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BY
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OF PHILADELPHIA.



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**PRACTICAL MEASURES FOR THE PRE-
VENTION OF TUBERCULOSIS.¹**

BY LAWRENCE F. FLICK, M.D.,
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THE history of tuberculosis in all times and in all countries in which any history of it is recorded is a broad demonstration of its contagiousness and, by inference, of its preventability.² So insidious, however, is its contagiousness that, although this has been recognized by the greatest minds of every age, and has at times taken strong enough hold of the lay as well as of the medical mind to beget successful measures of prevention, at no time in the history of medicine prior to the present age had it been recognized and understood by the medical profession as a body. The contagious theory of tuberculosis is now so far accepted by the profession that it is being taught in our medical schools; so that the medical profession is committed to it, at least through its teaching faculty. The prevention of the disease has, moreover, had sufficient practical testing to remove it from the category of experiments

¹ Read before, the Section on Hygiene, Climatology, and Demography of the Pan-American Medical Congress, September 7, 1893.

² Flick: "Contagiousness of Phthisis," Trans. of the Medical Society of the State of Penna., 1888.



and place it upon the list of sanitary expedients deserving of the most earnest attention of sanitarians. Spain, by teaching her people the contagious nature of the disease in question and by practising crude and unscientific but, nevertheless, successful methods of prevention, avoided carrying the disease into its new colonies in America;¹ Italy, by similar methods, in less than a century, reduced the mortality-rate from the disease in her midst from that of a most virulent epidemic to a comparatively rare disease;² England, by establishing special hospitals for the treatment of pulmonary tuberculosis and the consequent isolation of its tuberculous poor, reduced its mortality 50 per cent. in forty years;³ and Philadelphia, by preaching the doctrine of contagion and teaching its people methods of avoidance and prevention, has reduced the mortality-rate from the disease about 20 per cent. in eight years.⁴ With these facts before us and with our profession committed to the theory of contagion, we cannot, without failing in our duty, remain inactive while this disease carries off hundreds of thousands of human beings to a premature grave and inflicts indescribable suffering and loss upon hundreds of thousands of others.

¹ *Supra* cito.

² Flick: "The Prevention of Tuberculosis; a Century's Experience in Italy, etc.," *Trans. of the American Public Health Association*, vol. xvi.

³ Flick: "Special Hospitals for the Treatment of Tuberculosis," *Times and Register*, March 15, 1890.

⁴ Flick: "The Influence of the Doctrine of Contagion upon the Death-rate from Tuberculosis in the City of Philadelphia," *THE MEDICAL NEWS*, May 14, 1893.

A comprehensive scheme for the prevention of tuberculosis implies: 1. Registration of all cases of the disease which have arrived at the breaking-down or infectious stage. 2. The education of the public at large and of the people immediately concerned as to the contagious nature of the disease and how to avoid contracting it and how to avoid transmitting it to others. 3. The careful and thorough disinfection of all infected houses, penal and reformatory institutions, conveyances and public places. 4. The establishment of special hospitals for the treatment of the poor suffering from the disease. 5. Government inspection and regulation of dairies and slaughter-houses. 6. The enactment of laws and ordinances forbidding practices as a result of which others are liable to be infected. 7. The restriction and regulation of interstate and international emigration of persons suffering from the disease. 8. The retirement of all tuberculous patients in the infectious stage from occupations in which they can infect others and the pensioning of those who cannot be maintained in hospitals.

The enforcement of such a scheme in every particular would completely wipe out tuberculosis in a very few years. Of this there can be no doubt, whether our conclusions be evolved from our present knowledge of the etiology of the disease or from what history records of the past attempts at prevention.

As regards the merits of the respective measures named there will probably be differences of opinion. I have enumerated them partly in the order of their importance, as I rate them, and

partly in their natural order of sequence. The feasibility of their enforcement will necessarily vary, and ought to determine which should be adopted when all cannot be adopted. At the present stage of sanitary science and as governments are now equipped for the prevention of disease, there is probably no country in which the entire scheme could be put into operation; nor is it likely that any government is at present in a position to thoroughly enforce any of the measures. The prevention of tuberculosis is, however, so easily accomplished that even the incomplete enforcement of some of the measures would bring about a marked reduction in the mortality from the disease.

1. *Registration of all cases which have arrived at the breaking-down or infectious stage.* Registration is necessarily the foundation-stone of all orderly systematic effort at prevention. To be able to fight an enemy one must first know where he is. Even individual effort at self-protection is futile without this knowledge. Registration should not only include the residence, but also the movements of infectious persons, such as removals from one house to another or from one city to another—for a temporary residence in a house or even a transitory occupancy of a conveyance may infect it sufficiently to convey the disease to others. One tuberculous patient, by frequent change of residence, may infect many houses during the continuance of the disease.

Registration will be objected to on the ground that it will impose additional suffering upon those who are already sorely afflicted. In a matter of such great importance to the well-being of the

majority of those now living and of all of those yet to be born, the greatest good to the largest number ought to be our motto. Moreover, the registration of infectious cases of tuberculosis need inflict no suffering on anyone that would not be fully compensated for by a knowledge that near and dear ones can thereby be protected against the disease.

Objections based upon commercial grounds have no foundation in fact. People are too familiar with tuberculosis to take fright at it, even when they believe it to be contagious. The registration of cases would have no depressing effect upon the community as a body, and whatever care-inspiring influence it might have upon individuals would be a benefit. Private business might in certain cases be injured because people would not buy at a place conducted by a tuberculous person ; but this would be a benefit to the community, and the individual concerned could easily rid himself of the injury by removing the attendant from a position in which he jeopardizes the health of others. Interference with the value of real estate could be prevented by government disinfection of infected houses.

As most countries are now equipped for carrying out sanitary measures, registration would have to be accomplished through Boards of Health, with the aid of practising physicians. This is already being done with such diseases as smallpox, scarlet fever, typhoid fever, diphtheria, and some other contagious diseases. Many physicians object to being burdened with the labor of making out reports and to being placed in the embarrassing position of having to make public the ailments of their patients.

But, with properly prepared blanks, the making out of reports can be termed neither a labor nor a burden, and could easily be attended to by the busiest practitioner. As regards the making public of the ailments of patients, it is, under the circumstances, not only a privileged communication, but one which the public has a right to insist upon being made. The physician has no reason to complain of such duties, because they belong to the profession which he has espoused.

There can be no practical difficulty in the way of registering tuberculosis because of the obscurity of the disease or inability on the part of the physician to make a diagnosis. Tuberculosis is never contagious until broken-down tissue is given off, and when this occurs a diagnosis can always be positively made. There is no occasion for making a report until this stage has been reached.

2. *The education of the public at large and of the people immediately concerned as to the contagious nature of the disease and how to avoid contracting it and how to avoid giving it to others.* Of all of the contagious diseases the most easily prevented is tuberculosis. Its contagion is strictly confined to broken-down tissue, and this broken-down tissue, when given off, is readily recognizable—is indeed likely to attract attention. Efficient sterilization of all broken-down tissue must absolutely prevent the spread of the disease, and as this tissue is always within reach when it is a source of danger to others, and is never a source of danger to others unless it is within reach, sterilization is always feasible and is within the power of every one. The proper educa-

tion, upon this subject, of the public and the people who either have tuberculosis or who are exposed to it would go a long way toward preventing the disease.

The public at large ought to be educated upon the question of contagion. This can best be done through the Public Press, which has already accomplished a great deal in this direction. Those who have tuberculosis ought to be taught how to avoid giving it to others, and those who nurse tuberculous patients or whose duties require them to be about those who have the disease should be taught how to avoid contracting it. Special literature ought to be prepared for such persons and placed within their reach. This can be accomplished through Boards of Health, and better still through the organized efforts of humane persons who have given the subject special thought. Societies for the prevention of tuberculosis will find in this work not only a legitimate cause for springing into existence, but a field of labor worthy of their most earnest efforts. Such societies ought to be organized everywhere, and a concerted effort should be made, the world over, to educate the people upon methods of avoidance and prevention. The Pennsylvania Society for the Prevention of Tuberculosis was organized in Philadelphia about two years ago, and during its brief existence has printed and distributed about thirty thousand tracts on "How to avoid tuberculosis" and "How persons suffering from tuberculosis can avoid giving the disease to others." There is reason to believe that its efforts are already bearing good fruit in an increased reduction of the mortality-

rate from the disease in Philadelphia. The greatest obstacle in the way of performing its work has been non-registration of the disease. Were every case of tuberculosis registered it would be an easy matter to place literature where it would do the most good.

3. *The careful and thorough disinfection of all infected houses, penal and reformatory institutions, conveyances and public places.* Were it possible to induce every person suffering from tuberculosis to sterilize every particle of broken-down tuberculous tissue, immediately upon its being given off, it would not be necessary to institute any other measures for the prevention of the disease. Unfortunately this is not possible. The majority of tuberculous patients, even when they have been informed of the infectious character of the sputa, will spit where it is most convenient, and thus contaminate everything about them.

Infected houses play a most important rôle in the spread of the disease. In my topographic study of tuberculosis in the Fifth Ward of the City of Philadelphia I found that at least 50 per cent of all cases were contracted in such houses.¹ Drs. Chapin, of Springfield, Mass.,² and Louis S. DeForest, of New Haven, Conn.,³ have since made similar studies in their respective towns, with identically the

¹ Flick: "A Review of the Cases of Tuberculosis which terminated in Death in the Fifth Ward of the City of Philadelphia during the year 1888," Trans. of the Philadelphia County Med. Soc.

² Dr. Chapin's paper has never been published in a medical journal to the best of my knowledge.

³ Rep. Bd. of Health of Conn., 1891. N. Haven, 1892, xiv. 216—227.

same results. Dr. Cornet, of Berlin, has produced tuberculosis in animals by inoculating them with the scrapings from the walls of rooms which had been occupied by tuberculous patients.¹

Penal and reformatory institutions have been so scourged by tuberculosis that commitment to them is frequently paramount to a death-sentence. In Germany, Baer and Cornet have made statistical studies upon this subject and have found that from 45 to 70 per cent. of all deaths in penal institutions were due to tuberculosis.²

Conveyances, such as steamboats, railway cars, street-cars, carriages, etc., and public places, such as churches, public halls, public squares and streets, are constantly being contaminated with the expectoration of tuberculous patients. Fortunately however, these are not prolific sources of infection, because most people require prolonged and continuous exposure to contract tuberculosis. But persons who are greatly predisposed to the disease or who are in a weakened, depressed condition will contract the disease upon slight exposure, and infected conveyances and public places are to these a real source of danger.

With the clear knowledge that we have upon these various methods of spreading the disease it is incumbent on the government to see that every place which has become contaminated with broken-down tuberculous tissue be carefully disinfected.

¹ Dr. George Cornet: "Die Verbreitung der Tuberkelbacillen ausserhalb des Körpers," *Zeitschrift für Hygiene*, Band v, 1888

² Dr. George Cornet: "Die Tuberkulose in den Strafanstalten," *Zeitschrift für Hygiene*, Band x, 1891.

When a death from tuberculosis has occurred in a house the Board of Health should see that the rooms occupied by the deceased, and the furniture and clothing, that could in any way have been contaminated, are properly disinfected. When a house has been disinfected the fact should be recorded in an open record, of easy access to the public, so that persons seeking residences can first inform themselves as to whether or not a house is free from contagion. In penal and reformatory institutions every cell or room which has been occupied by a tuberculous person should be thoroughly disinfected before being assigned to a new occupant. Here the authorities have absolute power and there ought to be no difficulty about enforcing the most rigid rules in regard to prevention and securing the most thorough disinfection after contamination. The disinfection of conveyances and public places will have to be left largely to the sense of justice and propriety of those who have charge of them, as it is practically impossible to make and enforce rules covering such cases. Much can no doubt be accomplished by education. Most people are well disposed to do what they can to prevent the spread of disease, provided they have the proper knowledge and the necessary means. The demands of an enlightened public will probably be the most powerful lever that can be brought to play upon both individuals and corporations who have charge of any and all kinds of conveyances and places of public resort, to induce them to keep these free from contagion.

4. *The establishment of special hospitals for the treatment of those suffering from the disease.* Among

the very poor, preventive measures in their homes are so difficult of execution that they are practically impossible. Families who can barely make a living during health and of which every member has to contribute toward a common fund for sustenance are so badly upset by a prolonged illness, such as tuberculosis, that they are not capable of either understanding or putting into operation any systematic sanitary measure. Everything is made subservient to the happiness, comfort, and freedom from worry of the sick one. The room that serves as the family kitchen and dining-room is turned into a sick-room, and spitting all over it, into the coal-scuttle or into the front of the cooking-stove, anywhere indeed that is convenient, is a privilege that is freely accorded. Such habits in such places mean extension of the disease to the weakest member of the family, until in turn every one has assumed the rôle of victim and propagator of the disease. Among this class of people the most efficient measure for the prevention of the disease is the establishment of special hospitals for the treatment of those who are stricken down. Removal of the patient to a hospital removes the source of infection and at the same time relieves the pressure of worry, want, and care, which so strongly predispose the remaining members of the family to the disease.

Special hospitals for the treatment of tuberculosis have existed in Europe, and especially in England, for many years. In England the motive for their establishment was not prevention, but extending charity to the deserving poor. Now that it has been demonstrated that segregation will prevent the spread

of the disease and we still have the inspiring motive that England had, we ought to move more rapidly in the matter than is possible on the slow wheels of charity. Whilst every effort to establish special hospitals on the basis of charitable support should be encouraged by general aid, the government should promptly establish such hospitals on its own account. The only legitimate ground upon which the government can appropriate money for the support of hospitals is that of protecting the public against disease and death. Inasmuch as tuberculosis has been demonstrated to be a preventable disease, and as it has been proved by experience that segregation will prevent its spread, the establishment of hospitals for tuberculous patients becomes as much a function of the government as the maintenance of a police force. The truth of this proposition must sooner or later present itself to every enlightened government.

In considering the matter of special hospitals for the treatment of tuberculosis as a preventive measure, the question of forcible segregation, with its horrible features, need have no deterring influence. In the first place there is no necessity for such segregation. Were hospital-doors throw open for such cases there would be more applicants for admission than could be accommodated. With all its present capacity, which is very large indeed, England cannot accommodate all of the poor tuberculous patients that appeal for admission into its special hospitals. In the next place an alternative can always be given without jeopardizing public health. In a given case of tuberculosis in which the question of forcible segregation might arise, the sick person

and the family could be given a choice to either have the patient go to a hospital or practise certain preventive measures at home. Such measures could then be enforced by the Board of Health, as there would be a penalty at hand to support the order.

In our American system of government the taxation for the support of such hospitals ought to be as direct as possible, and for this reason they ought to be established and maintained largely by cities and States. Every large city should have such hospitals under the supervision and support of the city government, and every State should have at least one such hospital under its supervision and support.

It would be a step in the right direction of judicious bestowal of charity if some of the general hospitals of our large cities would take up this subject and devote themselves entirely to the care of the tuberculous poor. It is a well-known fact that the unfortunate victims of tuberculosis are turned away from general hospitals because of the disease from which they suffer. As general hospitals have grown so numerous of late that there is at times a lively competition for patients, it would no doubt prove a wise deviation from the beaten path for some of them to take up this specialty.

5. *Government inspection and regulation of dairies and slaughter-houses.* Ever since it became known that tuberculosis affects animals as well as man and that it is identically the same disease in both, there has been much speculation as to which was attacked first and what part each respectively plays in infecting the other. Some who have

given the subject much thought and study, and notably among them Dr. E. F. Brush, of Mount Vernon, N. Y., claim that the disease is primarily a bovine disease and that human beings and animals other than the cow are infected from this source. I have myself never been able to accept this theory, but whether we accept it or not, so much is certain, that human beings and domestic animals can and constantly are infecting each other.

The mediums through which the cow infects human beings are milk and meat. Much study has been given to this subject both in this country and in Europe, and we now have a pretty clear idea as to what constitutes infectious milk and meat. The milk of a tuberculous cow is not likely to be infectious unless the udders are diseased, so that the secretion becomes mixed with broken-down tuberculous tissue. At all events it is necessary that the bacilli gain entrance into the milk in order to make it capable of conveying the disease. The meat of a tuberculous animal is only infectious when the deposit exists in the parts that are consumed or when those parts have become contaminated in slaughtering and preparing for the market. It is important that these facts be kept clearly in mind, because of the important positions which meat and milk occupy as food-stuffs and the great injury that can be done by exaggerating the danger of using them. Clinically we have very little evidence of the conveyance of the disease through these mediums. I have never seen an authenticated case recorded in literature, and personally I have never seen a case which I could trace to the use of meat, and have seen but

few cases in which there was satisfactory evidence that they were contracted from the use of milk.

But while scientific investigations and clinical observations both point to the conclusion that in practical life the use of milk and meat is not a prolific source of tuberculous infection, it nevertheless cannot be denied that it is a source of sufficient importance to demand the most earnest attention of the government. An effort should be made to stamp out tuberculosis among cattle. To accomplish this the coöperation of Federal, State, and city governments will be needed. The Federal Government should prohibit and prevent the importation of tuberculous cattle. State governments should carefully examine every herd within their borders and condemn every head that is in the slightest affected by the disease. Cities should condemn and forbid the sale of every carcass that shows the slightest evidence of taint in the slaughter-house, and permit no one to sell milk within its limits except such as draw their supplies from dairies of which the herds have been officially examined. Such concerted effort would soon stamp out the disease among cattle, for it would no longer be commercially profitable to keep anything but healthy herds. Actual loss to individuals ought of course to be made good by the government.

6. *The enactment of laws and ordinances against practices which are liable to infect others.* Civilized man, in spite of his civilization, retains many of his primitive habits. Among these is the horrible custom of spitting anywhere and everywhere that is convenient. There are a great many diseases of which the contagion resides in the expectoration, and all of

which put people to a great deal of inconvenience, but none of which is so serious in its results as tuberculosis. How much would be added to the comfort and happiness of the human family were it possible to put a stop to the filthy habit of indiscriminate spitting.

The promulgation of knowledge about the danger of promiscuous spitting would no doubt contribute something toward breaking up the custom. It is, however, so much easier and more convenient to spit out than into a cuspidor or handkerchief, that with the majority of people it will require more than education to induce them to change their habits. The necessity of washing handkerchiefs no doubt contributes something toward the custom, and its continuance after people know the danger. The introduction of cheap paper handkerchiefs, which could be burned after using, would do away with this excuse for the habit. The enactment of State laws and city and borough ordinances against spitting into public conveyances, into public places or upon the streets would, however, be the most powerful lever that could be brought to bear upon the custom with the masses. It would be difficult to enforce such laws and ordinances, and they probably could not be enforced to the letter. Their existence and attempted enforcement would, however, do much good, if only even as a means of education. Many street-car companies now have notices up in the cars warning passengers not to spit upon the floor, but they do not attempt to enforce the order, probably because they have no warrant of law to support them should the matter be brought to an issue.

The disposal of clothing and furniture, either by gift or sale, without previous disinfection, is another practice fraught with danger. The Spaniards and the Italians recognized this source of infection a century ago and took the most careful precautions against it.¹ Their method was cumbersome and would not do as a model, but it was effective, and serves to illustrate what can be accomplished by a determined effort. The simplest way of stopping this mode of spreading the disease would be to make it a misdemeanor to dispose of anything, whether by sale or gift, that had been used by a tuberculous patient or had been in his room during his occupancy, without first thoroughly disinfecting it. Here again would, of course, come up the difficulty of enforcing the law, but the existence of such a law would at least enable individuals to protect themselves.

7. *The restriction and regulation of interstate and international immigration of persons suffering from the disease.* History teaches that one of the most potent factors in the spread of tuberculosis has been the migrations of tuberculous persons.² The will-o'-the-wisp of a climate that would cure tuberculosis has been indirectly the means of infecting the world. There is scarcely a country which has not at one time been free from the disease, and which for that reason became a resort for those suffering from it. In turn, the place became a place of exodus and a source of infection to some newer country. All of America was a virgin soil for the disease when Europeans first came. New York, Pennsylvania—in

¹ Flick: Prevention of Tuberculosis, supra cito.

² Flick: Contagiousness of Phthisis, supra cito.

fact every State and Territory—has in turn been a resort for the tuberculous, and has at some time been believed to possess a curative climate.¹

Unfortunately, this seductive method of spreading the disease is still in active operation, and with our modern facilities for travel has become more prolific than ever. It probably furnishes the most frequent source of infection for the wealthier class—those who can change their place of abode with every change of season. It infects our hotels, our sleeping-cars, and our state-rooms. It has made tuberculosis as rampant under the sunny sky of California as in the changeable climate of the Atlantic slope.²

What is the remedy? International immigration of persons suffering from tuberculosis should be entirely stopped. This is a matter for the Federal Government, and in the United States is, I believe, through the efforts of Surgeon-General Wyman, already receiving attention. Foreign travel of persons in the early stage of the disease, before there is any breaking down, need not be interfered with. Interstate emigration should be restricted and regulated. This would, of course, be a matter for the States, and in certain cases for cities to take charge of. Persons in the infectious stage of the disease should be discouraged as much as possible from changing their places of residence, and when they do make changes it should be with the consent and under the supervision of the health-officer. Some of the

¹ *Supra cito.*

² T. D. Myers, M.D.: *Some of the Peculiarities of the Climate of California.*

Territories and newer States, which are as yet comparatively free from tuberculosis, would probably find it to their advantage to shut out from their borders all tuberculous persons in the infectious stage who seek admission for climatic reasons. Such an embargo need, of course, not be applied to those in whom the disease has not yet reached the breaking-down stage, and to those that have it would be more of a benefit than an injury, as they can no longer be saved by a change of climate, and are frequently injured by it.

8. *The retirement of all tuberculous patients in the infectious stage from occupations in which they can infect others, and the pensioning of those who are dependent on their own labor for a living and who cannot be maintained in hospitals.* Because of the prolonged duration of tuberculosis it is necessary for the poor to follow their callings in life during the infectious period of the disease. We consequently have tuberculous patients as cooks, waiters, barbers, fruiterers, grocers, butchers, dairymen, nurses—in short, we have them in every walk of life. To have these people give up their positions would be a great hardship, unless some provision were made for their support and that of the destitute families depending upon them. As the giving up of their positions would be in the interest of the public good they ought to be retired at the public expense. Every case of tuberculosis which has arrived at the infectious stage ought to be retired from any position carrying with it the danger of infecting others, and either be admitted into a hospital or paid a pension sufficient for maintenance. For the destitute family

depending upon the labor of the person affected there would be ample provision in the eleemosynary institutions already in existence.

Retiring and pensioning persons suffering from a disease which is a menace to others will no doubt be considered too advanced ground in preventive medicine to be considered seriously at present. It will, however, force itself upon our attention in the near future. The justness of the principle involved has already been admitted in the compensation allowed for diseased cattle slaughtered by direction of the government.

By the establishment of special hospitals for the treatment of persons suffering from tuberculosis the tuberculous poor of the country could be maintained at a quite reasonable expense. The taxation which would have to be imposed upon the individual to enable the government to carry out such a plan would be returned a hundred-fold in the protection afforded against the disease. Tuberculosis carries off at least one hundred thousand people annually in the United States. It has been estimated that this entails a loss in public wealth of about five hundred millions of dollars a year.¹ A small fraction of this great loss well expended would go a long way toward wiping out the disease.

¹ Flick: "The Duty of the Government in the Prevention of Tuberculosis," *Journal of the American Medical Association*, 1891, vol. xvii.

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