been occupied by consumptives, should be disinfected. Such articles, if the Health Department be notified, will be sent for, disinfected, and returned to the owner free of charge, or, if he so desire, they will be destroyed.

By order of the Board of Health,

CHARLES G. WILSON,

*President.*

EMMONS CLARK, *Secretary.*

(Printed in four languages—English, German, Italian and Hebrew.)

#### EXTRACTS FROM SCIENTIFIC BULLETIN NO. 2.

*"The Sanitary Supervision of Tuberculosis as Practiced in New York City."*

"By Hermann M. Biggs, M.D., Pathologist and Director of the Bacteriological Laboratories, and John Henry Huddleston, M.D., Medical Inspector."

(Dated November, 1894.)

"A supply of these circulars ('Information for Consumptives and those Living with them') was sent to the hospitals and dispensaries throughout the city, with the request that a copy be given to every consumptive patient applying for relief, and, in addition, copies have been delivered, generally by an inspector, to all reported living cases of tuberculosis, except those under the care of private physicians.

"A registry of reported cases was begun the first day of March, and from that day till the first of November, 1894, 3,252 living cases had been



reported to the Department. Notice was sent to all the hospitals, dispensaries and other institutions in the city where cases of tuberculosis might be treated, informing them of the new requirements of the Health Department, and directing that reports of all cases be sent to the Department weekly, in accordance with the resolution of the Board.

"The circular of information delivered to physicians asked for their co-operation and requested that reports be sent of all cases that came under observation. The reports from private physicians were not made compulsory. From the two sources mentioned above, *i. e.*, institutions and private physicians, developed to their utmost, a nearly complete record of the cases of active tuberculosis living in any city might be obtained. It was not deemed wise, however, in the beginning, to make it obligatory for physicians to report cases, especially as it was comparatively easy to obtain reports from public institutions, which would give the most numerous class of patients and those whom it was most important to instruct.

"A registry of the deaths due to tuberculosis was also begun March 1, and this contained, on November 1, 3,316 names. This registry is made up by the examination daily of the death certificates filed with the Department, and a record is made of all those in which tuberculosis in any form is assigned as the cause of death.

"The records of living cases and of deaths are preserved in two card indices—one, a name index, arranged alphabetically, and the other a street index, arranged by streets and by the house number in each street. Dead cases are entered on blue cards and living cases on pink cards. In addition to the name and address there are entered on the cards the age, sex and occupation of the individual; in living cases also the institution from which reported and the date of report, and in dead cases the date of death. The registry finally is made more complete by plotting all cases on a series of maps which cover the whole of Manhattan Island. There are one hundred and ten of these maps bound in atlas form. They were made under the direction of the Department, and each one, three by two feet in size, is drawn to a scale of one hundred feet to an inch. This scale is large enough to show every house lot in the city by an area in which can be platted forty cases of tuberculosis. The maps are so arranged that they represent the sanitary districts of the United States census of 1890. These districts are supposed to contain a more or less homogeneous population. The entry of cases is made by conventional signs, which indicate the month and year of report, and whether the case is living or dead. It is believed that such a systematic study of the history of infected spots as can eventually be made from these maps will hardly fail to add greatly to our knowledge of the methods of extension of tuberculosis and the measures required for its repression.

"With certain exceptions, such as patients under the care of private physicians, all reported cases, living or dead, are assigned to the medical inspectors of tuberculosis for the district from which the cases are reported. The inspector visits the address given, and, if the patient is living, leaves



a circular of information and gives verbal instruction to the friends about the danger of infection and the care of the sputum. If the address is that of a dead patient, or if the patient, though living, has moved, the inspector examines the premises and makes such recommendations as seem to him necessary to render the habitation free from danger of infection. These recommendations, made out on a prescribed form, usually advise the following routine treatment of apartments: Kalsomined or whitewashed walls or ceilings are washed with a solution of washing soda (one-half pound to three gallons of hot water), and then kalsomined or whitewashed again; paper walls or ceilings are similarly washed and are repapered; the woodwork is scrubbed with the soda solution and repainted. The inspector's recommendations are forwarded to the Board, and on them as a basis a ten-day order is issued on the landlord requiring him to carry out the specified renovation. The execution of the order is then (as with all others of the Board) placed under the supervision of the Sanitary Police. The premises are reinspected, and if, at the expiration of ten days, the owner has not complied with the order, it is referred to the attorney of the Board for enforcement. This procedure was determined upon because of the difficulty of disinfection of apartments in which cases of tuberculosis have been, and the greater efficiency attained by the system of renovation. The method is easy of enforcement, as is shown by the fact that compliance with the order has not been refused in a single case. The chief point of interest in this plan is that renovation rather than disinfection is called for. Disinfection involves the use of materials and methods which are not universally familiar. The method of renovation required is understood by all, and is more efficient than any method of disinfection which could be employed; and, finally, disinfection often leaves the apartment in an undesirable condition, while renovation is, of course, always appreciated by the tenant. It is in line with this policy that soda solutions are advised for use instead of sublimate solutions. Soda is an efficient cleansing agent, is familiarly known, is usually in the house, and is comparatively inexpensive; and, finally, will be used, and used in sufficient quantity, while more expensive and unfamiliar disinfectants would not be employed.

"Not only the apartments, but the household goods should, of course, be freed from infection, and the attempt has been made to have goods, such as infected bedding, carpets, etc., disinfected at the city disinfecting station. This, however, has been only partially successful, for often a considerable interval has elapsed between the death of the patient and the visit of the inspector, and goods have often been washed, destroyed, or sent away to be cleaned. Still, when feasible, goods are removed by the Department and properly disinfected.

"At the same time that the other measures were introduced, arrangements were made for the collection and examination of sputa for the diagnosis of suspected cases of tuberculosis. This measure was designed to give greater accuracy to the work of the Health Department in dealing



with many cases, and to enlist the coöperation of physicians by affording them such assistance in the diagnosis of cases as otherwise would often be beyond their reach. It is in line with the previous work of the Department in making, without charge, bacteriological examinations for the diagnosis of diphtheria. In carrying out this measure, two-ounce glass jars with metallic screw-tops fitted with rubber washers are supplied at forty or more apothecary shops, scattered at convenient points throughout the city. These places are already familiar as depots for the distribution of 'culture outfits' for the examination of diphtheria. With the jars are delivered circulars containing the following directions as to the collection of sputa:

" 'Sputum should be collected only in clean, wide-mouthed, well-stoppered bottles, with a capacity of at least two ounces. Suitable bottles can be obtained at any of the depots for the distribution and collection of diphtheria culture tubes.

" 'Care should be taken that bronchial and not pharyngeal secretion is collected. The expectoration discharged early in the morning is to be preferred. If the expectoration is scanty, the entire amount discharged in twenty-four hours should be collected.

" 'The data asked in the accompanying blank should be carefully filled out in every case.'

" The data asked for are the name, age, sex, address and occupation of the patient, the name and address of the attending physician, the duration of the disease, and an answer to the question whether there have been previous cases of tuberculosis in the family. These are required for record in case the sputum contains tubercle bacilli, and examinations will not be made unless these data are forwarded with the sputum. The jars containing the sputa, and the forms filled out, are returned to the depot and are daily collected by an employee of the Department. The sputum is examined bacteriologically in the laboratory, and a report is sent to the attending physician the following day.

" In the prosecution of the work as above outlined certain difficulties have been encountered. These mainly relate to the obtaining of a full registration of cases. As yet, private physicians do not generally report their cases of tuberculosis, although more and more cases are being constantly reported, and the data in a constantly increasing number of cases are being obtained through the sputa examinations. The reports from institutions, therefore, furnish the largest proportion of the cases recorded, and such reports are in some instances very inaccurate. Many cases escape detection on account of the inefficient examination given patients. Incipient tuberculosis is not usually diagnosed in hospitals and dispensaries, and occasionally, perhaps, an erroneous diagnosis of tuberculosis is made. The addresses, also, given in many reports need revision. Patients frequently give their addresses wrongly through intention, and perhaps as frequently the clerk records the address incorrectly. Naturally, therefore, a great many false



addresses reach the Department and are excluded from the record only by the search of the inspector. Not infrequently, too, in death certificates, pneumonia and chronic bronchitis are given as the cause of death, to conceal cases of tuberculosis. The importance of this factor is increased through the influence of industrial insurance companies. It has been found that a large proportion, even of dispensary patients, carry a small life insurance, frequently just enough to pay funeral expenses, and if tuberculosis is ascribed as the cause of death, policies issued by many of the industrial insurance companies are wholly or in part vitiated. The number of persons who are interested that the word tuberculosis shall not appear on the death certificate may be inferred from the fact that investigation has shown that a single company carries nearly 400,000 policies in the metropolitan district, which corresponds pretty closely with the City of New York. Attempts to influence the statements on the death certificates are therefore common. Direct bribes are offered, and the remark, 'Well, doctor, if I don't get the insurance I cannot pay your bill,' may well be considered a forcible stimulus to some physicians to seek for other causes of death. An investigation is now being made of every case of death from diseases of the respiratory organs other than tuberculosis, to determine if the patient has been previously reported as suffering from tuberculosis, and in a number of instances such previous reports have been found.

"The obvious results of the work done thus far lie in the evident effects in the education of the people as to the infectious nature of tuberculosis and the means to be taken for its prevention, and in the destruction of sources of infection by the renovation of infected apartments. It may be doubted whether any considerable degree of popular information as to the necessity of care for the sputum can be diffused through the non-English speaking inhabitants of the poorest tenement-house districts, recruited as they continually are by fresh supplies of the most filthy and ignorant classes from all parts of Europe; but in the better class of tenements, where the inhabitants speak English, there has been already such a spread of knowledge concerning the nature of this disease that very frequently the inspectors now find at their first visits that all the precautions advised have been already taken. It is worthy of note, too, that while the number of apparent deaths from tuberculosis has been falling for several years, yet this year a much greater diminution has taken place than ever before.

"Another perhaps not unimportant result of the work in New York City is the influence on the action of other sanitary authorities. Similar measures have been adopted by the New York State Board of Health, and the measures and circulars of the New York City Board have been followed by sanitary authorities in many other cities, and by State Boards in other States. Still the work of restriction of tuberculosis even in New York has but just begun. Among the most pressing needs of the future are hospitals for the treatment of advanced cases, sanatoria



outside of New York, preferably in the pines of Long Island, for the care of incipient cases, inspection of factories, shops, and all other places where phthisical patients may be found, and the enforcement of sanitary measures in these places, in all places of public assembly, and in the means of public conveyance."

## CIRCULAR ISSUED IN 1896.

### *The Importance of Bacteriological Examinations in the Early Diagnosis of Pulmonary Tuberculosis.*

The symptoms of incipient pulmonary tuberculosis are few, not marked and not uniform. They are frequently not sufficient in number or importance to attract the attention of the affected individual, and their significance is often not recognized by physicians, as there are other conditions which closely resemble incipient pulmonary tuberculosis.

Tuberculosis results from the reception into a susceptible system of tubercle bacilli. These are usually drawn in with the air inspired, and find lodgment in some portion of the respiratory passages. There they increase in number, when conditions favorable for their multiplication exist, and by their growth set up an inflammation which becomes evident in the formation of new tissues, the so-called tubercle. The inflammatory changes are usually at first very slight and the effects entirely local. Moreover, in this early stage there is a marked tendency to a localization and restriction of the process and to an entire recovery. Many persons get well untreated. In such cases the tubercles are gradually replaced by fibrous tissue, and the bacilli die or are rendered harmless. At this time, *i. e.*, when a patient has tuberculosis, but when the disease is confined to a small, sharply circumscribed area, there is the best opportunity for successful treatment.

On the other hand, in a large percentage of the unrecognized and neglected cases, recovery does not take place, but the tubercular process extends; new tubercles form, the old ones become necrotic, and there is a coalescence of separate foci of infection, forming larger areas of disease, till a great part of one or both lungs is affected. At the same time, the bacilli in their growth form poisons which are absorbed by the system, and in the diseased or necrotic tissues other bacteria are deposited, producing the so-called mixed infection.

The disease has now assumed a far more serious aspect, is easily recognizable, and constitutes what is commonly called consumption. With few exceptions, this progresses to a fatal termination. The classical symptoms commonly assigned to early tuberculosis, *i. e.*, persistent cough with expectoration, loss of appetite and weight, hæmoptysis, are really signs, in most instances, not of the incipient affection, but of the advanced disease. In the early stage, a positive diagnosis is possible only when tubercle bacilli are found in the expectoration. It is an impression commonly held that the bacilli are not found unless the disease has advanced to a point at which the signs presented on a physical examination are themselves almost conclusive. Such, however, is not the case; bacilli are not infrequently found in the expectoration when the physical signs are indicative only of a slight bronchitis, or when there are absolutely no physical signs obtainable. When signs of consolidation are present, the affected area is always considerable, and always far greater than would be inferred from the evidences obtained on examination. It is, therefore, of supreme importance that the diagnosis should be made at the earliest possible moment. The expectoration should be examined early, and if bacilli are not found immediately, should be examined repeatedly in every case of doubtful diagnosis. All cases, also, in which there is a cough, with or without expectoration, persisting for more than a few weeks, and all cases in which there is unexplained pallor, loss of appetite, languor or loss of weight (general debility), even if the cough appears to be almost entirely absent, should be considered cases of doubtful diagnosis, and bacilli should be sought for in the expectoration.

In conclusion, emphasis should be laid upon the following clearly demonstrated facts:

First—Incipient tuberculosis tends to recovery.

Second—Advanced tuberculosis, with or without mixed infection, tends to a fatal issue.

Third—In all coughs which last more than a few weeks, tuberculosis is to be suspected as a cause.

Fourth—Successful treatment and prophylaxis demand the earliest possible diagnosis.



Fifth—The positive diagnosis of incipient pulmonary tuberculosis, properly so called, is possible only when tubercle bacilli are found in the expectoration.

Sixth—Repeated examinations of the expectoration are frequently necessary to demonstrate the presence of the tubercle bacilli in incipient cases of pulmonary tuberculosis.

By order of the Board of Health.

CHARLES G. WILSON,  
*President.*

EMMONS CLARK,  
*Secretary.*

---

COMMUNICATION RECEIVED, JANUARY 11, 1897,

*From Hermann M. Biggs, M.D., Pathologist and Director of Bacteriological Laboratories, and T. Mitchell Prudden, M.D., Consulting Pathologist.*

NEW YORK, January 11, 1897.

Hon. CHARLES G. WILSON, *President of the Board of Health:*

SIR—Nearly eight years ago the Health Department of the City of New York took its first steps in the education of the people regarding the communicable and preventable character of pulmonary tuberculosis. At that time this view of the nature of tuberculosis was held by only a very small proportion of the medical profession; now it is not only the universal conviction of the medical profession, but also a wide-spread belief among the laity, that pulmonary tuberculosis results solely from the transmission of infectious material from the sick to the well, and is wholly preventable.

It is a little more than three years since the Board determined that the time had arrived when more energetic measures for the prevention of this disease could be properly taken, and adopted resolutions requiring the notification of all cases occurring in public institutions in this city, the inspection of premises in tenement-house districts, the instruction of the occupants, when reported as suffering from tuberculosis, and the renovation, when required, of all rooms or apartments occupied by consumptives which had been vacated by death or removal. The Board also at this time offered to assist physicians, free of charge, in the diagnosis of cases of suspected tuberculosis, by the microscopical examination of the sputum.

The action of the Health Department, in relation to this disease, has always been as nearly abreast of the knowledge furnished by the most advanced scientific investigations as was practicable, and the methods adopted in the past have been followed by the most encouraging results.

The Department has cause for extreme gratification in the marked increase in intelligence and care, especially among the poor, which is observed in the presence of this disease, as the direct outcome of its conservative and educational policy, and in the proportionate curtailment of the danger and the suffering incident to it. During the past twelve years



there has been a reduction of more than thirty per cent. in the general mortality from all tubercular diseases in New York City.

But the time has now arrived, we believe, when more comprehensive and radical measures should be adopted to rapidly and materially diminish the prevalence of pulmonary tuberculosis in this city.

Some idea of the enormous sanitary importance of the subject is obtained by reference to the records of the Department showing the reported cases and deaths during the past year. Nearly 9,000 cases of tuberculosis were reported to this Department, and nearly 6,000 deaths resulted from this disease. It is conservatively estimated that at least 20,000 cases of well-developed and recognized pulmonary tuberculosis now exist in this city, and an additional large number of obscure and incipient forms of the disease. A very large proportion of the former cases constitute more or less dangerous centres for infection, the degree of danger depending, in each instance, upon the intelligence and care which is exercised in the destruction of the expectoration. It may be safely assumed that through the failure to carefully dispose of the sputum of consumptives, from thirty to fifty inhabitants of this city daily become infected by tuberculosis, and of these about one-half later die from the disease. All this suffering and death, in view of modern scientific knowledge, we know to be largely preventable by the efficient enforcement of simple, well understood, and easily applied, methods of cleanliness, disinfection and isolation.

The knowledge now at command regarding the methods of extension of pulmonary tuberculosis entirely justifies the belief that its ravages can as certainly be limited by proper sanitary control and appropriate treatment as can other infectious diseases, more acute, more dramatic, and more readily communicated, but at the same time far less prevalent, less fatal, and incomparably less important to the welfare of the community. We fully believe that with proper regulations tuberculosis may be restricted within the narrowest bounds, and eventually, perhaps, almost exterminated. This is not the idle dream of sanitary enthusiasts or theorists, but is a conviction founded upon the most thorough and conclusive experimental investigations, which have been amply confirmed by practical experience.

In order to make possible such restriction in the prevalence of this disease, it is necessary that the Health Department shall assume a more complete and comprehensive control. This requires, first, the adoption of such measures as shall make possible the general sanitary supervision of pulmonary tuberculosis, under well-defined conditions and regulations, differing in many respects from those applied to other more readily communicable diseases; second, the possession of such facilities for the care of the poor suffering from it as shall make possible the removal, when necessary, of those who are dangerous sources of infection.

From the beginning of this work the officials of this Department have encountered, in the utter lack of proper facilities for the care of con-



sumptives, an obstacle to practical success so great and so disheartening that we feel impelled to urge our conviction that the grave responsibilities which rest upon the Health Department in this matter cannot longer be adequately sustained without the immediate establishment, under its direct control, of a hospital for the care and treatment of this disease. No week passes in which the officials of this Department do not encounter many instances in which the members of many households, numerous inmates of crowded tenement houses, employees in dusty and unventilated workshops, and many others, are exposed to imminent peril from victims of this disease, to whom either the doors of our over-crowded public institutions are closed, or who reject all proffered assistance and instruction, and from ignorance, indifference, or inability through weakness due to the disease, scatter infectious material broadcast, and thus diminish their own chances for recovery, and imperil the health and safety of others. In such cases the sanitary suggestions of the Health Department Inspectors are now futile, and effective action impossible. We are convinced that no other factor is so potent to-day in perpetuating that ominous death-list from pulmonary tuberculosis as the lack of proper facilities for the care of the poor of this city stricken with this malady.

The best medical opinion forbids that persons suffering from pulmonary tuberculosis be treated in association with other classes of cases in the general medical wards of general hospitals. This opinion is based on the daily observation that consumptives, when occupying hospital wards in common with other classes of cases, not only constitute a serious source of danger to other patients, but that they are themselves placed under peculiarly unfavorable conditions. This is an opinion which the former action of this Board has done much to establish and extend. It has very properly resulted in the exclusion, to a large extent, of persons suffering from this disease, from many of the general hospitals to which they were formerly admitted.

The special hospitals for the treatment of pulmonary tuberculosis now existing in this city, are not free public hospitals, and are quite unable to meet the demands upon them by the poor. Much larger numbers than formerly of this unfortunate class of sufferers are forced to seek admission to the already over-crowded institutions of the Department of Public Charities, as other doors are closed to them; so that further provision for them must, of necessity, be made by the city. These cases appeal for care at all stages in the course of the disease; but, as a rule, seek for admission to the hospitals only when suffering with well developed or advanced forms of consumption.

The Department of Public Charities is not able to provide separate accommodations, excepting to the most limited extent, even for these advanced cases, and, as a result, actual isolation does not exist in any of the municipal institutions. In every one of the institutions of the Department of Charities and the Department of Corrections consumptives are found occupying beds in the general wards of the various hospi-



tals, associating with healthy prisoners in the cells, and in the greatly over-crowded work-rooms of the Workhouse and the penal institutions. Many of these cases, as we know from careful investigations, are sources of actual danger to their associates. No precautions whatsoever are taken with regard to the expectoration in many instances, and everywhere the precautions taken are utterly insufficient.

A communication has been referred recently to this Board by the Honorable Commissioner of Corrections regarding numerous cases of pulmonary tuberculosis which exist in the Workhouse, with the inquiry whether this Department could not, in some way, care for them. An investigation has shown that there are many cases of pulmonary tuberculosis among the inmates of the Workhouse; that these are, in part, in the hospital wards, and, in part, are among the well inmates in the sewing and work rooms, which are badly ventilated, dusty, and excessively over-crowded. It was found that in these rooms there were no sanitary provisions whatsoever in regard to the expectoration, and the most favorable conditions existed for the transmission of the disease.

Over 2,200 cases have been reported to this Board as admitted during the past year to the various institutions under the charge of the Department of Charities, and 900 cases in addition have been treated in the various dispensaries under the charge of the Department of Charities.

As the Health Department has already declared its conviction that pulmonary tuberculosis is a communicable disease, and has taken steps looking toward its prevention, and as the information at hand shows that it is far more fatal than any other communicable disease with which the Board has to deal, and destroys each year more lives than all the other communicable diseases together, it would seem self-evident that some efficient and far-reaching measures should be at once adopted to protect the inhabitants of this city from its further ravages.

The importance of provision for the separate care of persons suffering from other forms of communicable disease has long been universally admitted, and the maintenance of separate hospitals for these diseases is justly recognized as one of the most effective of the sanitary measures for securing public safety. There are most urgent reasons why similar measures should be adopted in dealing with pulmonary tuberculosis.

A large experience in this matter has shown that in institutions devoted solely to the care of consumptives, the general welfare of the patients is more easily fostered, the risks of fresh infections more certainly diminished, and the chances for recovery more surely enhanced, than in general hospitals in which all classes of cases are received.

We believe that such an institution in charge of the Health Department would secure all these advantages, without encroaching in any way upon the province of the institutions now caring for such patients, and would contribute, as no other measure can, to the success of the endeavor of the Department, now pursued in the face of hopeless obstacles, to curtail the ravages of pulmonary tuberculosis in New York.



We would, therefore, respectfully recommend :

1. That such action be taken by the Health Board as seems necessary and proper to at once secure the provision of hospital accommodations, under its charge, for the care of the poor suffering from pulmonary tuberculosis, who, as active sources of danger to the community, may properly come under its supervision.

2. That an amendment be made to the Sanitary Code declaring that tuberculosis be officially considered a communicable disease, and formulating regulations under which its sanitary surveillance shall be exercised.

3. That all institutions in this city which admit and treat cases of pulmonary tuberculosis be subjected to regular and systematic inspection by officials of this Board, and that specific regulations be established for the conduct of such institutions, in accord with the proposed amendment to the Sanitary Code.

4. That the scope of the measures designed for the education of the people in regard to the nature of pulmonary tuberculosis, and the methods to be taken for its prevention, be enlarged, and a closer sanitary supervision be maintained over individuals suffering from this disease in the densely populated tenement districts, and in the crowded work-shops and public buildings of this city.

(Signed) HERMANN M. BIGGS, M.D.,  
*Pathologist and Director of the Bacteriological Laboratories.*

T. MITCHELL PRUDDEN, M.D.,  
*Consulting Pathologist.*

Approved by the Board of Health of the Health Department, at a meeting held January 12, 1897.

CHARLES G. WILSON, *President.*

EMMONS CLARK, *Secretary.*

---

## Extracts from the Annual Report of the Board of Health of the City of New York for the Year 1896.

---

### REPORT ON DANGER OF INFECTION THROUGH EXPECTORATION IN PUBLIC PLACES.

NEW YORK, January 14, 1896.

Hon. CHARLES G. WILSON, *President :*

SIR—We desire to direct your attention anew to the continual transmission of infectious disease in public places through the expectoration of persons suffering with different forms of infectious diseases of the throat and lungs.



It has been for a long time well known that the expectoration of persons suffering from laryngeal or pulmonary tuberculosis (consumption), pneumonia, influenza or la grippe, and from diphtheria, contains the specific germs of these different diseases, and is capable of inducing these diseases in others. There is, furthermore, much evidence that a similar condition exists in certain more readily communicable diseases, such as scarlet fever, measles and whooping-cough.

In regard to some of these affections, the danger from the expectoration in public places is, of course, small, as the patients are ordinarily confined to their homes during the infectious period. But this is not universally the case. It has long since been shown that the chief means for the transmission of consumption is the dried and pulverized sputum of persons suffering from this disease. Such sputum may contain enormous numbers of living and virulent tubercle bacilli. Consumptives are often able to pursue their usual avocations for many years, and during all of this period the expectoration may contain the tubercle bacilli in large numbers.

It has been shown, with reference to diphtheria, that mild cases are frequently not recognized—are not regarded as diphtheria, while the diphtheria bacilli present in the throat secretion may, should they be transmitted, produce as virulent diphtheria in other persons as the bacilli from the severest types of the disease. These mild cases are often not confined to their homes at any period of the affection. Also during convalescence from more severe attacks, often for several weeks, the throat secretions may contain virulent diphtheria bacilli.

Again, in influenza, which at several periods during the last few years has been a source of great suffering and has led to a large mortality in this and other cities of this country, it has been conclusively shown that the expectoration ordinarily contains the influenza bacillus, and it is probable that the disease, as is the case with certain other infectious diseases, is largely communicated from person to person through the dried expectoration floating as dust in the air.

Occasionally, too, we find in health, or after convalescence from pneumonia, that the expectoration of apparently well persons contains the germs which cause pneumonia—pneumococci—and there is a large amount of evidence that this disease, which is undoubtedly under certain conditions communicable, is spread to no inconsiderable extent through the agency of such germ-laden expectoration.

The studies of the past years have shown that there are certain germs in the mouths and throats of many persons suffering from catarrhal affections which, while not ordinarily dangerous, may become so when they gain entrance through contaminated dust to the respiratory organs of susceptible persons.

It is not necessary, we believe, to refer in detail to the possible dangers connected with the expectoration in other infectious diseases. Enough has been said to indicate clearly the risks to which all persons



are subjected who ride in public conveyances in this city, or who are exposed in other public places to an atmosphere contaminated with dust arising from mats, floors, etc., soiled by sputum. The floors and platforms of the street cars and of the elevated cars, and particularly the stairs of the elevated road stations, and the platforms and floors of the stations themselves, are constantly being soiled by expectoration. This dries and pulverizes (the fibre mats of the elevated cars especially favor these processes) and shortly floats in the air as dust. Thus the passengers and occupants of these conveyances and stations are constantly more or less exposed to the germs of infectious disease through the breathing of this dust.

Another grave feature of this pollution of public places of assembly and public conveyance is the inevitable transportation of this always objectionable and frequently dangerous material on the footwear and on the clothing, and particularly the skirts of women, into private houses, where, in the absence of the most perfect system of ventilation and cleansing, it is a constant menace to the welfare of the occupants, whose attempts to maintain salubrious conditions in their homes are rendered, in an important particular, futile, through the vicious practices of others in public places.

Aside from these real and, as we believe, important dangers from a sanitary standpoint, the filthy habit of spitting in public places and conveyances is frequently an intolerable nuisance, and should not be permitted in a well regulated and intelligently governed community. This should be abated, as is any other public nuisance which is brought to the attention of this Department. That it is simply a habit, and not a necessity, is clearly shown by the large number of men who are free from it, and the insignificant proportion of women who practice it. There seems to be no good reason for the longer sufferance by the mass of people of the carelessness and negligence of the few. We believe that this is a matter of great importance, and that, on this ground alone, it demands the interference of your Board. We are aware that this subject has frequently engaged the attention of your Board, and that action has been delayed because of certain difficulties inherent in the problem, but we believe that the time has now arrived when the people of the City of New York will heartily support the adoption of such sanitary regulations as may seem necessary and expedient for the abatement of this wide-spread nuisance and source of danger. In Paris the authorities have caused to be placed in public conveyances a notice, which is signed by the Prefect of Police, cautioning people against expectoration upon the floor. Notices, with similar intent, have been posted in public conveyances in Belfast, Scotland, in Philadelphia, and in other places.

In view of all these facts, we would recommend to the consideration of your Honorable Board the following preamble and resolutions:

WHEREAS, It is a common practice to expectorate on the floors or on the mats in various public conveyances of this city, and upon the stairs, floors and platforms of the stations of the elevated roads, and upon the floors of halls and rooms in public buildings; and—



WHEREAS, It has been conclusively shown that in several forms of infectious diseases, the expectoration is a means of transmission of the disease, and that when coming from persons suffering from such diseases, who are able to go about in public places, it is a distinct and frequent source of danger; and—

WHEREAS, This diffusion of dangerous and infectious material is the result of carelessness and negligence, and is unnecessary and is a public nuisance; therefore, be it

*Resolved*, That notices be posted in all public places and in the halls and assembly rooms of all municipal and Federal buildings, and in all surface and elevated cars in this city, signed by the Board of Health, warning passengers against expectoration upon the floors of such places, and, further, that similar notices be posted in the stations of the elevated roads warning against expectoration upon the platforms and stairs or on the floors of such stations.

*Resolved*, That the municipal authorities be requested to provide sufficient and proper receptacles for expectoration for such public places as are in their control, and that the managers of the roads be required to provide similar receptacles, sufficient in number for their stations and platforms, and that in all cases these receptacles be kept in a cleanly condition.

*Resolved*, That the officers of the Manhattan Elevated Road be requested to give peremptory orders to their guards to refrain from and to prevent, so far as is possible, expectoration from the trains into the streets, and that the officers of all railroads, and the officers in charge of all public buildings in this city, be requested to secure the enforcement of the above regulations.

Respectfully submitted,

HERMANN M. BIGGS,  
T. MITCHELL PRUDDEN.

## REPORT ON THE DISTRIBUTION OF TUBERCULOSIS IN NEW YORK CITY.

*To the Pathologist and Director of the Bacteriological Laboratories:*

SIR—I have the honor to report herewith the results of an investigation, made in accordance with your directions, to determine the distribution of tuberculosis in New York City, which demonstrates, by statistical tables and maps, that consumption is unquestionably an infectious disease, as proved by its grouping, like other infectious diseases, in this city; that it is not generally diffused, but is confined to rather narrow limits, chiefly in the old and densely populated parts of the city; that, in consequence of its distribution, and the fact that it is a germ disease, there is good reason to believe that the necessary sanitary measures will prevent its diffusion and lower the death-rate; and that these observations are fully confirmed by the experience of others, both in this country and in Europe.

Attention is first directed to Table I, Fourth Ward, which gives the streets, number of houses, and number of cases of tuberculosis reported in these houses, and cases per house, during the last three years. The following is a summary of this table:

Number of streets in which cases occurred.....	21
Number of houses in which cases occurred.....	248
Number of cases in 1894.....	173
Number of cases in 1895.....	161
Number of cases in 1896.....	207
Total number of cases in three years.....	541
Average number of cases per house.....	2.81

According to the census of 1896, there are 663 inhabited houses in the Fourth Ward, with a population of 18,323, or an average number of 27.6 persons per house.



The following tables have been prepared to show the distribution of tuberculosis in this ward :

Total number of inhabited houses in the Fourth Ward.....	663	Population in the Fourth Ward..	18,323
Number of Houses infected.....	248	Cases per 1,000 in 1894.....	9.4
Percentage of houses infected.....	37.3	Cases per 1,000 in 1895.....	8.7
		Cases per 1,000 in 1896.....	11.2
Total number of houses.....	663	Total cases per 1,000 in three years.....	29.3
Total number of cases.....	541		
Cases per house in the Fourth Ward....	0.81		

TABLE I.—WARD IV.

*Streets, Number of Houses and Cases of Tuberculosis, and Cases per House, 1894-97.*

STREETS.	HOUSES.	1894.	1895.	1896-97.	TOTAL.	CASES PER HOUSE.
Chatham street.....	4	10	5	5	20	5.
Chatham Square.....	5	2	9	..	11	2.2
William street.....	7	3	3	6	12	1.7
Rose street.....	4	3	..	4	7	1.7
Madison street.....	17	12	12	15	39	2.3
Gold street.....	1	1	..	..	1	1.
Vandewater street.....	3	2	1	..	3	1.
Pearl street.....	19	17	20	20	57	3.
New Bowery.....	3	2	2	1	5	1.6
South street.....	8	5	3	5	13	1.6
Water street.....	20	8	9	16	33	1.6
Cherry street.....	43	26	25	44	95	2.2
New Chambers street.....	10	9	8	11	28	2.8
Roosevelt street.....	32	18	12	37	67	2.1
Oak street.....	13	8	16	9	33	2.5
James Slip.....	2	2	1	3	6	3.
James street.....	19	13	15	11	39	2.
Catharine street.....	7	5	3	2	10	1.4
Oliver street.....	28	24	10	17	51	1.8
Henry street.....	2	1	1	1	3	1.5
Batavia street.....	1	2	6	..	8	8.
Twenty-one streets.....	248	173	161	207	541	2.81

In a total number of 663 dwellings, with a population of 18,323, or 27.6 persons per house, 248 houses, or 37.3 per cent., were infected with tuberculosis. In the 248 houses there were 541 cases in three years (2.18 cases per house), 173 cases in 1894, 161 cases in 1895, and 207 cases in 1896-97. The average number of cases to the house for the whole ward (663 houses) was 0.81.

The cases given in these tables include deaths as well as reported living cases of tuberculosis. The list, however, is not complete, as there was no compulsory return of cases, and only a small proportion, doubtless, of the actual number were returned. The increase in the number of cases in 1896 is probably only apparent, as the returns were more promptly made during this than the two previous years. But it is evident that in the three years—1894 to 1896, inclusive—only a small proportion of the houses, viz., 37.3 per cent. of the total number in the ward, were infected. It is also seen that some streets have a greater number of infected houses and cases than others, and that this remains so year after year.

Table II., Ward IV., gives the streets, house numbers and houses in which three or more cases of tuberculosis have been reported in one or more years during the last three years. The following is a summary of this table:



Number of streets in which cases occurred.....		17
Number of houses in which three or more cases occurred.....		70
Number of cases in 1894.....	88	
Number of cases in 1895.....	95	
Number of cases in 1896.....	119	
Total cases in these houses in three years.....		302
Average number of cases per house.....		4.3

Comparing these figures with those obtained for the whole ward, we find :

Total number of infected houses in the ward.....	248
Number of houses in which three or more cases occurred.....	70
Percentage on total infected houses.....	28.2
Total number of cases in the ward.....	541
Cases occurring in 28.2 per cent. of the houses infected.....	302
Percentage of cases in same.....	55.8
Total number of inhabited houses.....	663
Number of houses in which 55.8 per cent. of cases occurred.....	70
Percentage on total houses.....	10.5

It is seen, therefore, that of the infected houses 28.2 per cent. contained 55.8 per cent. of the cases, and these occurred in only 10.2 per cent. of all the houses in the ward.

Many of these houses, as will be seen by referring to the table (II.), have had one or more cases every year for three consecutive years, some of them having had as many as eight to eleven cases during this period. Several houses, in which one or more cases of tuberculosis have been reported in the last three years, have had deaths from the same disease in them for eight or nine years, viz., five houses, in which 22 cases have been reported since 1893, have had 36 deaths from tuberculosis from 1888 to 1893, inclusive. Such houses would seem to be permanently infected, as Dr. Tracy remarks (from whose report on tuberculosis in New York, published in the "City Record," January 11, 1894, these figures are taken), and should be thoroughly renovated from top to bottom, or, better, condemned and torn down. They are old houses, in bad sanitary condition, some of them rear tenements, and densely packed with the poorest and filthiest class of people, some of them being used as cheap lodging-houses.

The distribution of tuberculosis in these districts is, perhaps, better shown graphically. The accompanying maps are *facsimiles* of those in the office of the Health Department, upon which all cases of tuberculosis have been recorded since 1894. From an examination of these maps it will be seen that tuberculosis is not uniformly distributed, even in Ward IV., which contains more cases of tuberculosis than any in the city. The bulk of the cases is confined to narrow limits in certain streets and houses. It is also seen, by noting the symbols for each year, that one case is apt to follow another in the same house within a year or two. Often all the houses in a block contain cases, but again, one or more houses in an infected area seemed to have escaped infection.



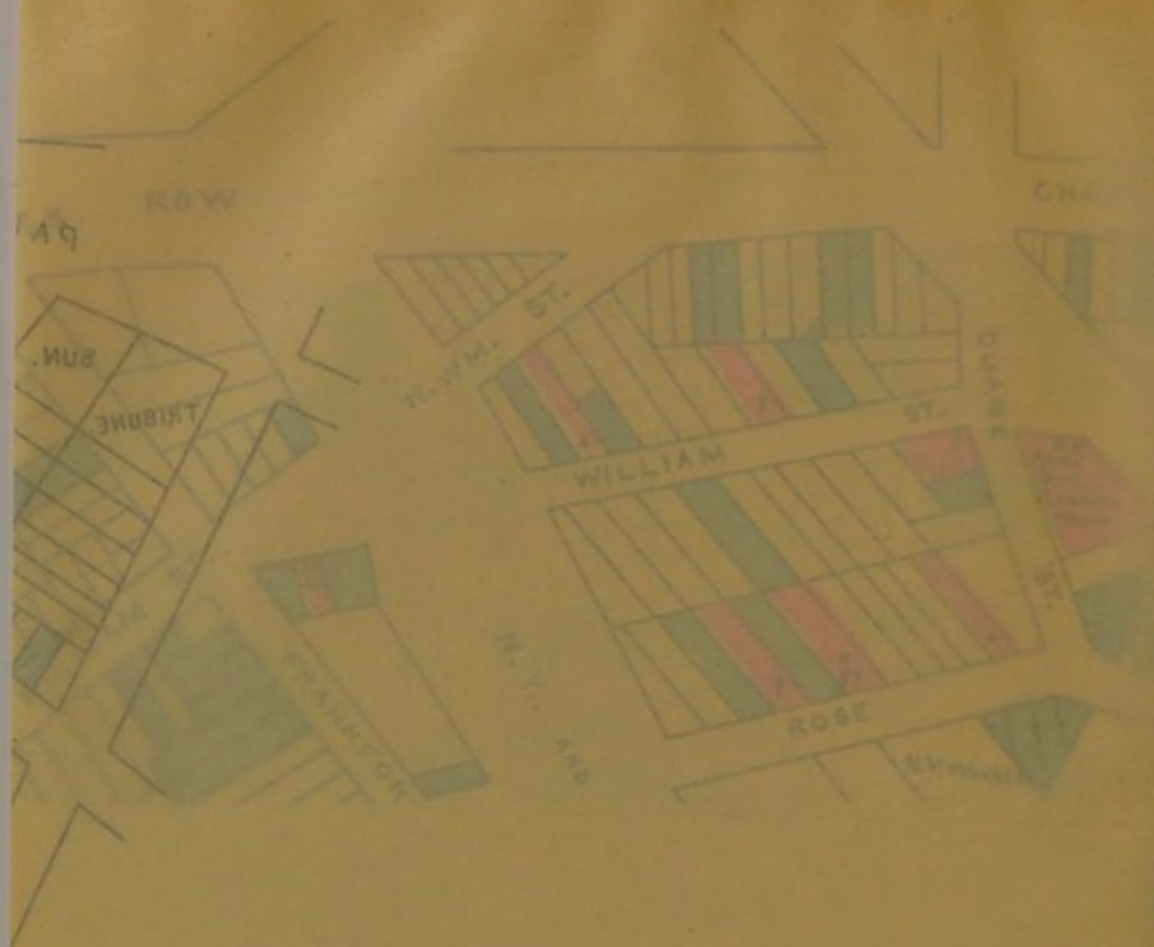
# WARD IV.

## DISTRIBUTION OF CASES OF TUBERCULOSIS

- = CASES IN 1894.
- ▲ = CASES IN 1895.
- † = CASES IN 1896.
- = DWELLINGS WITH CASES.
- = DWELLINGS WITHOUT CASES.







WARD IV

CASES IN  
CASES IN  
CASES IN  
CASES IN

DISTRIBUTION OF CASES OF TUB



TABLE II.—WARD IV.

*Streets and Houses in which Three or more Cases of Tuberculosis occurred in 1894-1897. Description of Houses and Number of Occupants.*

STREETS AND HOUSE NOS.	CASES OF TUBERCULOSIS.			TOTAL.	DESCRIPTION OF HOUSES.	Number of Occupants.
	1894.	1895.	1896-97.			
173 Chatham street.....	4	5	2	11	.....	..
219 Chatham street.....	3	..	2	5	.....	..
22 Chatham Square.....	2	1	..	3	.....	..
4 Chatham Square.....	..	3	..	3	.....	..
9 Chatham Square.....	..	3	..	3	.....	..
28 Rose street.....	1	..	2	3	.....	..
202 William street.....	..	2	2	4	.....	..
30 Madison street.....	..	1	2	3	4-story front.....	21
28 Madison street.....	3	1	1	5	4-story, front, and 7-story, rear.	102
36 Madison street.....	1	1	1	3	4-story, front.....	12
42 Madison street.....	2	4	..	6	.....	..
64 Madison street.....	1	1	1	3	5-story, front.....	46
334 Pearl street.....	3	..	2	5	5-story, front, and 5-story, rear.	92
336 Pearl street.....	1	2	1	4	5-story, front.....	51
404 Pearl street.....	3	2	3	8	.....	..
410 Pearl street.....	1	..	2	3	5-story, front.....	36
432 Pearl street.....	2	..	1	3	5-story, front, and 5-story, rear.	93
434 Pearl street.....	1	2	..	3	5-story, front, and 5-story, rear.	94
450 Pearl street.....	2	6	3	11	.....	..
456 Pearl street.....	..	2	1	3	.....	..
460 Pearl street.....	2	2	1	5	.....	..
151 South street.....	1	1	1	3	.....	..
197 South street.....	..	..	3	3	.....	..
336 Water street.....	..	1	2	3	4-story, front.....	8
341 Water street.....	..	..	3	3	5-story, front.....	62
347 Water street.....	2	..	3	5	5-story, front.....	15
18 Cherry street.....	1	1	6	8	5-story, front, and 6-story, rear.	76
20 Cherry street.....	..	1	3	4	5-story, front, and 3-story, rear.	39
22 Cherry street.....	3	..	5	8	4-story, front, and 4-story, rear.	92
19 Cherry street.....	2	..	1	3	4-story, front, and 5-story, rear.	82
27 Cherry street.....	1	1	2	4	4-story, front.....	41
29 Cherry street.....	1	..	2	3	.....	..
32 Cherry street.....	1	3	1	5	4-story, front, and 4-story, rear.	138
33 Cherry street.....	..	2	2	4	4-story, front.....	31
36 Cherry street.....	1	2	3	6	5-story, front, and 5-story, rear.	148
39 Cherry street.....	1	2	..	3	.....	..
67 Cherry street.....	..	..	3	3	4-story, front.....	26
117 Cherry street.....	..	2	1	3	.....	..
56 New Chambers street.....	1	1	1	3	5-story, front.....	29
70 New Chambers street.....	1	2	3	6	5-story, front.....	69
73 New Chambers street.....	3	4	..	7	5-story, front.....	41
8 Roosevelt street.....	2	1	..	3	5 and 4-story fronts.....	97
10 Roosevelt street.....	..	..	3	3	5-story, front, and 4-story, rear.	167
12 Roosevelt street.....	1	1	1	3	5-story, front.....	126
27 Roosevelt street.....	3	..	..	3	5-story, front.....	87
75 Roosevelt street.....	1	..	3	4	5-story, front.....	56
77 Roosevelt street.....	1	..	2	3	4-story, front.....	41
91 Roosevelt street.....	1	3	3	7	3-story, front.....	15
114 Roosevelt street.....	2	..	1	3	4-story, front.....	31
121 Roosevelt street.....	..	2	4	6	4-story, front.....	18
7 Oak street.....	..	3	2	5	5-story, front, and 5-story, rear.	71
32 Oak street.....	3	2	3	8	5-story, front, and 4-story, rear.	168
34 Oak street.....	1	2	..	3	5-story, front.....	41
55 Oak street.....	..	4	1	5	5-story, front and rear.....	125
15 James Slip.....	2	..	3	5	.....	..
45 James street.....	1	1	1	3	.....	..
65 James street.....	1	1	1	3	.....	..
78 James street.....	1	2	..	3	3-story, front.....	19
102 James street.....	1	..	2	3	5-story, front.....	66
3 James street.....	2	4	..	6	4-story, front.....	33
7 James street.....	1	..	2	3	.....	..
82 Catharine street.....	1	2	..	3	.....	..
28 Oliver street.....	3	..	..	3	4-story, front.....	31
36 Oliver street.....	1	1	1	3	.....	..
42 Oliver street.....	1	..	3	4	5-story, front.....	66
51 Oliver street.....	1	2	1	4	5-story, front.....	68
64 Oliver street.....	1	1	1	3	5-story, front and rear.....	87
66 Oliver street.....	3	1	0	3	5-story, front.....	67
77 Oliver street.....	1	1	2	4	5-story, front.....	81
5 Batavia street.....	1	1	6	8	5-story, front, and 4-story, rear.	112
70 houses.....	88	95	119	302		



In a total of 248 infected houses (see Table I.) there occurred 302 cases in 70 houses, or 28.2 per cent.—88 cases in 1894, 95 in 1895 and 119 in 1896-1897. Of 541 cases in the ward, 302, or 55.8 per cent. occurred in 28 per cent. of the houses, and in 10.5 per cent. of all the houses in Ward IV. (663) there was an average number of 4.3 cases to the house in 28 per cent. of the infected houses.

Some of the infected houses had as many as 8 and 11 cases in the three years. See Nos. 404 and 450 Pearl, No. 173 Chatham, Nos. 18 and 22 Cherry, No. 32 Oak and No. 5 Batavia streets.

The following is a list of houses in which deaths from tuberculosis have occurred almost every year since 1888, taken from Dr. Tracy's report, January 11, 1894. The cases (including deaths) are also given which have been reported in the same houses since that time:

STREETS AND HOUSE Nos.	DEATHS.						CASES (INCLUDING DEATHS.)		
	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896-97.
18 Cherry street.....	2	1	1	1	1	2	1	1	6
90 Catharine street.....	1	1	1	1	1	1	1	1	..
5 Batavia street.....	1	2	2	2	2	1	2	6	..
10 Roosevelt street.....	..	1	1	1	4	..	..	..	3
9 James street.....	..	2	..	..	3	..	1	..	..
5 houses.....	4	7	5	5	11	4	5	8	9

Table III., Ward VI., shows the following for this ward:

Number of streets in which cases of tuberculosis occurred.....	19
Number of houses in which cases of tuberculosis occurred.....	239
Number of cases in 1894.....	157
Number of cases in 1895.....	127
Number of cases in 1896-1897.....	191
Total number of cases in three years.....	465
Average number of cases per house.....	1.94



According to the last census there are 630 inhabited houses in Ward VI., with a population of 22,897, or an average number of 36.3 persons per house. Therefore we have the following distribution of tuberculosis in this ward :

Total number of inhabited houses in Ward VI.....	630	Population of Ward VI.....	22,897
Number of houses infected.....	239	Cases per 1,000 in 1894.....	6.8
Percentage of houses infected.....	37.9	Cases per 1,000 in 1895.....	5.5
		Cases per 1,000 in 1896-97.....	8.2
Total number of houses.....	630		
Total number of cases.....	465	Total cases per 1,000 in three years....	20.5
Cases per house in Ward VI.....	0.72		

It appears, therefore, that the distribution of tuberculosis in this ward is the same as in Ward IV., but there are not as many cases in proportion to the number of inhabitants.

TABLE III.—WARD VI.

*Streets, Number of Houses and Cases of Tuberculosis in 1894-1897.*

STREETS.	HOUSES.	1894.	1895.	1896-97.	TOTAL.	CASES PER HOUSE.
Bowery .....	8	11	7	5	23	2.9
Chatham street.....	16	20	6	14	40	2.5
Elizabeth street.....	2	2	1	..	3	1.5
Mott street.....	37	24	22	34	80	2.2
Mulberry street.....	41	19	21	30	70	1.7
Baxter street.....	28	12	22	11	45	1.6
Pell street.....	21	19	8	32	59	3.1
Bayard street.....	19	11	8	8	27	1.4
Doyer street.....	7	3	6	11	20	2.8
Park street.....	12	5	3	10	18	1.5
Worth street.....	7	3	4	2	9	1.3
Pearl street.....	21	10	11	13	34	1.6
Canal street.....	2	2	1	..	3	1.5
White street.....	3	1	..	2	3	1.
Franklin street.....	6	3	1	2	6	1.
Leonard street.....	7	5	3	3	11	1.5
Reade street.....	3	..	..	3	3	1.
Chambers street.....	2	1	..	1	2	1.
City Hall place.....	8	6	3	10	19	2.3
Nineteen streets.....	239	157	127	191	465	1.94

In a total of 630 dwellings in Ward VI., with a population of 22,897, or 36.3 persons per house, 465 cases, or 0.72 per house for the whole ward, were reported. These cases occurred in 239 houses, or 37.9 per cent. of the number of houses in the ward; there were 1.94 cases per house of the infected houses.



TABLE IV.—WARD VI.

*Streets and Houses in which Three or More Cases of Tuberculosis Occurred, 1894-1897.*  
*Description of Houses and Number of Occupants.*

STREETS AND HOUSE NOS.	CASES OF TUBERCULOSIS.			TOTAL.	DESCRIPTION OF HOUSES.	Number of Occupants.
	1894.	1895.	1896-7.			
20 Bowery.....	1	1	1	3	.....	.....
9 Bowery.....	7	2	1	10	.....	.....
6 Bowery.....	1	2	1	4	.....	.....
190 Chatham street.....	3	4	1	8	.....	.....
184 Chatham street.....	3	..	2	5	.....	.....
128 Chatham street.....	1	..	2	3	.....	.....
18 Mott street.....	..	1	4	5	5-story, front.....	86
20 Mott street.....	4	3	..	7	5-story, front and rear.....	67
15 Mott street.....	4	2	2	8	5-story, front and rear.....	120
24 Mott street.....	1	..	2	3	4-story, front and rear.....	54
30 Mott street.....	1	..	2	3	3-story, front.....	36
26 Mott street.....	2	..	1	3	4-story, front.....	37
59 Mott street.....	3	1	..	4	5-story, front and rear.....	109
9 Mulberry street.....	2	5	1	8	5-story, front.....	98
20 Mulberry street.....	2	1	..	3	4-story, front and rear.....	82
26 Mulberry street.....	1	..	2	3	5-story, front.....	41
60 Mulberry street.....	1	1	3	5	6-story, front and rear.....	139
89 Mulberry street.....	3	..	..	3	5-story, front and rear.....	164
91 Mulberry street.....	..	3	3	6	5-story, front and rear.....	153
9 Baxter street.....	1	..	3	4	.....	.....
40 Baxter street.....	..	3	..	3	6-story, front, and 5-story rear.....	85
90 Baxter street.....	..	3	1	4	5-story, front and rear.....	144
91 Baxter street.....	1	1	1	3	5-story, front.....	98
90 1/2 Baxter street.....	1	2	..	3	5-story, front.....	61
85 Bayard street.....	..	..	3	3	5-story, front.....	41
89 Bayard street.....	2	2	..	4	5-story, front.....	32
10 Pell street.....	1	..	2	3	.....	.....
12 Pell street.....	4	5	6	15	5-story, front (2 houses).....	128
11 Pell street.....	1	1	1	3	5-story, front, and 4-story rear.....	98
16 Pell street.....	..	1	3	4	5-story, front.....	98
22 Pell street.....	3	..	4	7	6-story, front.....	112
30 Pell street.....	2	..	1	3	3-story, front.....	26
32 Pell street.....	1	..	2	3	4-story, front and rear.....	73
4 Doyer street.....	1	1	2	4	4-story, front.....	46
17 Doyer street.....	2	1	5	8	3-story, front.....	18
37 Park street.....	..	..	3	3	6-story, front and rear.....	129
155 Worth street.....	1	2	..	3	.....	.....
468 Pearl street.....	1	2	..	3	.....	.....
472 Pearl street.....	1	1	1	3	5-story, front, and 4-story rear.....	112
484 Pearl street.....	..	..	4	4	6-story, front.....	68
148 Leonard street.....	1	1	1	3	5-story, front.....	39
19 City Hall place.....	3	1	..	4	4-story, front and rear.....	82
36 City Hall place.....	..	..	3	3	.....	.....
40 City Hall place.....	2	1	3	6	.....	.....
Forty-five houses.....	72	56	78	206		

Of a total of 239 houses infected with tuberculosis (see Table III.), 206 cases out of 465, or 44.37 per cent., occurred in 19 per cent. (45) of the infected houses, and in 7 per cent. of all the houses in the ward (620). Of the 206 cases, 72 occurred in 1894, 56 in 1895 and 78 in 1896-97.

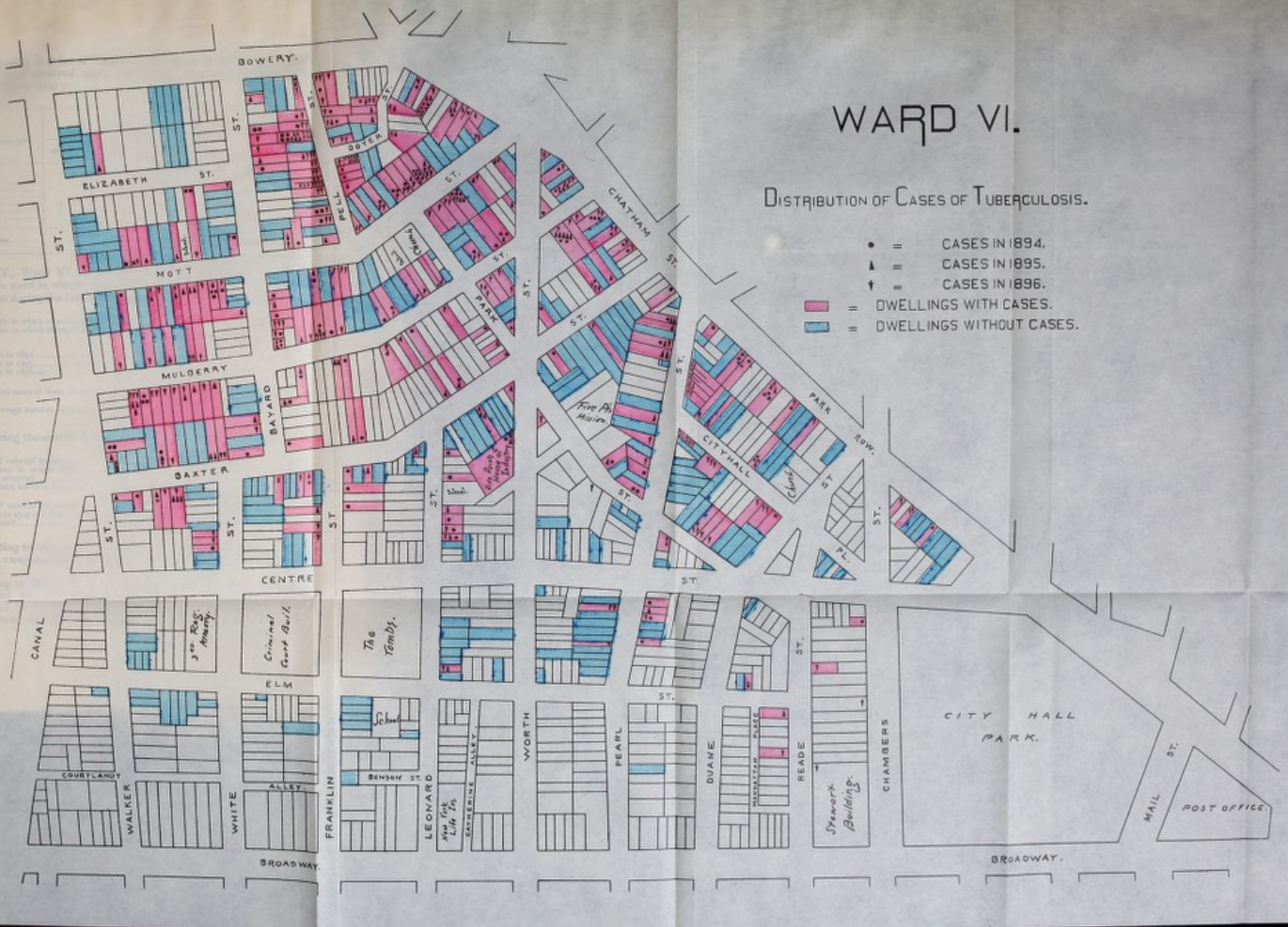
In the greater number of houses one or more cases have been reported every year for the last three years, and in some many cases for several consecutive years.



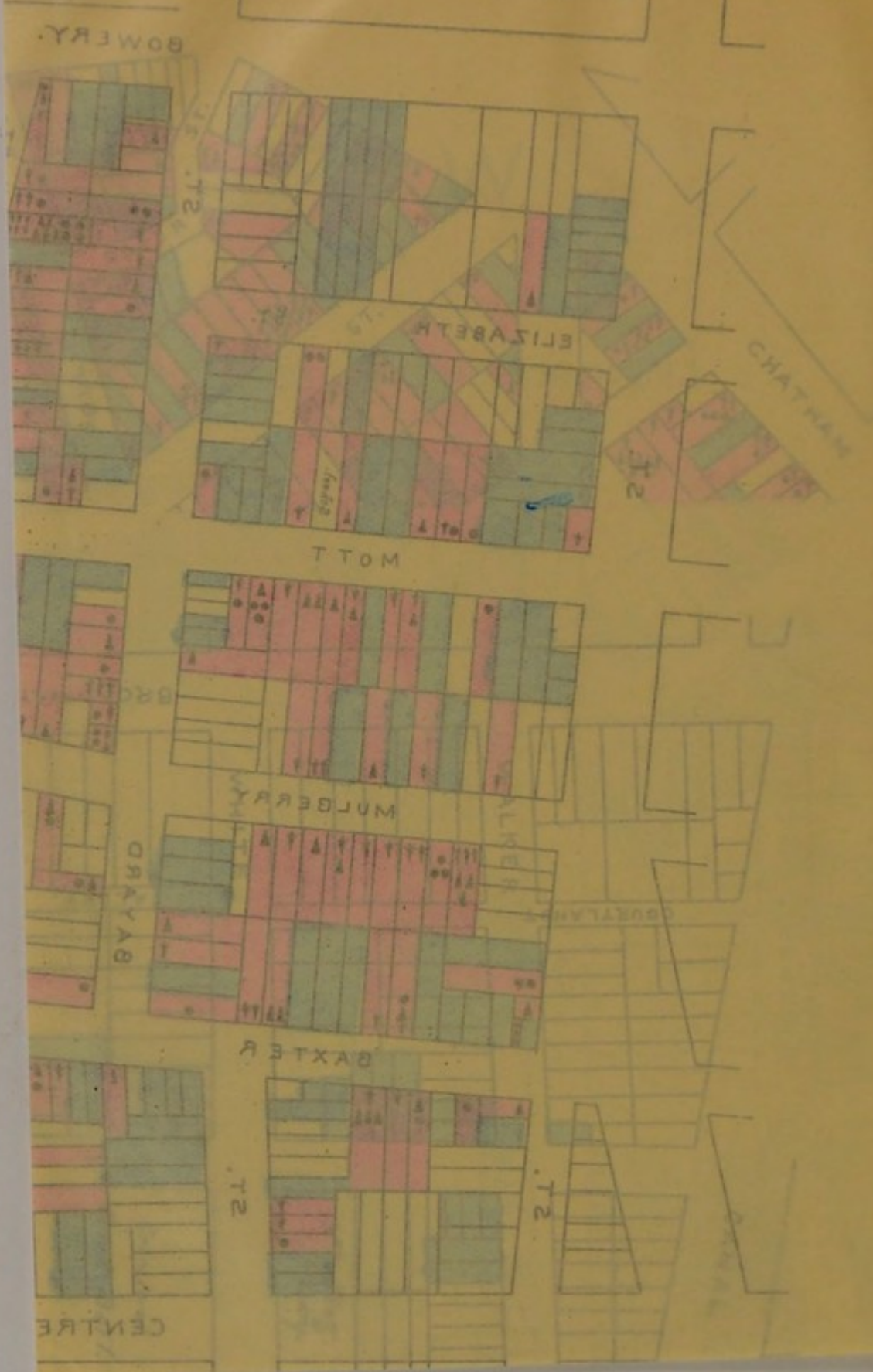
# WARD VI.

## DISTRIBUTION OF CASES OF TUBERCULOSIS.

- = CASES IN 1894.
- ▲ = CASES IN 1895.
- † = CASES IN 1896.
- = DWELLINGS WITH CASES.
- = DWELLINGS WITHOUT CASES.









The following is a list of houses in this ward in which deaths from tuberculosis have occurred since 1888, cases, including deaths, being given from 1893 to 1897 :

STREETS AND HOUSE NOS.	DEATHS.						CASES (INCLUDING DEATHS).		
	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896-97.
102 Bayard street.....	2	1	1	1	1	..	..	1	..
76 Mulberry street.....	1	1	1	1	1	..	..	..	1
40 Mulberry street.....	..	..	..	1	3	..	..	..	1
17 Mott street.....	..	3	..	2	3	..	..	..	2
18 Mott street.....	2	1	2	1	4	..	..	1	4
11 Pell street.....	7	9	3	1	4	..	1	1	1
40 City Hall place.....	..	..	..	..	4	..	..	..	3
Seven houses.....	12	15	7	7	20	..	1	3	12

Table IV., Ward VI., shows the following distribution of infected houses in this ward in which three or more cases have occurred for one or more years during the last three years :

Number of streets in which cases have occurred.....	13
Number of houses in which three or more cases occurred.....	45
Number of cases in 1894.....	72
Number of cases in 1895.....	56
Number of cases in 1896-97.....	78
Total cases in these houses in three years.....	206
Average number of cases per house.....	4.5

Comparing these with Table III., we find for the whole of Ward VI.:

Total number of infected houses.....	239	Percentage of cases in same.....	44.3
Number of houses in which three or more cases occurred.....	45		
Percentage on total infected houses.....	18.9	Total number of inhabited houses.....	63
Total number of cases in the ward.....	465	Number of houses in which 44.3 per cent. of cases occurred.....	4.5
Cases occurring in 19.9 per cent. of the houses infected.....	206	Percentage of total houses.....	7.0

According to this, in 18.9 per cent. of the infected houses 44.3 per cent. of the cases occurred, and these in only 7 per cent. of all the houses in Ward VI.

The map of Ward VI. shows graphically also the same thing as the map of Ward IV., viz., that tuberculosis is chiefly confined to certain localities and to a small number of houses in these localities. In this ward also there are found to be a number of houses in which one or more



cases have been reported for a series of years. There are in fact 7 houses in which 61 deaths from tuberculosis, according to Dr. Tracy's report, already referred to, have been reported since 1888; these same houses have had 16 cases in them since 1893 (Dr. Tracy's report was from 1888 to 1892, inclusive).

It is evident, therefore, that identically the same conditions exist as to the distribution of tuberculosis in these two wards. Wards IV. and VI. were selected for special study, because they were in the old part of the city, and because, containing as they do a greater number of tuberculous cases than any other wards in the city, they illustrate the fact most forcibly that the disease is concentrated in groups or foci of infection. The population, for the most part, is of the lowest class of Italians, Irish, Russian Jews, Greeks, Chinese, etc., but, as a rule, it is a comparatively fixed population, that is to say, with the exception of a few sailors' lodging houses, the people may move from one house to another in the same neighborhood, but they do not go far from the old haunts. The centres of tubercular infection are found chiefly in over-crowded houses, rear tenements and dilapidated buildings, where ignorance, poverty and filth furnish a suitable soil for all infectious diseases, as well as for tuberculosis.

But though tuberculosis is more thickly distributed in these wards and in the old part of the city, a similar distribution in groups, in a more limited degree, is found in other parts of the city, where the population is less dense and the hygienic conditions are better.

Dr. Tracy, in studying the distribution of this disease throughout the entire city, during the five years from 1888 to 1892, inclusive, gives the following figures in his report:

Total number of dwellings in New York City (census 1890).....	81,828
Number of dwellings in which deaths from tuberculosis occurred.....	18,771
Percentage on total.....	22.94
<hr/>	
Total houses in the city.....	81,828
Houses with deaths in only one year.....	14,479
Houses with deaths in more than one year.....	4,292
Percentage on total deaths :	
For one year.....	17.69
For more than one year.....	5.24
<hr/>	
Houses with deaths in one year.....	14,479
Total deaths in same.....	15,511
Deaths per house.....	1.07
<hr/>	
Houses with deaths in more than one year.....	4,292
Total deaths in same.....	11,232
Deaths per house.....	2.61
<hr/>	



It will be seen from an examination of these figures that during the five years less than 25 per cent. of the dwellings in the city have had deaths from tuberculosis; that only  $5\frac{1}{4}$  per cent. of the dwellings showed any evidence of infection by a repetition of tuberculous disease in years subsequent to the first; that the number of deaths was slightly more than twice as great in houses in which deaths occurred in more than one year of the five; but as there were deaths in every one of these houses during two years, at least, it could not be said that they showed any greater intensity of infection. It was found that 42 per cent. of the deaths from tuberculosis occurred in 23 per cent. of the affected houses, and in  $5\frac{1}{4}$  per cent. of the total number of dwellings in the city. It would appear, Dr. Tracy concludes, that there is no question as to the infectious nature of the disease. Though tuberculosis causes from 14 to 15 per cent. of the total number of deaths in the city, yet it is confined within narrow limits and to a small number of houses.

These are the conditions in New York City which have existed here for at least the last eight years, as proved by statistics. But other large cities in this country show the same thing. Dr. Lawrence F. Flick, of Philadelphia, who has made a special study of this subject, comes to the following conclusions, from an investigation of the distribution of tuberculosis in the Fifth Ward, Philadelphia, extending over a period of twenty-five years (1863-87):

That consumption is centralized; that it gradually changes its centre; that it completely changes its centre every three or four years; that it reappears in the same locality in from one to two years; that it has a preference for filthy neighborhoods; that its grouping is identically the same as that of typhoid fever, small-pox, scarlet fever and diphtheria; that a house which has had a case of consumption will probably have another within a few years, and may have a very large number of cases in close succession; that when a case of consumption occurs in a house, approximate houses are considerably exposed to the contagion; that houses in localities where endemic after endemic has existed, have, nevertheless, escaped the disease; that tuberculous diseases of various kinds occur in the same localities and often on the same lots as consumption; that whilst density of population and filth attract the disease, thinness of population and cleanliness afford no protection when the disease germ is introduced into a locality; that with our present knowledge of the etiology of the disease we have it in our power completely to wipe it out in a single generation.

These facts, and observations of recent years taken from our own cities, would seem to be sufficiently conclusive in regard to the distribution of tuberculosis and the infectious character of the disease.

But let us turn back a page of history and witness the results obtained by the enforcement of sanitary laws for the control of tuberculosis in other times and countries. The history of tuberculosis in Italy during a century's experience under the influence of preventive laws, as narrated by Dr. Flick,\* is most instructive and well worth recalling just at present.

\* Prevention of Tuberculosis, by Dr. L. F. Flick, 1890.



In 1782, the death rate from tuberculosis for the kingdom of Naples and for Italy was 10 per 1,000. The disease raged almost in epidemic form. Vigorous measures were taken to check the spread of the disease and a law was passed making tuberculosis a returnable disease on penalty of a fine of 300 ducats (\$684) for the first offense, and, upon repetition, of banishment for ten years; any layman who assisted in the evasion of the law was sent to prison; the clothes and chattels of the infected person were destroyed by fire; infected houses were thoroughly renovated, doors and windows replaced by new ones, the walls replastered; the sick poor were removed to hospitals and isolated. It is not known how long this drastic law remained in force; but evidently for a considerable length of time it must have been carried out vigorously, and, even when relaxed, it created among the people such a fear of the disease that its effects have been felt ever since. As a result of this law, the death rate from tuberculosis in Italy was reduced from 10 per 1,000 in 1782 to 1.29 in 1887. That part of Italy which formerly constituted the kingdom of Naples, in the country districts and small towns, is now practically free from the disease; and the mortality from consumption for all Italy is lower than that of any other country in Europe, with the possible exception of Spain.

"When side by side with the reduction in the mortality from tuberculosis in the kingdom of Naples and in the operation of the Neapolitan law," says Dr. Flick, "is placed the reduction which has taken place in England during the last forty years from the same disease, as the result of isolation in special hospitals, it can certainly no longer be said that the prevention of this disease is a mere theory. In England there has been a reduction of 50 per cent. in the mortality from tuberculosis in forty years as the result of isolation, or from 3 to 18 per cent. of all cases a year. In the kingdom of Naples the disease has been nearly exterminated in one hundred years, by a system of isolation and disinfection, or rather destruction of infected objects. Either of these facts, standing by themselves, might be looked upon as a mere coincidence; but, taken together, they must be accepted as the exponents of a fixed law. They show that tuberculosis is not only a preventable disease, but that it can be prevented by simple, easy methods. \* \* \* If empirical methods could produce such results in Italy, and isolation on a comparatively small scale \* could produce such effects in England, what would be the result of well-regulated scientific methods for its prevention?"

The conclusions which may be drawn from this investigation are the following:

(1) That the distribution of tuberculosis in New York and other large cities is positive evidence of the infectious character of the disease.

---

\* According to Dr. Flick, there were in 1890 in Great Britain eighteen hospitals for the treatment of tuberculous diseases, which all together accommodate from 6,000 to 7,000 in-patients annually. Of the eighteen, only three are exclusively for tuberculous diseases. Fifty per cent. represents the percentage reduction for forty years; the reduction for a single year was over 15 per cent., the percentage of isolation 3 to 18 per cent. a year.



(2) That tuberculosis is not uniformly diffused through a community, not even in those localities where it occurs most frequently, but is confined within narrow boundaries, as in certain streets and within the walls of certain houses.

(3) That though there may be some danger of infection from the inhalation of dust in the open air in crowded parts of the city, it seems probable, from the fact that tuberculosis is found clinging to certain houses, that a prolonged exposure to a concentrated atmosphere of infection, as living in an infected room or in close contact with a consumptive person, is generally necessary to contract the disease in this way.

(4) That there is every reason to believe that the inclusion of tuberculosis in the list of notifiable diseases and the enforcement of sanitary measures for the control of the disease—such as inspection, disinfection and renovation of premises, and isolation of cases, when necessary, in special hospitals for consumptives, situated on the outskirts of the city—will greatly lower the death rate from tuberculosis, even if it is too much to hope, as yet, that the disease can be entirely eradicated.

(5) That these conclusions are confirmed by the observation and experience of the most distinguished physicians of the day, as well as by scientific investigation, and by the history of the disease in all ages and countries.

Apropos of the present discussion, the following conclusions of Dr. William Murrell, of London, in his clinical lectures on the prevention of consumption (1895) are worth quoting. Dr. Murrell maintains that to lessen the mortality from consumption there must be combined legislative action and personal effort.

In the first category we aim at:

(1) The ultimate inclusion, when public opinion is ripe for that step, of consumption in the list of notifiable diseases.

(2) Public and official announcement of the fact that, in the event of a person having died of consumption, the rooms occupied by him will be disinfected by the sanitary authorities free of charge. The facilities for disinfection should extend to any dwelling which has been vacated by a consumptive person, and should be enforced in the case of hotels and lodgings at health resorts frequented by sufferers from chest diseases.

(3) The passing of an act making it illegal to let any house or room in which any person, within two months, has suffered from consumption, without having had it properly disinfected.

(4) To make it a punishable offense, by fine or imprisonment, for any person letting a house or room willfully to conceal or deny that there has been consumption in the house.

(5) To call the attention of shipping agents to the fact that there is danger to a healthy person in occupying the same cabin with a consumptive, especially on long voyages, and when, from the inclemency of the weather, the passengers are not much on deck.

(6) To make it compulsory for a consumptive person taking a long voyage by sea to notify the nature of his complaint before starting.

(7) To call the attention of railway companies, on lines connected with well-known health resorts for consumptives, to the necessity for having the sleeping carriages carefully cleansed with some disinfecting solution, and, above all, thoroughly aired.



(8) The removal of hospitals for consumptives in large cities to some convenient and open suburb.

(9) The exercise of greater care in the inspection of carcasses intended for food, and the compulsory rejection of those indicating tubercular disease.

(10) The rejection, as an article of fluid food, of the milk of tubercular cows.

(11) The inspection of herds by paid officials, with the view of destroying tubercular disease, and isolating or destroying tubercular animals.

(12) The prevention of overcrowding amongst animals intended for consumption as food.

(13) The prevention of overcrowding amongst people, by regulating the amount of cubic space allotted to each person in common lodging-houses, workshops, etc.

(14) Back-to-back houses should be condemned, and the height of houses in cities should be in proportion to the width of the streets.

(15) Blind alleys should be opened out, and the custom of building houses at right angles to the length of the streets should be forbidden.

(16) Dusty occupations should be strictly regulated, so as to minimize the danger to those who are compelled to follow them.

(17) Convents and other religious communities should be periodically inspected by some independent authority, with a view of ascertaining the general condition of the health of the inmates, and suggesting such sanitary and other measures as may seem necessary.

#### In the second category, the following points are of importance :

(1) No one should consent to sleep in the same room with a person suffering from advanced phthisis, especially when the expectoration is abundant.

(2) The temperature of the room occupied by a consumptive person should not be too high, especially when he is confined to bed, and efficient ventilation should be secured, preferably by means of open windows.

(3) The patient should expectorate into a spittoon containing the solution of the local Health Department, or some other equally good disinfectant. The expectorated matter should be destroyed by mixing it with fine coal and burning it in the fire.

(4) The pocket-handkerchief used by the patient should be thrown into a bucket containing a good disinfecting solution, and should be scalded before being sent to the wash. Instead of ordinary handkerchiefs, a paper substitute, or pieces of rag, may be used, and then be burnt.

(5) It should be remembered that the risk of conveying the disease from the sick husband to the healthy wife, who nurses him, is great.

(6) The wife who nurses a husband suffering from consumption should get out in the fresh air as much as possible, and should do all in her power to maintain the condition of her own health.

(7) Never travel on board ship in the same cabin with a consumptive person.

(8) Food should be well cooked, not only superficially, but throughout.

(9) In the case of tuberculous children, or of people predisposed to phthisis, it is a good plan to boil all milk previous to use.

(10) Those predisposed to phthisis should select non-sedentary occupations, and should be encouraged to spend as much time as possible in the open air, and, above all, in direct sunlight.

(11) People should be taught to value the importance of amusement of all kinds, and to recognize the danger of leading monotonous and depressing lives.

(12) The children of phthisical parents should devote much time to athletic exercises and should not be allowed to follow sedentary occupations.

(13) They should be encouraged to migrate, and not live in the house which their parents occupied.

Respectfully submitted,

ARTHUR R. GUERARD, M.D.,

*Assistant Bacteriologist.*



## APPENDIX.

POINTS FOR CONSIDERATION SUGGESTED BY THE ACCOMPANYING  
TABLE OF MORTALITY FROM TUBERCULAR DISEASES.

BY

ARTHUR R. GUERARD, M.D.,

*Assistant Bacteriologist.*

According to the official reports of New York, London, Paris, Berlin and Vienna, there has been a gradual but steady decline in the death-rates from tubercular diseases during the last ten or twelve years. To what is this due? It has been attributed, and with reasonable grounds for the assumption, to the more active sanitary precautions which have been taken by the Public Departments of Health, particularly since 1888-1889, in regard to tuberculosis, and to the education of the people, by means of circulars of instruction, in the disinfection and destruction of tubercular sputum, the chief mode of communicating the disease.

If this be true—and there is no other known cause to which we can reasonably attribute the reduction of mortality occurring simultaneously in various parts of the world—and these hygienic measures, inadequate as they have been, have produced such distinctly good results, how much more may we hope to accomplish by organized legislative control, and the establishment of public hospitals for the systematic treatment of the tuberculous poor?

But, it may be asked, will it pay to do this? Can we afford to save the victims of such a widespread disease as tuberculosis? It is true that the problem involves a large expenditure of time and money; that the number of tuberculous persons is immense, and that the establishment of public hospitals will entail a great outlay of capital. But when into comparison with this is brought the loss of life and money to the state or community from the annual deaths from tuberculosis, even the cost and vastness of such an undertaking, if it offers a probable chance of success, sinks into utter insignificance.

In a recent lecture delivered at the Franklin Institute, Philadelphia, Professor Mason, of Troy, N. Y., has attempted to estimate the cost of typhoid fever to the City of Philadelphia. He says: "According to Rochard, the economic value of an individual is what he has cost his family, the community or the State, for his living, development and education. It is the loan which the individual has made to him by his relatives and the State, in order to reach the age when he can return it by his labor. Chadwick considers an English laborer equivalent to a permanent deposit of \$980. Farr gives \$780 as the average value of each human life in England."



The average annual deaths from tubercular diseases in New York City from 1884 to 1896, inclusive, were 6,072, or a total of 78,943 deaths from this cause. In 1896 there were 5,926 deaths from tubercular diseases, of which 4,770, or 253.7 deaths per 1,000 deaths from all causes, occurred between the ages of 15 and 65 years, that is, during the period of the greatest productive power of the individual.

Now, estimating the value of a human life in New York at \$1,000, which is certainly a very moderate estimate for this country (Mason estimates it at \$2,000), and taking the average annual death-rate from tubercular diseases to have been 6,072, there has been an actual loss to this community of \$6,072,000 per annum, and a total loss of \$78,942,000, during the thirteen years, from this cause alone. But these persons were incapacitated from work for a considerable length of time before they died, during which period they received no wages, and the city lost in productive power to that extent. Estimating the average wages of the 6,078 persons at \$1 per day, and the lost time at three months, or ninety days, at least, we find that there was a further loss to the community of \$546,480. Leaving all other details out of the calculation, such as nursing, doctors' bills, funeral expenses, etc., which are included by Professor Mason, it appears that there has been a total annual tax of at least \$6,618,480 levied by tubercular diseases on New York City.

In this estimate only the actual deaths reported as due to this cause have been taken into account; but, doubtless, many deaths really caused by tuberculosis were reported as due to some other disease, and, at the same time, at least 20,000 living persons in New York have suffered from tubercular diseases, many of whom have been incapacitated from work for a longer or shorter period. But taking only those that have died, and translating this loss to the city into a money value, there has been an annual loss to the community of at least \$6,500,000, as the result of the ravages of this fell disease; and it may not be exceeding the bounds of possibility to place this loss at not less than \$10,000,000.

According to the most recent investigations, based upon practical results obtained from the treatment of tuberculous patients in special hospitals, at least three-fourths of those treated during the earlier stages of the disease may be restored to health and productive capacity for some time to come, and many may be permanently cured; added to this are the benefits which may accrue to the healthy members of the community, from the isolation of infectious persons and the prevention of the spread of the disease.

This subject of the reduction of mortality from tubercular diseases, both from a humanitarian and economic point of view, would, therefore, seem to be worthy of the earnest consideration of all thoughtful men, statesmen and legislators, as well as of sanitarians and physicians; but it is not so much a question of finances—it concerns the welfare of the state.



## MORTALITY FROM TUBERCULAR DISEASES.

*General Death-rates from all Causes, Deaths and Death-rates from Tubercular Diseases per 1,000 Population in New York, London, Paris, Berlin and Vienna from 1884 to 1894, inclusive.*

(From the Official Statistics.)

YEAR.	NEW YORK CITY.			LONDON.			PARIS.			BERLIN.			VIENNA.		
	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.	General Death-rates from all Causes.	Deaths from Tubercular Diseases.	Death-rates from Tubercular Diseases.
1884.....	25.82	6,039	4.45	20.39	12,537	3.12	25.44	11,625	5.19	26.33	4,534	3.62	26.80	5,470	7.20
1885.....	25.55	5,953	4.26	19.67	11,850	2.90	24.38	.....	.....	24.38	4,657	3.61	28.50	5,574	7.23
1886.....	25.99	6,349	4.42	19.89	12,164	2.93	25.25	12,258	5.56	25.63	4,547	3.40	26.60	5,525	7.04
1887.....	26.32	6,007	4.06	19.53	11,424	2.71	23.92	11,818	5.15	21.84	4,388	3.16	25.80	5,110	6.42
1888.....	23.39	6,073	3.99	18.42	10,929	2.54	22.92	11,472	4.93	20.30	4,554	3.16	25.20	5,054	6.26
1889.....	25.32	6,041	3.86	17.47	11,168	2.56	23.78	12,047	5.11	23.00	4,938	3.30	24.50	4,802	5.85
1890.....	24.87	6,409	3.97	20.98	12,306	2.94	23.70	12,586	5.26	21.51	4,684	3.02	24.40	4,876	5.85
1891.....	26.31	5,909	3.56	21.11	11,854	2.81	22.45	12,430	5.13	20.82	4,743	2.96	25.01	7,940	5.76
1892.....	25.95	6,061	3.55	20.31	11,465	2.68	23.24	11,153	4.54	19.97	4,357	2.66	24.97	7,745	5.50
1893.....	25.30	6,163	3.51	20.83	11,426	2.65	22.25	12,267	4.92	21.01	4,671	2.72	24.04	7,418	5.16
1894.....	22.76	5,730	3.16	17.80	10,570	2.43	21.32	12,376	5.10	17.57	4,283	2.51	23.20	7,417	5.06
1895.....	23.10	6,283	3.34												
1896.....	21.54	5,926	3.06				(Other data not yet published.)								
Average, { 1884-89 }	26.01	.....	4.23	19.58	.....	2.84	24.38	.....	5.20	23.69	.....	3.39	26.58	.....	6.83
Average, { 1889-94 }	25.08	.....	3.60	19.75	.....	2.68	22.78	.....	5.10	20.64	.....	2.86	24.35	.....	5.53
Decrease, { Per cent. }	.....		14.8	.....		5.6	.....		1.9	.....		15.6	.....		19.0

NOTE.—The ratio of deaths to population has been calculated from the figures given in the official reports, but the mortality rates for Paris are somewhat higher than they should be, as the last census in Paris was taken in 1891, and no allowance is made for increase of population. In Berlin, on the contrary, the rates are somewhat lower than they should be, owing to the mode of estimating the population in Berlin, which, when the census was taken, in 1895-96, proved to be incorrect. In Vienna, in 1891, the suburban districts were included in the city limits, which accounts for the greater number of deaths from that time.

From an examination of this table it appears that tubercular diseases have caused from one-fourth to one-seventh of the deaths from all causes in these five great cities, during the period from 1884 to 1894, inclusive; that along with the decline in the general death-rate, there has been a gradual but decided decrease in the death-rates from tubercular diseases, not in one but in all of these cities; and that the lowest death-rates have been in London, Berlin and New York.

In 1888 and 1889 the sanitary authorities began to take more active steps to prevent the spread of tuberculosis, except in England, where such precautions were previously introduced. The table shows the average death-rates from tubercular diseases from 1884 to 1889, and from 1889 to 1894, with the percentage of decrease of mortality from this cause, during the latter period. The greatest percentage of decrease in the death-rate from tuberculosis has occurred in New York, Berlin and Vienna. New



York City shows a still further decrease in mortality in 1895 and 1896. The statistics for 1895 and 1896, for the other cities, have not yet been published in full.

*Further Evidences of the Existence of a Specific Infective Agency in Dwellings which have been observed to foster Tubercular Disease.*

In addition to the evidence already given of the existence of a specific infective agency in dwellings, the following instances may be cited as bearing upon the same subject :

Kempf ("Louisville Medical News," March 27, 1884) reports that: "Phthisis appeared to be introduced into a convent, well situated and ventilated, by a girl of eighteen, with a result that, within four months, nine sisters, regarded as exceptionally healthy, became consumptive, and four died in the course of the year. After complete isolation of the sick and cleansing of the rooms, the epidemic was stopped."

Sendter ("Münch. Med. Wochenschrift," 1889, No. 43), records that: "In the Island of Frauen Chiemsee, with a population of about three hundred persons, the deaths from tuberculosis since 1880 never exceeded seven in the decade until the last; while the Cloister, with from 20 to 40 members, was immune until 1860. During the sixties two died of tuberculosis; the same in the seventies; while during the last decade eleven fell victims to the disease."

Ransome ("Some Evidences Respecting Tubercular Infected Areas," a paper read before the Epidemiological Society, referred to also in his Milroy Lectures), gives an account of "the prevalence of phthisis in certain streets of badly built houses, deficient in supply of fresh air." Referring to instances in which two or more deaths from phthisis occurred in the same house, he says, "altogether there were 21 such coincidences," and 15 of them (30 deaths in all) occurred in narrow streets, cul-de-sacs or small courts. This was in a district in Ancoats, Manchester, in a period of five years. In a district in Greengate (Salford) 8 deaths were in four houses, or four "coincidences." In another district, out of 40 cases in six years, 10 were in five houses. In his Milroy Lectures "On the Causes and Prevention of Phthisis" (p. 65), Dr. Ransome quotes also a personal communication from Dr. Niven, of Oldham, showing that out of 3,001 deaths from tuberculosis during eleven years, in 302 instances there were two or more in a house.

Dr. Janeway (Archives of Medicine, quoted in the British Medical Journal, 1883, Vol. I., 377), reports that "a gentleman died of phthisis after two years' illness in February, 1882. His sister and her husband occupied his room after his death. The brother-in-law began to fail five weeks afterward, and in May was a subject of acute phthisis."

Dr. George Burney (British Medical Journal, 1885, I., 774) mentions the following: "A fine young Scotch girl of a healthy, long-lived family was afflicted with phthisis. On inquiry it was found that some few months before she had been given a bed-room which had just been quitted by a maid-servant with phthisis."

Dr. Niven (Public Health, II., 206) gives a very similar case: "A married woman from Oldham went with two children (one a lad of ten years old) to Southport, to join her husband in September, 1887. The husband, wife and two children all slept in one front room. In the same house was a woman suffering from consumption, said to have been contracted from her husband, who had previously died of the same disease. As the weather got colder, this consumptive woman asked them to change rooms with her, as her bedroom was colder than theirs. This was done. The Oldham woman used to complain of a peculiar odor in the room, which did not seem to have had any special cleansing or disinfection. In January, 1888, the boy, ten years old, died of "inflammation of the brain." He had been ill a month, and from the history his fatal malady was almost certainly tubercular meningitis. The Oldham woman became pregnant in Southport, but removed shortly afterward to Oldham, and was there confined in June, 1888, but before the birth of the baby she lost flesh, and showed the first symptoms of phthisis. The baby died in June, 1889, of *tabes mesenterica*, and she died in October of phthisis."

Dr. Heron quotes the following ("Evidences of the Communicability of Consumption," 1890, Appendix, p. 153), from Kruche (Deutsch. Med. Zeit., 1882): "A young, robust lawyer spent some time at a health resort, and some weeks after his return home showed symptoms of a rapidly fatal attack of consumption. It was found on inquiry that in the place referred to he had occupied a room and bed which had just previously been vacated by a consumptive who suffered from suppurating sores."



One of the most striking examples of this mode of communication is quoted by Payne (who also quotes most of the previous cases cited), in an article on "Tuberculosis as an Endemic Disease," read before the Epidemiological Society, London, 1892-93, from Englemann (Berlin Klin. Woch., 1889, Journal 7, p. 6), which relates to "a particular dwelling or flat in a large house occupied by the families of several glass blowers employed in a certain factory. This occupation is one known to produce remarkable liability to phthisis, and Englemann believes that 75 to 80 per cent. of the workmen in this particular place die of it. It is well known that this frequently has been ascribed, among other causes, to direct infection from mouth to mouth by the blow pipe. However, that would not explain the special incidences here described. The house was built about 1865, and was generally in tolerable sanitary condition. The particular dwelling in question was badly ventilated and lighted. It was occupied from 1865 to 1873 by three families in succession, who were all healthy. In 1874 a family named Nestle entered, in which the mother was already consumptive, and had lost a son from the same disease. She died there from phthisis, and shortly afterward the family left, having lived there for one year only. The next occupants were a family (Gotz) of seven persons, all in good health, though there was a history of that disease in the mother's family. After one year's residence in this dwelling they left, and at a later time it was found that the father, mother and one son had died of phthisis, and a fine boy of chronic peritonitis. The third family occupying the dwelling were healthy on arrival, and had no hereditary taint. A child born in the house died of meningitis; another child died of 'marasmus'; another boy acquired hipjoint disease. Later on the father died of phthisis, and another child of meningitis; the mother became phthisical, and a surviving girl was extremely scrofulous. A fourth family came in after the last mentioned; all healthy. The mother became phthisical, and bacilli were found in the sputum. Two children died of meningitis under one year old."

"Summing up the history, it appears that for eight years (1865-73) the dwelling was free from tubercular disease. Then came one year's tenancy by a person already tuberculous. After this, in a period of twelve years, at least 12 cases of tubercular disease were traced to this source. It is noted that the dwelling was never vacant, the new tenants entering while it was, so to speak, still warm from the last; and during the whole period it was never painted or cleaned. Englemann asserts that this neglect did not occur in other parts of the same large house, and that no similar instance of tubercular disease clinging to a dwelling was observed in them."

The following case is recited by Dujardin-Beaumetz (*Revue de la Tuberculose*, 1893, p. 156), from a report of Dr. Ducor, in Paris: "A family of 11 persons—father, mother and 9 children—hired a small apartment in October, 1890. This apartment had been occupied since 1888 by a man and his wife; the man died of tuberculosis in May, 1890, and the woman twenty days after, of the same disease. The mother and two children slept in the room where these two deaths had occurred. In 1893 these three persons, the mother, a little girl of nine years and an infant of sixteen months old, all showed symptoms of tuberculosis accompanying bronchitis after measles. Dr. Ducor, struck by the symptoms of the disease, and the fact that the occupants of this room were the only members of the family who were affected in this way, made an investigation into the matter, which resulted in discovering the history of the former occupants. He then observed that the wall paper of the room in question was stained with the remains of dried sputum. Submitting this paper to the medical inspector of epidemic diseases, not only were tubercle bacilli found under the microscope, but two guinea pigs, inoculated with an emulsion made with fragments of the paper, gave evidences of tuberculosis. The following conclusions are drawn from these observations:

"First—Tuberculous sputa deposited in a room, as on wall paper, dries there, and may remain virulent for at least two years.

"Second—According to the degree of virulence or of attenuations present, other things being equal, the absorption of the tubercular germs may give rise to a general tuberculosis, a local tuberculosis, or a scrofulous tubercular.

"Third—Too much importance cannot be attached to the destruction of sputa and disinfection of premises occupied by consumptives, not only for the sick and their families, but for those who come after them to live in the same apartments."

Dujardin-Beaumetz, commenting on this case, remarks that "it is by no means isolated, many observers having noted analogous cases. The infectiousness of tuberculosis is now admitted by all without dispute, and it is well known that the chief mode of communicating this infection is through the sputa. In view of the possibility of such an infection occurring from dwellings occupied by tuberculous patients, there would seem to be no escape from the logical conclusion that tuberculosis should be included in the list of contagious diseases, for the protection of the public."

But in spite of these facts, which M. Beaumetz admits have been satisfactorily demonstrated, he expresses the opinion that we should still hesitate in this matter for fear of offending the sensibilities of families who are affected with this disease.



Apropos of this question, Cornil (*Ibid.*, 1894, p. 87), communicates to the Academy of Medicine in Paris, February 27, 1894, a letter signed by several distinguished physicians, Gilbert, Berlioz, Fleury, Roux and others, directors of the Sanitary Departments of Havre, Grenoble, St. Etienne and Lyons, requesting—

“That tuberculosis be placed among the list of notifiable diseases. They regret that extra-academical considerations and the ‘fear of offending people’ should deter the Academy from taking action in this matter, for, they say, such apprehension is entirely without foundation. As proof of this, attention is drawn to the fact that out of 300 disinfections of premises after deaths from tuberculosis, made in Paris between January 12, 1892, and August 31, 1893, according to the sanitary regulations, in only 22 instances was there any opposition whatever. They conclude from this that the public has already accepted the idea of the infectiousness of tuberculosis, and are quite prepared to see it placed under sanitary control along with other infectious diseases. If any opposition should be encountered at any time, the attending physician in the case, by the employment of a little tact, will find it very easy to reconcile his duty to the family with his duty to the public. They, therefore, request the Academy to include tuberculosis among the list of notifiable diseases.”

In 1895, according to the official reports, there were 9,787 tuberculous premises disinfected in Paris; in 1896, 8,560 premises, or 1,227 less than the previous year. This is due to the fact that there were fewer deaths from tuberculosis in 1896 than there were in 1895. Whether this reduction of mortality is to be attributed to the improved sanitary regulations in regard to tuberculosis, is not stated; but it would not be too much to assume that at least a part of the reduction is due to the education of the public as to the infectiousness of the disease, and the precautions which they themselves take to prevent its spread, as well as to improved public hygiene in the city of Paris. Other causes, as the clemency of the seasons, etc., may also have been at work.

---

### *The Spread of Tuberculosis among Cattle and Animals, as Illustrating the Infectiousness of the Disease.*

In the report of the Commission on Tuberculosis in Cattle of the State of New York, 1895, we find the following: “Dr. Ruhling, of Göttingen, writing (1774) of the disease in animals, says:

“‘The malady is transmitted to sound animals by direct contact of animals standing side by side in the stall and licking each other, and breathing the expired air direct from the diseased lungs; the frequenting of the same pastures will also serve to propagate it.’ Fromage, in the *Dictionnaire de Rogier*, article ‘Phthisis,’ says: ‘Men in art are very much in accord that this malady is not contagious, but some stock owners think differently.’ Hazard, who saw much of tuberculosis in the Parisian dairies in the concluding decade of the last century, said that ‘most of the veterinarians looked upon the disease as contagious, and that some of the physicians believed the same of the phthisis of man.’ Cruzel, in his work, 1868, says: ‘This foetid expired air, inhaled immediately by another cow upon a sound lung, gives the latter tuberculous infection. It is a matter of every-day experience to the veterinarian. Two oxen or cows are kept in the same stable, take their food from a common rack or manger, lie in the same stall, and respire nose to nose. The one is, to all appearances, perfectly sound; the other is in as good a condition and is vigorous, but it coughs from time to time and its breath is foul. Soon we notice that the animal that does not cough eats with less appetite, it loses flesh, and soon it is unequivocally affected with the same malady as the first.’”

Nocard (*Annal d'Hyg. et de Med. Leg.*, Nov., 1892, p. 385), says that “formerly the Parisian dairies were celebrated for being infected with tuberculosis; the cause was that the cows



remained too long in the stables, during which time the infection was communicated from one cow to another. There is less danger of this at present, because the animals are only kept in the stalls during the milking period; afterward they get with calf again, or are slaughtered when they give no milk. In the country the conditions as regards infection are the same. If a tuberculous cow has unfortunately been introduced into a stable, after it has been there a certain length of time it may be said that this stable has become infected and the disease taken up its abode there; all the cows, with very rare exceptions, will become tuberculous one after the other." Nocard gives many cases illustrative of this fact, a few of which may be noted here:

"In the dairies of St. Helaine, out of a herd of 56 cattle, 25 were found to be tuberculous in June, 1891. It was decided to isolate them at once, and kill them off as they were needed. At the end of the year 15 other animals were found to be tuberculous, and they were isolated. The 16 that remained showed no symptoms of tuberculosis on clinical examination, but when subjected to the tuberculin test, 10 more proved to be tuberculous, which was confirmed by autopsy. Thus, out of 56 cattle in this herd, 50 became tuberculous." Nocard considers that this infection was due to the stable in which the tuberculous cattle had originally been confined.

"On another farm, 10 cows of the finest type of Jerseys had been kept for two years. They were proved to be tuberculous by the tuberculin test, and the diagnosis was confirmed by autopsy. Only one cow which did not react to the tuberculin injection remained healthy. This stable was kept in the most perfect hygienic condition, both as to food and habitation, and was regularly disinfected at certain intervals. Another stable contiguous to the first and communicating with it contained 9 other cows. None of these were found to be tuberculous." Nocard directs attention to this interesting fact, as showing that "infection by the atmosphere from a distance is next to *nil*"; that in order to produce tuberculous infection there must be intimacy, repetition and prolonged contact of the healthy with the infected subjects."

Nocard and Leclainche ("Les Maladies Microbiennes des Animaux," 1896,) gives some interesting statistics of bovine tuberculosis, showing that the disease has enormously increased within the last few years, as the result of infection. In Great Britain, the progress of the disease has been so rapid during the last fifteen years that certain breeds of cattle, notably the Durham, threaten to die out entirely in a short time. Walley and Fleury have directed attention to this fact as a "clear proof of the spread of the infection." In Denmark, until 1789, the disease was practically unknown except by name. In 1818 it was still extremely rare. In 1840 tuberculosis was imported into Denmark from Schleswig-Holstein, and in 1850 it had spread all over the country. In Leipzig (Rieck, "Die Tuberculose unter den Rindern," Archiv. f. Thierheilkd., vol. XIX., 1893), there were found, on the examination of cattle at the abattoirs, 11 per cent. tuberculous in 1888; in 1891, 26.7 per cent.; in 1894, 29.1 per cent. Among cows, the increase in tuberculosis was from 17.5 per cent. in 1888 to 38.6 per cent. in 1894. It is noted that the spread of tuberculosis is very much more rapid among the adult cattle than the calves. These facts have been observed in every part of the world where cattle have been examined carefully. In Australia, in the province of Victoria, where tuberculosis, twenty or thirty years ago, was unknown, to-day from 15 to 20 per cent. of tuberculous cattle are slaughtered annually.

Jeffries ("How Tuberculosis is Acquired," Boston Med. and Surg. Journ., Sept. 3, 1891), refers to Bayard's statistics (Archiv. f. Wissensch. u. prakt. Thierheilkd. XV., p. 1, 1889), showing that the curves of tuberculosis in cattle and man follow each other closely all through Baden and Bavaria. He remarks that, "the case is cited to show the dependence of human tuberculosis on that of cattle. It would be just as logical to argue the other way. If men catch tuberculosis from eating cattle, where do the cows get it—from eating each other? The proper place to look for the cause is in ways common to both, that is, indirect infection, not food."

That human and bovine tuberculosis are identical may be inferred from the fact that the germ found in the two cases is absolutely indistinguishable. Its morphology is the same; its peculiar behavior in regard to staining fluids is identical; it grows in the same culture media at the same temperatures, and has the same appearance and chemical products of its growth; it has the same thermal death point; it produces the same pathological lesions in both subjects. If inoculated from man, ox, horse or pigs into guinea pigs, the same pathological phenomena are produced in the various cases. There are cases to be found in the literature of the subject which give evidence of the disease having been communicated from tuberculous animals to man, and vice versa, when living



in close and prolonged contact, as well as from the ingestion of tuberculous flesh and milk, and by means of infection through wounds. That which is indistinguishable in all its relations and conditions, and which is interchangeable, cannot be otherwise than identical.

*The Prevalence of Tuberculosis in Insane Asylums and Prisons, etc., as Evidence of the Infectiousness of the Disease.*

Dr. Babcock, Superintendent of the Hospital for the Insane, in Columbia, S. C. (American Jour. of Insanity, Oct., 1894), has collected the following statistics on this subject:

"While statistics prove that tuberculosis causes one-seventh of the deaths among the whole population of the world, the figures collected by Hagen (Zeitschrift f. Psychiatrie VII., 1850, p. 759), from the reports of many asylums, showed that among the insane more than one-fourth of the mortality was due to this fatal disease. In 1892, Clouston, who has studied the subject more than thirty years, concludes (Tuke's Dict. of Psycholog. Med., p. 939), that 'the fact that under the most favorable conditions of life and treatment that we can devise at present for the insane in the best asylums, 3 of them die of pulmonary tuberculosis to 1 person in the general population at the same age, is one full of interest and significance.' 'So great is the liability of tuberculosis,' says Ireland, 'in certain prisons, that commitment to them is almost equivalent to a death sentence.' Cornet found that during a period of fifteen years the mortality from phthisis among males in Prussian prisons was 45.82 per cent. of all deaths; in females, 49.33 per cent. In the prisons of Austria the mortality from this disease reached 61 per cent. during four years, while in the penal institutions of Bavaria, it was only 38.2 per cent. during eight years (von Zeimssen, Pathology and Treatment of Tuberculosis, Wood's Monographs). Among the 1,400 convicts in the Illinois State Prison at Joliet, fully one-third have consumption, and nearly all the deaths in that penitentiary are due to this single cause (Journ. American Med. Assoc., May 6, 1893). Clouston, commenting on the reduction of the mortality from tuberculosis in asylums since improved sanitary measures have been adopted, says that 'in older institutions, where the hygienic conditions were bad, the number of deaths from phthisis was often from 25 to 30 per cent. of the whole number who died, and when the post mortem records of these institutions were examined, from 40 to 60 per cent. showed signs of tubercular deposits to a greater or less extent. The sanitary conditions of modern hospitals for the insane, however, are much better than they were fifty years ago, \* \* \* so that recent statistics of the prevalence of phthisis are far more favorable than they used to be. In the Royal Edinburgh Asylum for the Insane, from 1842 to 1863, the percentage of deaths from phthisis in the whole number of deaths was 29, while for the ten years, from 1879 to 1888, it was only 13.6 per cent. During the first twenty-three years of the existence of the Inverness Asylum (Scotland), 35.4 per cent. of the whole deaths were due to phthisis.' In referring to the report of that asylum for 1887, a writer in the Journ. of Mental Science (Jan., 1881), remarks that 'when 18 deaths out of 47 (38 per cent.) are due to phthisis, it is time to cease speculations concerning the prevalence of phthisis in the Highlands, and to take active practical steps to discover the real cause of the pest.'"

"In the United States the death-rate from tuberculosis is also high in some hospitals for the insane. According to Workman (Amer. Journ. of Insanity, July, 1862), in eight American asylums consumption was the cause of 27 per cent. of the whole number of deaths. In the Columbia Asylum, the mortality from tuberculosis for the ten years ending November 1, 1893, was 22 per cent. of all the deaths. All the deaths from this cause occurred in certain wards in the older part of the asylum, built in 1822; the remaining wards remained free from the disease."

The following table gives the death rate from tuberculosis in 98 American asylums, collected by Dr. Babcock:

Number of Asylums.	Percentage of Mortality from Phthisis.	Number of Asylums.	Percentage of Mortality from Phthisis.
3.....	0.0	14.....	20.25
1.....	0.1	13.....	25.30
2.....	1.5	6.....	30.35
14.....	5.10	3.....	35.40
16.....	10.15	1.....	50.60
24.....	18.20	1.....	60.

The low mortality rates occurred in small institutions, the higher death-rates in larger asylums, the highest being found in colonies for the chronic insane.



The conclusions reached by Dr. Babcock in his study of the subject are as follows :

"1. That tuberculosis is two or three times as common in institutions for the insane as in the general population.

"2. That among the insane two-thirds of the cases have had an asylum residence of over one year.

"3. That the disease is frequently the result of hospitalism, and its prevalence may be regarded as a test of the sanitary condition of the institution.

"4. That improved sanitation alone has diminished the death-rate, but has not exterminated the disease.

"5. That the disease is really ubiquitous, although some small well-conducted asylums are free from it.

"6. That asylum statistics, based upon clinical diagnosis alone, do not give the full mortality of tuberculosis.

"7. That in private houses the insane are not more liable to phthisis than are other people.

"8. That direct heredity is probably less potent than has been supposed.

"9. That predisposition to tuberculosis may be congenital or acquired.

"10. That among the more important external predisposing influences are imperfect ventilation, absence of sunlight, dampness, defective plumbing and drainage, insufficient exercise, want of variety in diet; in fact, an unhealthy environment; but such physical elements as depression of spirits, homesickness, loneliness, etc., may also play a part.

"11. The history of the disease, clinical observation and bacteriological investigation, all prove the disease communicable, the element of infection being a specific germ contained in tuberculous discharges.

"12. 'Being communicable, the disease is therefore preventable.' (Michigan State Board of Health.)"

Many statistics might be quoted to show that consumption prevails in prisons to a disastrous extent. Among others Hirsch gives the following, not already quoted: "In the United States prisons, from 1829 to 1845 the mortality from phthisis was 12.82 per 1,000 prisoners at Philadelphia, and at Auburn and Boston 9.89 and 10.78 respectively; in Baltimore prison it was 61 per cent. of the mortality from all causes. In the French prisons, particularly those in which long terms of penal servitude are worked out, the death-rate from phthisis amounts to between 30 and 50 per cent. of the mortality from all causes. In the Dutch prisons it reaches the same height; in the Danish convict prisons it amounted, in 1853 to 1869, to 39 per cent. of all the deaths. Baly, in his report on the prevalence of phthisis from 1825 to 1842 among the convicts at Millbank penitentiary, England (quoted by Evans, *Phthisiology*, 1889), records that, 'when 31 out of 205 deaths were due to cholera, 75 of the remaining 174, or 43 per cent., were due to phthisis; while of 355 prisoners discharged during the same period on account of ill-health, 90 were phthisical, and quite three-fifths of these, according to precedent, would have died of that disease if they had been left to complete the term. In that way we bring the annual mortality from phthisis at Millbank up to 13 per 1,000, or more than three times that of the London population at large.'"

"Pietra Santa gives the following facts for the prisons of Algiers: 'Of 23 natives who died in the public prison of Alger, 17 succumbed to phthisis; in the Central Prison of l'Harrach there were 57 deaths from phthisis in a total of 153, or 37.2 per cent.'"

The important influence of imprisonment in the occurrence of this disease is very clearly brought out by its prevalence in those regions where phthisis is in general a rare thing, as, for example, in lower Bengal. Webb quotes the following remarks by Green, with reference to the commonness of the disease among the natives in the prison of Midnapore: "After a careful examination into the early history and origin of the cases of this disease as they have occurred, I have been led to the conclusion that many of the men thus affected were previously hale and capable of earning their livelihood, and were not subject to cough before imprisonment. I find that after they have been working a few weeks or months on the roads here, and inhabiting the jail, they have become the subjects of attacks of inflammation of the lungs, etc., \* \* \* which have ended in some cases in death \* \* \* with all the symptoms of tubercular disease of the lungs."

"The great frequency of consumption in convict prisons may seem to be due to many of the prisoners bringing the disease with them; but that such is not the case follows from the well-authenticated fact that most of the deaths from phthisis among prisoners do not occur until the later years of their term of confinement. At Millbank Penitentiary signs of a pulmonary affection on admission could be made out, as Baly tells us, in only 12 prisoners among 1,502 who entered in 1842, and in only 15 among 3,249 who were received in 1884. Among the convicts of 1842 there were 510 women sentenced to transportation, who remained at Millbank not longer than three months, and of these two fell ill with phthisis or scrofula during that time; whereas of the remaining prisoners no fewer than 47 became consumptive before the completion of their



term of two or two and one-half years. It is further to be kept in mind that most of the convicts sent to Millbank had already served longer or shorter terms in smaller prisons elsewhere, and not a few of them more than one term, so that in a certain proportion of those who were found phthisical on admission to the central prison, the seeds of the disease might have been implanted while they were undergoing sentence previously."

"Kolb (*Zeitschrift f. Hyg.*, Vol. XIX., p. 484), arrives at the same conclusions, as the result of his investigations in the prison of Kaiserslautern during ten and a half years (1882-92), namely, that the majority of cases of tuberculosis were contracted in the institution. Out of 934 prisoners admitted, 284 were later affected with phthisis. Four hundred and seventy of them were perfectly healthy on admission, and two-fifths of these became tuberculous in from six months to one year. Most of the deaths from tuberculosis occurred within the first two years; some died within one year and some in fifteen months."

"Cornet (*Revue de la Tuberculose*, 1894, p. 184) gives the following statistics to show the reduction of mortality from tuberculosis in Prussian prisons since 1887, when sanitary measures were regularly applied in Germany for the prevention of the disease:

Deaths per 10,000 Prisoners.	Year.	Deaths per 10,000 Prisoners.	Year.
118.9.....	1875 to 1876	89.4.....	1887 to 1890
140.8.....	1878 to 1884	81.2.....	1890 to 1894
101.0.....	1884 to 1887		

"These figures are confirmed by the statistics for the whole of Prussia and other German states since prophylactic measures have been introduced. From 1875 to 1886 there was an average mortality from tuberculosis of 30 per 10,000 inhabitants; it has been reduced to less than 25. In Saxony, the death-rate has fallen from 25 to 21; in Baden, from 30 to 26, as a result of sanitary regulations."

*Health Statistics of the Catholic Nursing Orders in Prussia; an Investigation into the Communicability of Consumption by Dr. Cornet (Zeitschrift f. Hyg. Vol. VI, Part I., 1889, and "Evidences of the Communicability of Consumption," by Heron, 1890).*

These orders were selected by Cornet for special investigation, because their members, being bound by a vow to remain for life in their respective institutions, are never permitted to leave convent life, neither when ill nor for any other reason. Thirty-eight convents were chosen for statistical purposes, because their reports furnished the most reliable information in answer to the questions asked. These reports were obtained through the Department of the Prussian Minister of State, and are therefore in some sense official.

The communities, consisting of both male and female members, represent a yearly average of 4,028 persons and a sum total of 87,450 years of human life under observation during a period of 25 years, from 1864 to 1889, inclusive, in which time there was a total of 2,099 deaths from all causes.

The following table gives a summary of the causes of death, number of deaths from various causes, and the percentage of mortality on the deaths in these 38 nursing orders during 25 years:

CAUSES OF DEATHS.	NO. OF DEATHS.	PERCENT. OF MORTALITY ON DEATHS.	CAUSES OF DEATHS.	NO. OF DEATHS.	PERCENT. OF MORTALITY ON DEATHS.
Tuberculosis.....	1,320	62.88	Kidney disease.....	21	1.00
Typhoid and typhus.....	177	8.23	Intestinal disease.....	27	1.28
Smallpox.....	20	0.95	Liver disease.....	18	0.85
Cholera.....	17	0.81	Abdominal disease.....	32	1.52
Erysipelas.....	9	0.42	Spinal disease.....	17	0.81
Cancer.....	50	2.38	Rheumatism.....	10	0.47
Dropsy.....	54	2.57	Gout.....	5	0.24
Apoplexy.....	30	1.43	Weakness and old age.....	28	1.33
Inflammation of lungs.....	74	3.53	Other diseases.....	86	4.09
Heart disease.....	77	3.67			
Brain disease.....	27	1.28	Total deaths.....	2,099	



It will be seen from an examination of this table that, while the death-rate from tuberculosis in the general public is from one-seventh to one-fifth of all deaths, in these nursing communities nearly two-thirds, or 62.88 per cent. of the mortality from all causes, is due to tuberculosis alone. In nearly one-half of the convents it was found that the death-rate from tuberculosis rose still higher than two-thirds; in some of them it was three-fourths of the mortality; in two "Mother Houses" tuberculosis was the sole cause of death. In convents where many of the nurses were engaged in attending upon surgical cases, among which there were few or no consumptives, the mortality from this disease was considerably lower.

The following table gives a summary of the ages at deaths from tuberculosis and other diseases, and the average duration of life among the nursing orders:

CAUSE OF DEATH.	AGE.							
	15-20	20-25.	25-30.	30-40.	40-50.	50-60.	60-70.	70.
Tuberculosis .....	14	164	348	525	201	43	19	66
Other diseases.....	9	79	124	186	147	107	81	47
Total .....	23	243	472	711	347	150	100	53

Average duration of life, 36.27 years.

It will be observed that the death-rates between the ages of 15 and 20 years and after 50 years are comparatively low. The low mortality in the first case is accounted for by the fact that few persons enter convent life below the age of 18 years, and, in the latter, it is due to the fact that the average age at death of the inmates is only 36.27 years.

It is seen that the highest death rate in these communities is between the ages of 25 and 50 years. Cornet states that the members of these orders are persons whose health at first is known to be excellent, because admission to membership is, amongst the other requirements, dependent upon the production by the applicant of a medical certificate to that effect. Their health is therefore first, as a rule, better than that of their countrymen in general, and yet the average age at death of these originally healthy individuals, under the peculiar conditions in which they live in these convents, is lower by ten years at least than that usually estimated of men who are engaged in trades notoriously the most unhealthy, such as metal and stone workers, upholsterers, etc.

The following table gives a summary of Cornet's statistics comparing the mortality in the Prussian State as a whole with that of the nursing orders, estimated per 10,000 living people:

CAUSE OF DEATH.	15-20 YEARS.		20-25 YEARS.		25-30 YEARS.		30-40 YEARS.		40-50 YEARS.		50-60 YEARS.		60 YEARS.	
	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.
Tuberculosis ....	18.6	116.9	29.9	137.3	26.1	176.2	41.8	142.1	47.9	88.8	66.1	47.3	73.0	88.8
Other diseases...	29.7	87.7	38.3	79.4	45.3	63.2	64.2	52.7	96.0	61.2	172.6	145.7	483.8	495.2
Total .....	48.3	204.6	68.2	216.7	71.4	239.4	106.0	194.8	143.9	150.0	238.7	193.0	556.8	584.0
Excluding infectious diseases.....	23.9	29.2	32.1	34.0	39.5	22.7	57.3	30.5	84.6	46.5	153.7	111.6	459.6	480.8

In studying this table it should be borne in mind that the great majority of the inmates do not begin convent life until they have reached the ages of 20 to 30 years, and that they die of consumption in the greatest numbers between 25 and 40 years of age. The novices and



those who have most lately entered the convent have most of the rough work to do; they are required to clean the wards, make the beds and remove and wash pocket handkerchiefs and bed and body linen used by the sick.

Comparing the mortality in the Prussian state with that of the nursing orders it is seen, that between the ages of 15 and 20 years the general proportionate death-rate in the convents is four times that of the state; between 20 and 30 years of age it is about three times greater in the convents than in the state; between 30 and 40 years of age the convent death rate is double that of the state; after 40 years of age the inmates of the convents and the general population begin to show more equally proportionate death-rates.

If from the total death-rate in the state and in the convents that portion of it due to tuberculosis be deducted, then the marked difference between the two death-rates disappears to a great extent. If the mortality due to all infectious diseases, including tuberculosis, be deducted in the state and orders, then up to the age of 40 years the death-rates in state and convent are remarkably equal. From 40 to 60 years of age the death-rate due to non-infectious diseases is lower in the convent than in the state. In other words, it is clearly evident that the high mortality which obtains in these orders is due entirely to the infectious diseases, and more particularly to tuberculosis.

The following table shows the frequency of tuberculosis and other diseases in these convents, as compared with the whole of Prussia, in every hundred deaths, between the ages of 15 and over 70 years :

CAUSE OF DEATH.	15-20 YEARS.		20-25 YEARS.		25-30 YEARS.		30-40 YEARS.		40-50 YEARS.		50-60 YEARS.		60-70 YEARS.		70		TOTAL.	
	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.	State.	Orders.
Tuberculosis .....	37.8	60.8	43.0	67.4	43.5	73.7	39.3	73.8	32.7	57.9	26.8	28.6	17.8	19.0	3.25	11.3	23.7	62.89
Other diseases .....	62.1	39.1	56.9	32.5	56.4	26.3	60.6	26.1	67.2	42.0	73.1	71.3	82.1	81.0	96.7	88.6	76.2	37.11

From this table it is seen that, up to the age of 50 years, never less than one-half the deaths, but for the most part three-fourths (75 per cent.) of them are due to tuberculosis. It is again shown that the deaths from tuberculosis in the nursing orders are much the most numerous between the ages of 25 and 40, just at the period of life when they are required to do the hardest work.

The following table shows the relation of the mortality to the length of residence in the convents and employment as sick nurses, divided into periods of five years each :

LENGTH OF RESIDENCE IN CONVENT.	MORTALITY FROM ALL CAUSES.	MORTALITY FROM TUBERCULOSIS.	MORTALITY FROM INFECTIOUS DISEASES.	MORTALITY FROM CANCER.	MORTALITY FROM OTHER DISEASES.
½ to 5 years .....	709	494	118	4	88
5 to ten years .....	505	374	41	5	90
10 to 15 years .....	300	210	23	9	67
15 to 20 years .....	197	133	21	9	43
20 to 25 years .....	134	53	18	10	63
25 to 30 years .....	94	27	11	3	56
30 to 35 years .....	49	7	9	6	33
35 to 40 years .....	31	5	3	2	23
40 to 45 years .....	35	8	1	..	25
45 to 50 years .....	16	2	1	1	13
50 to 55 years .....	14	..	..	..	14
55 to 60 years .....	6	1	..	..	5
Over 60 years .....	5	..	..	..	5

Cornet found that during the first half year of convent life the mortality was very low, but that afterward it rapidly increased, so that in the first five years, out of 709 deaths, 494 were due to tuberculosis; and in the first ten years nearly twice as many (868 out of 1,214) died from



this disease as succumbed to it in all the other years of convent life together. The highest mortality from tuberculosis was reached in the third year of the nurses' cloister life.

"It must strike every one as startling," remarks Heron, who quotes Cornet's statistics, "that in these convents we find communities recruited from amongst persons who, with very few exceptions, are certified by physicians to be in excellent health when they enter upon their conventional duties, and that in from 16 to 18 years from that time these healthy young people will have reached the average limit of their lives. This enormous mortality, unequalled, I believe, amongst adults, owes its monster proportions to one cause above all others—tuberculosis."

Reference has already been made to the work which the novices and recent members of these orders are required to do, namely, cleaning the wards, making the beds, washing the handkerchiefs and bed and body linen, etc., of the consumptive patients. "It is obvious," Heron says, "that amongst persons so occupied we should expect to find tubercular disease unusually frequent. These are the people most likely to come into intimate and frequent contact with a chief source of infection—the dried expectoration of consumptives. The principal insanitary condition of convent life is the living together of considerable numbers of persons who have not, from the nature of their calling, sufficient opportunities for open air exercise. It is impossible to believe, knowing what we do of the cause of tubercle, that such a condition of life could, of itself, produce tubercular disease. On the other hand, it would certainly lead to the rapid spread of that disease after it was introduced amongst such communities."

Finally, Dr. Heron, who carefully weighs the various questions as to the cause of tuberculosis, comes to the following conclusion: "Still, though infection is the only route by which tubercular diseases reach mankind, and beasts also, there does remain something of mystery, so it seems to me, around the fact that so many people, who are often exposed to the infection of tuberculosis through many years of their lives, never show a symptom of tubercular infection. The oft-quoted statistics of the Brompton Hospital, and my experience amongst my colleagues at the City of London Hospital for Diseases of the Chest, and my observations of the resident staff there, medical officers and nurses, have greatly impressed me with the fact, that it is not a trivial number of people who are often and closely associated with consumptives, and who escape infection by them. I cannot adequately explain this very interesting and important point. When, however, I turn to the bacteriology of tuberculosis, and to the statistics, for example, of the Catholic Nursing Orders of Prussia, the evidence strikes me as overwhelming in its force, and as leaving no escape from the solemn conclusion, that tuberculosis, in all its forms, results from infection alone, and that the only source of the infection, of which we have any knowledge, is found in the tubercular bodies of animals, both men and beasts."

*Mortality Statistics from Tuberculosis in the University Polyclinic in Munich (Goldsmith and Luxenburger, Munch. Med. Wochenschrift, September, 1896.)*

In 100 autopsies made in the above polyclinic during the year 1894-95, the following data were obtained:

Tuberculosis as cause of death in 44 cases.

Active phthisis in 12 cases.

Inactive phthisis in 24 cases.

No tubercular lesions in 20 cases.

Comparing the deaths from tuberculosis with the deaths from all causes, half of whom were autopsied, the following table is given:

YEAR.	TOTAL DEATHS FROM ALL CAUSES.	DEATHS FROM TUBERCULOSIS.
1893 .....	131	63-48 per cent.
1894 .....	141	71-50 per cent.
1895 .....	152	77-50.6 per cent.

"This shows only too clearly the enormous death-rate from tuberculosis in this institution, as was confirmed by autopsy in many of the cases. Only 20 out of the post mortems made in 1895 were free from tuberculosis. Of the 80 persons affected with the disease 56 (70 per cent.) were seriously ill, and of these 44, or more than one-half of those affected, died; and in 24 cases (30 per cent.) the previously existing tubercular processes were healed. It is stated that these figures rather under than over estimate the actual facts, as in these investigations extensive pleuritic growths were not reckoned as being tuberculous, except when they showed caseous formations in the lungs or corresponding lymphatic changes in the bronchial glands, etc



"Such being the case, then, that among certain classes of people in Munich 80 per cent. are tuberculous, no one can deny that something should be done to prevent the spread of this disease."

The following table gives the average ages at death of those who died at this institution :

	AVERAGE AGE AT DEATH FROM TUBERCULOSIS.		AVERAGE AGE AT DEATH FROM OTHER CAUSES.	
	MALE.	FEMALE.	MALE.	FEMALE.
1893 .....	42.4	35.8	59.5	56.8
1894 .....	37.6	28.8	61.2	55.9
1895 .....	37.0	33.6	56.0	60.0

"Can it be a mere coincidence," inquire these observers, "that the average duration of life of the tuberculous males is longer, both relatively and absolutely, than that of the tuberculous females; while with those who are not tuberculous this difference entirely disappears, or the reverse is the case. This we venture to deny. The true explanation of this striking circumstance is to be found in the fact that among the working classes, the men, owing to the character of their work as laborers, are afforded much greater opportunities to work in the open air than the women, and that they provide better food for themselves than the women obtain. In other diseases, such as heart and kidney diseases, joint affections, nervous disturbances, etc., these factors do not seem to play so important a part. If good food and fresh air, under such conditions, accidental and inadequate as they are, evidently have such a beneficial effect on tuberculous diseases, how much better results may we hope to get from the establishment of public hospitals for the proper treatment of consumptives?"

### *The Influence of Occupation on the Liability to Tuberculosis.*

It has long been recognized that the habits and occupations of people have an important influence in predisposing them to the disease. The following table has been prepared from statistics collected by Lindsay in his "Climatic Treatment of Consumption," quoted by Evans (Phthisiology), to illustrate the effect of occupations on the mortality from tuberculosis:

OCCUPATION.	MORTALITY FROM TUBERCULOSIS PER 1,000 DEATHS FROM ALL CAUSES.	OCCUPATION.	MORTALITY FROM TUBERCULOSIS PER 1,000 DEATHS FROM ALL CAUSES.
Fishermen .....	108	Earthenware workers .....	473
Grocers .....	167	Hosiery workers .....	168
Drapers .....	301	Cotton-mill operators .....	257
Printers .....	461	Wool workers .....	272
Farmers .....	103	Quarrymen .....	308
Gardeners .....	121	Cab and omnibus drivers...	359
Cutlers .....	371	Coal miners .....	126
File-makers .....	433		

From an examination of this table it will be seen that consumption is comparatively rare among those who live an outdoor life under normal



and healthy conditions; that it is comparatively common among those who live habitually indoors; and that it attains its maximum height among those whose occupation involves prolonged confinement in a vitiated atmosphere.

The apparent exceptions to the law that the mortality from consumption is in direct ratio to the contamination of the air of respiration, admit, for the most part, of a ready explanation. Thus quarrymen, although working in the open air, have a high mortality; but here the inhalation of particles of stone dust, which is known to be one of the most powerful predisposing causes of consumption, comes into play. Cab and omnibus owners, also working in the open air, have a mortality rate from consumption of 359 per 1,000 deaths; but they are proverbially an unhealthful class in general, owing to their intemperance, exposure to wet weather, etc. Again, coal miners are an apparent exception to the rule, enjoying comparative exemption from consumption, though engaged in work which one might suppose would render them peculiarly liable to the disease; but, as Lindsay remarks, this is probably due to the fact that the work is excessively laborious, and hence is usually chosen by those who are free from hereditary tendency or acquired debility of any kind, and that as their work requires the exertion of so much physical strength, they relinquish it at the first signs of failing health, and, seeking some lighter occupation, are not tabulated as miners in the mortality statistics.

Hirsch, also quoted by Evans, gives the following data on this subject: "Summing up Greenhorn's inquiries, which were based in part on official statistics of the mortality, and in part on independent local researches into the death-rate from consumption in the manufacturing districts of England, Simon concludes as follows: 'In proportion as the male and female populations are severally attached to indoor branches of industry, in such proportion, other things being equal, their respective death-rates by lung diseases increased \* \* \* and this further conclusive proof was given to the influence of an accused occupation, namely: That the high death-rate from lung disease belonged, according to the occupation, to men or to women of the district, that it sometimes was nearly twice as high for the employed sex as for the unemployed sex, and that it only extended to both sexes when both were engaged in the occupation.'

"Smith has ascertained, for 1,000 persons treated for consumption at the Brompton Hospital, that 70 per cent. of them had been in the habit of spending their time in over-crowded, hot and dusty places indoors. Finkelnburg's summary of his inquiries into the causes of mortality in Rhenish Prussia is as follows: The victims of pulmonary phthisis are the more numerous the more generally are indoor occupations followed by the one sex or the other, especially when the materials of their work are such as to create dust—wool-carding and spinning, knife-grinding and metal polishing are the most conspicuous. Wherever these occupations are found, among the rural population as well, there also the mortality from phthisis reaches a high figure, although never so high as in towns with the same industries. The same circumstances serve to account for the strikingly common occurrence of phthisis in nunneries, seminaries and such like institutions \* \* \* also in the Oriental harems, not only among the women, but among the children also; again among the badly lodged troops, of which we have evidence from England, France, Turkey and India, and, above all, in prisons."

Lagneau ("mortality from tuberculosis following occupation," *Revue de la Tuberculose*, 1893, p. 88) compares numerous European statistics, and arrives at these results:

"1. The occupations which render persons particularly predisposed to tuberculosis are those in which they are especially exposed to dust, as, for example, quarrymen, who, according to Swiss statistics, have a mortality of 10 per cent. from tuberculosis.

"2. Persons who, owing to their occupations, lead a sedentary mode of life, are more predisposed to tuberculosis than others. According to English statistics, students, young clergymen and others show a mortality of 459 deaths from tuberculosis per 1,000 deaths from all causes.

"3. Printers in England and lithographers in Italy have a mortality of 300 to 400 per 1,000 deaths.



"4. On the other hand, those who live in the open air constantly have an almost complete immunity from consumption; such as shepherds, farmers and sailors; 1 to 2 per 1,000 only."

Lagneau has also investigated the influence of density of population on the death-rate from tuberculosis in cities.

In France, the statistics of 662 cities show that the denser the population the greater the number of deaths from tuberculosis.

The following table illustrates this fact:

Cities.	Deaths per 1,000.
In 95 cities of less than 5,000 inhabitants .....	1.81
In 33 cities of less than 5,000 to 10,000 inhabitants .....	2.16
In 127 cities of less than 10,000 to 20,000 inhabitants .....	2.71
In 50 cities of less than 20,000 to 30,000 inhabitants .....	2.88
In 46 cities of less than 30,000 to 100,000 inhabitants .....	3.05
In 11 cities of less than 100,000 to 430,000 inhabitants .....	3.63
In Paris, 2,424,705 inhabitants .....	4.90

### *Some Evidences of Infection by Dust from Places Occupied by Tuberculous Persons.*

Cornet (Zeitschrift f. Hyg., Vol. V., 1888) has chiefly studied the dust, and his article is so well known that it is only necessary to state here that out of 311 trials with the dust and dirt from places occupied by consumptives, 59 gave positive results; 77 trials made with the dust of other places were negative. Many other experimenters since Cornet have confirmed his observations. Reinhold (Central-bl. f. Bact. u. Parasit., Vol. II., p. 199) and others, have found tubercle bacilli in the air of infected rooms. Spillman (Compt. Rendu. CV., '87, p. 352) and Hoffman (Central-bl. f. Bact. u. Parasit., Vol. IV., p. 269) have found that flies carry the germ in their intestines and deposit it in their droppings, and Hoffman, in one case out of four, found the bacilli in the intestines of flies virulent when inoculated into the eyes of rabbits. Stone (Amer. Jour. Med. Sci., March, 1891) has shown that the tubercle bacilli may be virulent in sputa after three years, during the last two of which it had been in a state of absolute dryness. Cadeac and Mallet (Congress pour l'Etude de la Tuberculose) found that the lungs of tuberculous cattle, dried and powdered, and then exposed to the air of a room, were virulent at the end of 102 days. A piece the size of the fist, dried and exposed to the air, infected at the end of 150 days; a similar piece, buried in a 3-litre flask filled with sand, was virulent at 159 days; also pieces in a flask of water, exposed to sunlight for 120 days, and others in running water for one month, were virulent (quoted by Jeffries, Boston Med. and Surg. Jour., Sept. 3, 1891).

Straus (Revue de la Tuberculose, 1896, p. 198) has found tubercle bacilli in the nasal cavities of healthy persons exposed to infected areas. In twenty-nine healthy individuals remaining in consumptive wards in a hospital for a greater or less period of time, nine were found to have virulent bacilli in their nostrils. About one-fourth of all cases examined contained tubercle bacilli in the nasal cavities. This observation of Straus has been also confirmed by others, as regards the nose.



Lermoyez, Dieulafoy, etc., have found tubercle bacilli in the throats of healthy individuals exposed to infection.

Since the investigation of Villemin, Koch, Cornet and others, it is acknowledged generally that the dried sputum of consumptives contained in the dust of infected areas is the chief source of tubercular infection. The common form of the disease in man, namely, pulmonary consumption, would seem to indicate that, for the most part, infection was brought about by inhalation. These experiments now show, first, that virulent tubercle bacilli may penetrate and become lodged in the nasal cavities and throats of healthy individuals, when exposed to contact for any length of time to tuberculous patients, as in infected rooms or hospital wards; second, they demonstrate how numerous these germs are in the atmosphere of such places inhabited by consumptives; and third, they prove that the common mode of communicating the disease is by the respiratory tract.

### *Some General Considerations of the Prevalence, Cause and Prevention of Tuberculosis.*

Vaughan (Med. News, March 7, 1896), writing on the restriction of tuberculosis, says: "Of the 63,000,000 people living to-day in the United States, 9,000,000 or more will die of tuberculosis, unless something is done to prevent it. In the census of 1890, 102,199 deaths are reported as due to pulmonary tuberculosis. To the reported deaths, not less than 30 per cent. should be added in order to arrive at the actual number. When this computation is made, it will be found that the annual number of deaths in this country from pulmonary tuberculosis amounts to nearly 133,000. \* \* \* In all probability the tubercle bacillus is directly or indirectly the cause of not less than 150,000 deaths in this country each year.

"Leyden gives the ratio between annual deaths and the total number of infected persons as 1 to 7. Williams states that the average life of the consumptives among the better-to-do classes of England is eight years. Accepting Leyden's estimate, we see that an average of 150,000 deaths annually, indicates that the total number of persons in this country to-day infected with tuberculosis amounts to 1,050,000, or 1 out of every 60 of the population. These figures are probably too small. Germany has a population equal to about three-fourths that of this country, and Leyden stated before the International Congress of Hygiene and Demography at Buda Pesth, last September, that the number of consumptives in the German Empire is not less than 1,300,000, and the annual deaths from this disease in the same country range from 170,000 to 180,000. It should be stated that the figures given include only those cases in which tuberculosis progresses and causes death. The number of persons actually infected is indeed so large that one hesitates to give it. The records of the autopsies show that not less than one third of all men have tuberculosis during some period of life.

"When the consumptive knows how, and properly attends to the thorough destruction of the germs thrown off from his body, there is no longer any danger of his becoming a centre of infection. Residence in a properly conducted hospital, arranged especially for the care and treatment of tuberculous patients, would be perfectly safe. The danger of infection in such a house would be much less than that to which the traveler subjects himself every time he passes a night in a hotel. \* \* \* Wherever we go we are in danger of being infected, but if certain well-known rules should be followed in detail, the infected and the uninfected might mingle without danger. \* \* \*

Cornet has shown by positive demonstration that of all places examined by him where people congregate, the one most free from the chance of accidental infection is the properly equipped and kept surgical operating room. Here one is less liable to infection than he is in the open street, or in the best kept hotel, or in a private house.

"Frequently we hear it stated that only the weak and feeble acquire consumption, and the fittest survive. A more heartless, false and unscientific statement was never made. \* \* \* While there are undoubtedly differences in susceptibility with little exposure, with no exposure the most feeble and unfit will not acquire tuberculosis, and with sufficient exposure there is



probably none sufficiently robust to remain immune to this disease. \* \* \* Mentone once had the reputation of being a most excellent place for the climatic treatment of consumption, but the invalid visitors coughed and expectorated on the streets and in the houses until the disease became tearfully prevalent among the native-born. The following quotation is from an article by Bennet, who practiced medicine at Mentone for many years, and who, at the time of writing this article, did not believe tuberculosis to be infectious: "During the last few years phthisis has become much more common at Mentone among the girls and young women than it formerly was, especially among the washerwomen, a numerous class, and contagion from the linen soiled by the sputa of consumptives has been suggested as the cause. \* \* \* When I first settled in this region in 1859, nearly the entire population was agriculturally occupied. All the young women of a village lying on a mountain side a few hundred feet above a property of mine were thus engaged, working at the soil with their fathers and brothers, carrying stones and earth in baskets on their heads. They were fine, healthy, robust girls and women, fed on macaroni, olive oil and wine, worthy to be the mothers of men. \* \* \* Times have changed; the Grimaldi girls have all become town workers, washerwomen, seamstresses, servants, and they begin to die of consumption. Is it not because they work in close, badly ventilated, damp rooms, instead of in the open air? Is it not again a question of rebreathed air, not of contagion?"

"We are to restrict the disease by preventing the primary infection. How can this be done? Only in one way—by the destruction of the infecting agent. The places where the tubercle bacillus is found outside of the human body have already been enumerated. We must stop the sale of milk and meat from tuberculous animals. \* \* \* The greatest work must be done in the disinfection of the sputum and other germ-containing excretions from the human body. Much good can be accomplished by the circulars now being quite generally distributed by Boards of Health, but this agency is insufficient and incomplete. \* \* \* I believe that every State should establish one or more hospitals for the education and treatment of its consumptives. \* \* \*

These hospitals should have a twofold use. The training of its inmates in methods of restricting the disease would be of untold benefit, and it is now generally conceded that the institutional treatment of the disease is the most successful. \* \* \* But, says one, the experiment which you propose would be, if carried out, an expensive one. This is true, but is it not also true that we are paying heavy tribute to this plague at present? How much loss in money do the 150,000 annual deaths from this disease entail? \* \* \*

I will not attempt to name a money value of these lives. The question is above any financial considerations. It is one of the welfare of the human race. \* \* \* In the plan which I propose, it would not be necessary for every consumptive to go to such a hospital, nor would it necessitate even the incurables remaining in these places indefinitely. The intelligent tubercular patient may live in intimate relations with his family, so soon as he knows and will practice the rules necessary to prevent infecting others. There is nothing cruel in the proposition which I make. On the other hand, it has everything to recommend it from a humane and even sentimental standpoint."

Ransome, in his *Milroy Lectures on the Etiology and Prevention of Phthisis* (Lancet, March 8, 1890), says: "Tuberculosis at the present day carries off, annually, nearly 70,000 persons (in England) in the form of phthisis, at the ages between 15 and 45, the most useful stages of human existence; it kills more than one-third of the people who die, and nearly half between 15 and 35. Moreover, in its prolonged and painful course, it either prevents its victims from earning a livelihood, or at least interferes greatly with their daily work. Its habit of seizing upon the flower of the population; its slow but almost certain progress toward death; the utter misery of the last few months or weeks of existence—all these are features in the fell disorder that renders its study all-important, not only to medical men, but also to statesmen, and to all who are concerned with the welfare of the nation. Up to a recent period, not only was consumption supposed to be incurable, but it was also regarded as almost inevitable, and the fate of the consumptive patient himself was generally looked upon as hopeless. \* \* \* But these views of the inevitable character and incurability of phthisis are now altered; for not only does clinical evidence show a considerable percentage of cure and improvement, under judicious treatment, but the evidence derived from the post-mortem examination of adults who have died from diseases other than phthisis shows that a very large percentage of persons have suffered and have recovered from tubercular disease of the lungs. With regard to the prevention of the disease, still less can any doubt prevail; during the last thirty years the returns of the Registrar General show that the annual death rate from phthisis has been reduced by more than one-third. This improvement, which is not confined to England, is too large to credit to the greater accuracy in diagnosis; it is attributable to the prevention of phthisis by improved hygiene. The records of the mortality of the British army and navy furnish evidence of the strongest kind of the influence of sanitary measures as a preventative of consumption, and Dr. Buchanan has shown that good drainage of a locality may diminish by one-half the prevalence of the disease. \* \* \*

"Few medical men who have been long in practice will doubt the existence of family predisposition to tubercular disease. Most of us have seen instances in which almost every member



of a family have died of tuberculosis, and in other cases members of the same family living in different places have most of them ultimately succumbed to it. Yet it is quite possible to make too much of this influence, and when we consult the statistics that have been put together on the subject, we find great differences in the results given by different observers, and in the figures no account is taken of the external circumstances, sources of infection from without, that are common to all members of the family. Again, since nearly half of all the deaths between the marriageable ages, from 15 to 35, are due to this cause, there would be nothing surprising in the fact that half of the consumptive patients have had consumptive relatives, unless the families were unusually large; and if we draw grandparents and collateral relatives into the statistical net, it breaks at once, and holds no solid conclusion. It is highly probable that heredity has less to do with consumptives than is commonly supposed; we must ascribe to it a much smaller influence than is usually given.

"There are four possible modes of infection by the tubercle bacillus: It may gain access to the interior by the skin, the generative organs, the digestive tract and the lungs. The few exceptional recorded cases of inoculation by the skin only serve to show the rarity of the occurrence. Infection by means of marital intercourse is also probably very uncommon. Tuberculosis has been produced in animals by feeding them with tuberculous material, and the question as to the suitability for food of the flesh of tuberculous animals is undoubtedly one of enormous importance.

\* \* \* The evidence as to the transmission of tubercle by the ingestion of milk from tuberculous animals is much more distinct and positive even where there was no evidence of general infection in the beasts. \* \* \*

But there are certain broad considerations which should, I think, prevent us from attributing much of the phthisis that prevails to either source of infection (meat or milk). The poor, who mostly suffer, very rarely take meat, and they prefer it over-cooked rather than under-done; butchers and cooks who suffer from tapeworm from picking at raw meat are less liable than others to phthisis. The Hindoos, who abjure meat of oxen, are as subject to phthisis as other races; and the Guanchos, of South America, who subsist almost entirely upon beef, are remarkably free from the disease. So, too, the poor denizens of our towns are often unable to procure milk, though when they do get it it is more likely to be obtained from diseased animals, and also more open to contamination by tuberculous dust in the small milk shops in which it is stored. The comparative rarity of the disease among the children of the rich, who consume it largely, and who will very seldom take it after it has been boiled, shows that the danger from this source is not quite so serious as it has lately been represented to be both in this country and abroad. \* \* \*

The next medium through which the bacilli may be conveyed is the air. There is but little certain proof of the contagiousness of phthisis from mouth to mouth. \* \* \*

It is well known that Koch regards the dissemination of phthisis by means of dust as the most common way in which this disease is produced, by the drying up and pulverization of matter expectorated upon the ground, or on the floors of dwellings, or on the handkerchiefs. This view was taken long before the discovery of the tubercle bacillus, and it would account for most of the cases of supposed direct infection that have been recorded. \* \*

"If all the suggestions that have been made (inspection of meat, milk, building of sanitary dwellings, disinfection of sputa, etc.), were carried into effect, we might fairly hope that in a few years there would be a considerable reduction of the phthisis death-rate; but in spite of preventive efforts there would remain a large number of persons suffering from the disease, and it would become a serious question, for the public and for the State, whether such persons, if they are without proper lodging and accommodation for preventing infection, should not be provided with asylums or hospitals until the disease is either cured or ends in death. Enormous sums have been spent in the past in the isolation of leprosy, which is less easy to control by such a method; and if a country like Norway can provide asylums for a large population of its lepers, it is not too much to ask Great Britain to make the attempt to segregate those consumptives who are likely to be a source of danger to the community. \* \* \*

Although phthisis is not directly contagious, I venture to contend that there would be nothing unreasonable in thus classing it; for it is strictly analogous to enteric fever. I would class phthisis with other infective disorders, so that every case, as soon as it is discovered, should be notified to the medical officers of health. \* \* \*

When the patient becomes unable to follow his employment, he should be offered such an asylum as a workhouse or hospital, which should be made as little humiliating and free from ignominy as possible. When such a hospital is effectively administered, there could be probably no better fate in store for the poor invalid, who might even be restored to his family, and be able to return to his work. For patients not reduced to pauperism, male and female wards might be constructed in connection with the hospital for infectious diseases, and there is still a wide field open to private benevolence in the provision of sanitariums or houses for these unfortunates."



## THE IMPORTANCE OF SPECIAL HOSPITALS FOR THE CONSUMPTIVE POOR.

Hon. CHARLES G. WILSON,  
*President:*

SIR—I have the honor to transmit herewith for your consideration a communication issued from the Imperial Office for Health, of Germany, on the importance of establishing special hospitals for the treatment of pulmonary tuberculosis.

Very respectfully,  
HERMANN M. BIGGS, M.D.

*A Contribution to the Determination of the Utility of Special Hospitals  
for Consumptives.*

(From the *Kaiserliches Gesundheitsamt.*)

Tuberculosis has long been accorded a rank of supreme importance among the diseases which threaten human life, and especially so since it became known that the term included all forms of the disease, and scrofula as well as consumption. This importance increases immensely when we take into account the question of age—that is to say, when leaving out of consideration the peculiar conditions of childhood and old age, we study the mortality from tuberculosis between the ages of 15 and 60; for the disease makes its greatest ravages among the laboring classes of the population.

Statistics as to age mortality, upon which such special investigation could be based, have only been accessible in Germany within comparatively recent years. As the result of an inquiry into this subject, the following figures have been deduced. According to the official returns for the year 1893, the latest period for which these dates are accurately given, out of a total of 268,500 persons dying between the ages of 15 and 60, of whom the cause of death was reported, 88,654 died from tuberculosis—a mortality of 33 per cent for these ages.

Including deaths from unknown causes, the total number of deaths was 275,094. As these returns include only 94 per cent. of the total population, the actual number of deaths was probably 292,650 of those dying between the ages of 15 and 60, of whom 94,300 died from tuberculosis and 90,800 from phthisis pulmonalis. This proportion of 33 to 100 was not the same for all parts of the empire; in East Prussia the mortality percentage was 22, whereas in parts of Bavaria it was 43 per cent. Whether this difference in mortality was due to the mode of life of the people, locality, etc., was not definitely determined. But at all events, it was found that those living in the northeastern parts of Germany had a lower mortality per 1,000 from tuberculosis in these ages than those inhabiting the western and more densely populated districts. The fact of living in the high lands does not seem to have any important effect on the death-rate from tuberculosis, as this was greater in several districts situated higher above the sea level, as for instance, in Upper Bavaria and the Black Forest, than in any low-lying districts.


The high mortality rate from tuberculosis for the ages between 15 and 60 in the year 1893 is no exception to the rule, as is shown by the mortality in previous years. The following figures give the deaths from tuberculosis for the ages between 15 and 60 in the kingdom of Prussia for the five years, 1889 to 1893, inclusive:

YEAR.	DEATHS.	DEATHS FROM TUBERCULOSIS PER 1,000 DEATHS FROM ALL CAUSES.
1889.....	57,712	358
1890.....	59,300	346
1891.....	56,083	341
1892.....	53,015	317
1893.....	54,727	313



It is seen, therefore, that during the great epidemic of influenza, 1889-90, the mortality from tuberculosis was greater than in 1893.

The following sketch and statistics illustrate how very insignificant are all other causes of death in comparison with tuberculosis between the ages of 15 and 60:

	CAUSE OF DEATH BETWEEN 15 AND 60.	TOTAL DEATHS.	DEATHS PER 1,000 DEATHS FROM ALL CAUSES.
Unknown causes.			
All diseases in which cause was not especially stated.			
Typhoid-Typhus	Tuberculosis.....	88,654	322.3
New Growth (cancer).	Pneumonia.....	25,144	91.4
Accident & Suicide	Other diseases of the respiratory tract...	17,879	65.0
Diseases of the Respiratory Tract.	Suicide and accident.....	17,843	64.9
(not including tuberculosis)	New Growths (cancer).....	15,284	55.6
	Typhoid and typhus.....	4,948	18.0
Tuberculosis.	Unknown causes.....	6,632	24.1
	Total from all causes including unknown causes.....	275,094	

From this it appears that not only such important causes of death as typhoid fever and the much dreaded cancer, but pneumonia and deaths from violence, suicide and accident are all overshadowed by tuberculosis.

In view of these recent statistics, founded upon indubitable facts, the question forces itself upon the minds of every one who has the welfare of the people at heart, by what means the ravages of this disease can be checked, which threatens more particularly the lives of the working classes.

That it is possible, in many instances, in otherwise healthy subjects, to conduct a case of tuberculosis to a favorable termination, or at least to stay its progress, has been amply shown by the results of scientific investigation.

It is a fact well known to experienced pathological anatomists, as the result of numerous autopsies, that evidence is often given of healed tuberculous processes; that not only more than one-half of all those who die show on examination the old scars of tubercular lesions, but also that even those who have died of diseases other than tuberculosis, or in the full bloom of health from sudden death by accident or suicide, often show these scar lesions.

According to trustworthy authorities, such healed tubercular foci, encapsulated or calcified, are found in every third or fourth body examined. These have not been the cause of death, and, on the contrary, have apparently not affected to any extent during life the functions of the organs attacked. One renowned university professor expresses the opinion, from his own experience, that *healed* tubercular lesions may be found in 14 per cent of all those who have died having given no physical signs of phthisis during life, and that this is a low estimate of the actual number.

Another celebrated teacher of pathological anatomy, in an article recently published, says: "Relative recoveries from tuberculosis are frequent."

But it is not only the pathologists who have come to the conviction, from their observation, that it is possible to check the tubercular process; many other physicians, who a few years ago considered tuberculosis to be an incurable disease, have now come to regard it in a much more hopeful light.

Aside from the possibility of removing, by surgical means, the localized tubercular foci, the hygienic and dietetic treatment of consumption, which is by far the most common form of the disease, and the systematic education of patients to live in a manner necessary to health, has undoubtedly led to the most satisfactory results.

In the sanatoria of Görbersdorf and Falkenstein, which have been established for more than twenty years, many tuberculous cases have been treated and hundreds have been fully, and often permanently restored to health, when the treatment was begun early enough and conscientiously carried out.



Among the proofs to be found in the medical literature of the day is the list published by Koeniger, giving the number of persons who are known to have recovered from tuberculosis, and who have been since followed up and seen in positions of active work years after they were treated and discharged from "The Home for Invalids and Aged" in Hanover. Out of 591 persons received for treatment for tuberculosis in that institution, 248 were, at the time of the communication, still under treatment, and 343 had been discharged. Of these, 200 were dismissed as well, or improved (considerably improved), giving a percentage of 58.3 recoveries.

Dr. Liebe (*Hygienische Rundschau* No. 17, 1895), gives the following statistics, as the result of the treatment in public sanatoria: Of 128 patients admitted during six months into a Hanseatic Institute, 90 were under treatment toward the end of the first year, 26 were fully restored to health and able to return to work, and 12 were considerably improved. From the reports of such institutions, Dr. Liebe deduces the following estimate: That of 81 patients discharged after nine months' treatment, 36 would be able to return to work (or 44 per cent), 26 would be able to do light work (or 32 per cent.), while 19 would not be sufficiently recovered to do any work, and 12 would become worse or die.

In order to show that the results obtained in these institutions were not temporary, but in many cases permanent, the following figures have been published by the management of the Hanseatic Hospitals for invalids and aged persons: From March, 1894, to June, 1895, in all, 226 patients were discharged; 51 (or 22.6 per cent.) were classified as entirely cured; 104 (or 46 per cent.) as being able to return to work; 41 as being able to do only light work; and 30 were classified as without result. Later inquiries made in regard to those who were considered cured or able to return to work, received a definite reply from 98. In 17 cases the answer was unfavorable—that is to say, the progress made in the sanitarium was again lost; but in 81 cases (more than four-fifths of those from whom replies were received) the result was permanent.

Such experiments as these warrant us in hoping for good results from the treatment of tuberculosis in public sanatoria; that the patients in such institutions receive sufficient care and attention to produce the desired result is proved by statistics.

Of course it would be necessary in such institutions to separate those patients who are suffering from an advanced stage of the disease, and who are, so far as treatment is concerned, beyond human aid, from those with incipient tuberculosis, and for whom there is still some chance of recovery. All possible effort should also be exerted to persuade those who are admitted for treatment to submit readily and willingly to the measures prescribed; they should be encouraged and cheered, and taught to appreciate the necessity for carrying out faithfully the instructions given for their recovery.

If this is done, then these hospitals will not only assist in restoring many sick and suffering to full health or ability to return to work, but they will be of extended benefit to the families and fellow laborers of all those treated. While there is danger of infection, the tuberculous persons will be isolated, and when they come out of the hospitals they will have learned how to keep themselves in a condition of health, and if a relapse should occur, they will know how to protect their children and others around them from the danger of infection by this fatal disease.

Some estimate may be made of the financial benefit which such public hospitals for consumptives would bring to the people by the following calculations: Assuming that only one-seventh or one-eighth of the 90,800 persons between the ages of 15 and 60 who die annually in Germany from tuberculosis—or, in round numbers, 12,000—were subjected to treatment, and that of these three-fourths, or 9,000, were restored to health or ability to work, and thus remained alive and with their families for three years longer than would be otherwise possible; and estimating the wages of a man (in Germany) to be 600 marks (\$150) a year, or say an average of 500 marks (\$125) for each person between the ages of 15 and 60, then there would be a total gain of  $3 \times 500 \times 9,000$  equals thirteen and one-half million marks (\$3,375,000) for those who were thus benefited. To do this would require an expenditure, say, of 400 marks (\$100) for each of the 12,000 persons treated, without deducting interest on plant, or a total cost of about five million marks (\$1,250,000). If now the interest on the estimated capital necessary to maintain 4,000 beds be added to this, or one million marks (\$250,000) more, there would remain, after subtracting the total cost of six million marks (\$1,500,000) for the annual treatment of 12,000 patients, a total yearly gain to the public of seven and one-half million marks, or \$1,875,000. To this should be added the profit to the patients themselves in the pleasure of living and the protection afforded to the children and families of those restored to health, to whom are thus preserved the support of the working father or care of the devoted mother for perhaps many years to come.

It is moreover to be considered that by this treatment in special hospitals a more wholesome and sanitary mode of living would be more and more cultivated, particularly among that class of the population which is always most neglectful in this respect.

Finally, as the treatment of incipient tuberculosis continues to progress, the number of those suffering from the advanced stages of phthisis would gradually become less and less, until in time the disease would be only rare, if it were not entirely stamped out.



There is no work which can be undertaken which is so humane, and at the same time so profitable, as the establishment of special hospitals for consumptives.

The following table gives the deaths from tuberculosis and consumption, per 1,000 deaths from all causes, for Germany, England, France, Austria and Belgium, arranged according to age and compared with one another:

*Mortality from Tubercular Diseases and Phthisis, per 1,000 Deaths from all Causes, According to Age.*

COUNTRIES.	CAUSE OF DEATH.	YEAR.	DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, ACCORDING TO AGE.				DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 60.					
			0-1	1-15	15-60	Over 60	15-20	20-30	30-40	40-50	50-60	
German Empire.....	Tubercular diseases.....	1892-93	10.7	65.6	321.7	61.7	.....	.....	.....	.....	.....	.....
	Phthisis alone.....	1892-93	7.1	45.0	288.3	55.8	.....	.....	.....	.....	.....	.....
Prussia.....	Tubercular diseases.....	1892-93	10.6	53.6	315.1	60.9	.....	.....	.....	.....	.....	.....
	Phthisis alone.....	1892-93	8.8	45.1	305.7	68.4	.....	.....	.....	.....	.....	.....
Berlin.....	Tubercular diseases.....	1886-93	10.6	55.7	343.7	84.3	411.4	449.5	396.8	318.4	242.6	.....
	Phthisis alone.....	1886-93	14.7	78.4	338.0	53.6	.....	.....	.....	.....	.....	.....
Bavaria.....	Tubercular diseases.....	1892-93	12.6	113.7	359.3	54.5	.....	.....	.....	.....	.....	.....
	Phthisis alone.....	1888-92	11.7	112.9	371.6	59.7	496.0	552.8	455.3	338.4	220.0	.....
Austria-Vienna.....	Tubercular diseases.....	1891-92	46.8	230.0	459.0	*93.5	624.6	643.0	540.9	386.2	233.2	.....
	Phthisis alone.....	1891-92	40.1	171.5	427.4	*88.2	574.9	597.6	505.3	361.6	217.1	.....
Prague.....	Tubercular diseases.....	1888-89	5.2	109.1	421.0	*95.9	569.2	566.1	492.5	326.6	248.6	.....
	Phthisis alone.....	1885-94	45.3	196.5	371.2	28.0	465.9	529.9	491.3	334.0	169.2	.....
Belgium-Brussels ...	Tubercular diseases.....	1885-94	6.0	51.5	364.7	27.4	442.7	520.9	484.7	327.6	167.7	.....
	Phthisis alone.....	1885-94	.....	.....	.....	Over 60	.....	.....	.....	.....	.....	.....
France—Cities over 30,000 population..	Tubercular diseases.....	1892-94	23.1	195.8	318.8	31.9	448.3	.....	.....	215.2	.....	.....
	Phthisis alone.....	1892-94	6.3	111.7	279.3	25.7	393.6	.....	.....	187.9	.....	.....
Paris.....	Tubercular diseases.....	1892-94	31.8	231.0	400.7	46.9	544.2	.....	.....	287.2	.....	.....
	Phthisis alone.....	1892-94	9.1	126.8	369.9	43.3	502.2	.....	.....	265.2	.....	.....
England.....	Tubercular diseases.....	1885-93	32.1	101.9	223.4	12.4	378.2	390.4	211.4	66.8	.....	.....
	Phthisis alone.....	1885-93	5.1	35.1	213.1	11.7	335.2	372.2	205.2	64.5	.....	.....

\* Deaths at unknown ages also are included with these in Austria.

The following tables have been prepared by Dr. A. R. Guerard, Assistant Bacteriologist, to illustrate further the facts regarding the mortality from tuberculosis at different ages:

TABLE I.

*Mortality from Tubercular Diseases and Phthisis, per 1,000 Deaths from all Causes, According to Age, in New York City.*

CAUSE OF DEATH.	YEAR.	DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, ACCORDING TO AGE.				DEATHS FROM TUBERCULOSIS, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 65.			
		0-1	1-15	15-65	Over 65	15-20	20-35	35-55	55-65
Tubercular diseases.....	1892-93	39.0	74.2	241.2	48.8	354.0	354.8	204.3	92.0
Phthisis alone.....	1892-93	5.4	22.7	230.7	48.1	321.5	338.6	197.9	88.3
Tubercular diseases.....	1895-96	30.6	80.8	253.7	46.8	387.2	379.4	216.8	94.5
Phthisis alone.....	1895-96	4.2	20.2	244.1	45.6	340.3	365.9	210.6	92.3



TABLE II.

*Death-Rates from Tubercular Diseases and Phthisis. per 1,000 Population, in 1893 and 1896, Showing the Percentage of Decrease in the Mortality from these Diseases in Three Years, in New York City.*

YEAR.	POPULATION.	DEATH-RATES FROM TUBERCULAR DISEASES.	DEATH-RATES FROM PHTHISIS.
1893.....	1,758,010	3.51	2.91
1896.....	1,934,077	3.06	2.58
Decrease in mortality in three years.....	.....	12.8%	11.3%

TABLE III--SUMMARY.

*Mortality from Tubercular Diseases, per 1,000 Deaths from all Causes, Between the Ages of 15 and 60 Years, in Germany, Prussia, Bavaria, France and England.*

COUNTRIES.	YEAR.	DEATHS FROM TUBERCULAR DISEASES, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 60.
German Empire.....	1892-93	321.7
Prussia.....	1892-93	315.1
Bavaria.....	1892-93	359.3
France.....	1892-94	318.8
England.....	1885-93	223.4 (15 to 65 years.)

TABLE IV--SUMMARY.

*Mortality from Tubercular Diseases, per 1,000 Deaths from all Causes, Between the Ages of 15 and 60 Years, in Berlin, Vienna, Prague, Paris, Brussels and New York.*

COUNTRIES.	YEAR.	DEATHS FROM TUBERCULAR DISEASES, PER 1,000 DEATHS FROM ALL CAUSES, BETWEEN THE AGES OF 15 AND 60.
Berlin.....	1892-93	338.0
Vienna.....	1891-92	459.0
Prague.....	1888-89	421.0
Paris.....	1892-94	400.7
Brussels.....	1885-94	371.2
New York.....	1895-96	253.7 (15 to 65 years.)

*cinth*

6







