Tuberculosis as a disease of the masses, and how to combat it : prize essay / by S.A. Knopf ; adapted for use in England by J.M. Barbour.

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TUBERCULOSIS

as a Disease of the Masses, and How To Combat It

Motto

To combat consumption as a disease of the masses successfully requires the combined action of a wise Government, well trained physicians, and an intelligent people.

PRIZE ESSAY

BY

S. A. KNOPF, M.D.

NEW YORK

The 'International Congress to Combat Tuberculosis as a Disease of the Masses,' which convened at Berlin, May 24th to 27th, 1899, awarded the International Prize to this work through its Committee on July 31st, 1900

Adapted for use in England

BY

J. M. BARBOUR, M.B.

LONDON

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The American edition is translated by the Author, and published by M. Firestack, 200, West Ninety-sixth Street, New York.

Entered at Stationers' Hall, 1902.

PREFACE TO THE GERMAN EDITION*

At the meeting of the 'International Congress for the Study of the Best Way to Combat Tuberculosis as a Disease of the Masses,' which was convened at Berlin May 24 to 27, 1899, the sum of 4,000 marks was donated by two Berlin merchants, lay members of the Congress, as a prize to be offered for the best essay on the subject, 'Tuberculosis as a Disease of the Masses, and How to Combat It' ('Die Tuberkulose als Volkskrankheit und deren Bekämpfung').

The Congress decided on the following regulations concerning this prize:

1. The best popular essay on the subject 'Tuberculosis as a Disease of the Masses, and How to Combat It,' comprising not more than eighty, and not less than forty-eight, printed pages, shall receive the prize of 4,000 marks. In case the jury of the prize committee should decide that two essays deserve the prize, the best may receive 3,000 marks, and the second best 1,000 marks. Or, should the decision of the judges find two essays of equal value, each shall receive 2,000 marks.

2. The following gentlemen have consented to act as judges: Geheimrath Professor Dr. B. Fränkel; Geheimrath Professor Dr. Gerhardt; Kapitän z. S. Harms; Wirkl. Geh. Ober-Reg.-Rath Präsident Köhler; Generalarzt Professor Dr. von Leuthold, Excellenz; Geheimrath Professor Dr. von Leyden; Freiherr Dr. Lucius von Ballhausen, Excellenz; Geheimrath Dr. Naumann; Oberstabsarzt Dr. Pannwitz; Dr. Graf von Posadowsky-Wehner, Excellenz; Se. Durchlaucht der Herzog von Ratibor.

* By Geh. Med.-Rath Professor B. Fränkel, of Berlin, Germany, setting forth the conditions under which the prize was awarded.

3. All essays must be sent by December 1, 1899, to Privy Councillor Professor Dr. B. Fränkel, 4, Bellevue Strasse, Berlin, and each essay must bear a motto, selected by the writer, who shall insert his name within a sealed envelope having the motto on the cover.

4. The essay, or essays (see § 1), to which has been awarded the prize, become the property of the 'German Central Committee for the Erection of Sanatoria.' The latter will take upon itself the printing of the essay and the least expensive method of distribution.

5. The decision of the judges is to be announced through the public press.

The foregoing regulations were published in the medical and lay papers, and, as a result, eighty-one essays were received by December 1. The essays were distributed among the judges, with the request to select from them such as were deserving of closer examination. The judges recommended twenty-six for that purpose.

The fifty-five rejected essays were once more examined by the undersigned and his assistants, Drs. Edmund Meyer, Alexander, Finder, Claus, and Elwert, but neither could these gentlemen recommend any of the fifty-five essays for further consideration.

At the meeting of the jury on February 25, 1900, under the presidency of his Serene Highness the Duke of Ratibor, it was decided that the twenty-six selected essays should be once more carefully examined by Drs. Fränkel, Gerhardt, Harms, Köhler, Von Leuthold, Von Leyden, Freiherr von Lucius, and Pannwitz, and the result was that three were ultimately selected for closer choice.

At the next meeting of the judges, on June 15, it was decided to form a subcommittee, composed of Drs. Fränkel, Gerhardt, Harms, Köhler, and Pannwitz, to decide upon final action. After careful consideration this committee came to the conclusion that the work bearing the motto,

'To combat consumption successfully requires the combined action of a wise Government, well-trained physicians, and an intelligent people,'

so much surpassed all the others in excellence that it should be awarded the Congress prize. It was then found that Dr. S. A. Knopf, of New York, was the author of this work.

A few changes, as recommended by the judges, were accepted by Dr. Knopf, and have been incorporated in the present work.

At a subsequent meeting of the German Central Committee it was resolved to publish this essay and arrange for its widest distribution.

PROFESSOR B. FRÄNKEL.

BERLIN,
October 1, 1900.

PREFACE TO THE ENGLISH EDITION

In presenting an English translation of this essay, originally written in German, Dr. Knopf found it necessary to change several passages, making some additions and omissions. His reasons for having done so will be obvious to all who have studied pulmonary tuberculosis or consumption, not only in its medical, but also in its sociological aspects, and who will bear in mind the fact that the habits of nations differ, and that in a popular essay it is absolutely necessary to take these differences into account. Thus it was even necessary, before the original German essay could appear in print, that the author should consent to make certain changes bearing on the particular local conditions and situation of the consumptive poor in Germany. These changes were suggested in detail by the judges who awarded the prize. With a generosity which cannot be lauded too highly, these gentlemen did not expect to find in the essays, submitted to them for competition from all over the world, a complete knowledge of the sanitary laws and regulations which are now in vogue in the German Empire, nor did they expect the essayists to be familiar with local conditions to the extent of knowing all that would or would not be practicable in the carrying out of suggestions to prevent the spread or the development of tuberculous diseases.

The social conditions in Germany differ very much from those in England, and the writer felt it his duty to speak in this English edition of all the important points bearing directly on the question of tuberculosis as a 'social disease' in England. The evils of alcoholism, of the overcrowding of tenement houses, and of unsanitary dwellings of the poor in general, also some of the causes of malnutrition or underfeeding of the labouring

classes, are the headings under which preventive measures may grapple with the spread of the malady. In the meantime let us labour as best we can; let each country, county, and city board of health do its best towards an intelligent, vigorous, and yet not too oppressive public prophylaxis of human tuberculosis; and let the people at large lend a willing hand in their combat against our common foe—the 'Great White Plague.'

J. M. Barbour.

Swanage, Dorset,
January, 1902.

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TUBERCULOSIS AS A DISEASE OF THE MASSES, AND HOW TO COMBAT IT

INTRODUCTION

Historical items.

Tuberculosis has been called a disease of the masses on account of its great prevalence among all classes of people. It has been known for hundreds of years as the most feared, most prevalent, and, alas! also as the most fatal of all diseases. Hippocrates, the most celebrated physician of antiquity (460 to 377 B.C.), and the true father of scientific medicine, described pulmonary tuberculosis or consumption as the disease which is 'the most difficult to treat, and which proves fatal to the greatest number.' Isocrates, also a Greek physician, who lived about the fifth century before Christ, was the first to write of tuberculosis as a disease transmissible through contagion. In the Middle Ages (1550) the celebrated physician, Montano, declared consumption to be one of the most dangerously contagious and most easily contracted of diseases. An equally strong advocate of the theory of contagion was the celebrated anatomist, Morgagni (1682 to 1771), who never performed an autopsy on an individual who had died from tuberculosis. Toward the end of the eighteenth century the sanitary authorities of some cities of Italy and France considered consumption a highly infectious and contagious disease, and a French medical author of the name of Janett de Langrois reports that the municipal authorities of Nancy had caused the furniture and bedding of a woman who had died from consumption to be destroyed by fire. The contagion in this case had actually been demonstrated, inquiries revealing that the deceased woman had slept frequently with a consumptive girl friend until she finally succumbed to the same disease.

In Naples a royal decree, dated September 20, 1782, ordered the isolation of consumptives and the disinfection of their apartments, personal effects, furniture, books, etc., by means of vinegar, brandy, lemon-juice, sea-water, or fumigation. Any violation of this law was punished, if the individual was an ordinary mortal, with three years in the galleys, and if he happened to be a nobleman he was sent for the same time to the fortress, and had to pay 300 ducats. The physician who failed to notify the authorities of the existence of a tuberculous patient was fined 300 ducats for the first offence, and a repetition of the neglect would banish him from the country for ten years. According to Portal (1742 to 1832), there was a law in Spain and Portugal which obliged the parents or nearest relatives of a consumptive to notify the authorities when the patient had arrived at the last period of the disease. This was done for the purpose of making sure of the disinfection of the personal effects of the patient after his death.

In the first half of the nineteenth century little attention was paid to the infectious theory of tuberculosis even by medical men. The contagiousness or communicability of the disease could not be scientifically demonstrated, and, although there were physicians here and there who believed in the infectiousness of the disease, nothing positive was taught in regard to it at the centres of medical learning.

At last, in 1865, the French physician, Villamin, demonstrated beyond a shadow of doubt that tuberculosis could be transmitted from one individual to another. He inoculated animals with tuberculous substances, and reproduced tuberculosis not only in the lungs, but also in other portions of the body. Since this discovery and its verification by numerous experimenters, such as Cohnheim, Welch, Prudden, Straus, and others, it has been generally acknowledged that tuberculosis is an infectious disease, and that for its production a specific germ is essential. The discovery of this specific organism (*Bacillus tuberculosis*) was reserved to the great German scientist, Robert Koch (1882).

Consumption is an endemic disease—that is to say, habitually prevalent—and it exists in all civilized countries. Wild tribes and less civilized people succumb to the disease, as a rule, very

rapidly as soon as they come in contact with civilization. The proof of this we might find among the North American Indians and among the negroes and their descendants now living in the United States. According to the recent report of the Board of Health of Toronto (Canada), pulmonary tuberculosis is dangerously prevalent among the Blood Indians of the Dominion of Canada. Of every hundred deaths which occurred among this tribe in the year 1898, twenty-three were due to consumption. Since these Indians are kept on a reservation under the supervision of the Canadian Government, these statistics should be considered reliable.

Consumption an Endemic Disease.

The mortality from tuberculosis among the coloured population of the United States is nearly twice that of the white population. However, let us state here that the cause of this increased mortality among Indians and negroes is to be ascribed not to the blessings of civilization, but rather to the vices, such as alcoholism and excesses of all kinds, which, alas! too often accompany civilizing agents.

A few Statistics.

There have been so many statistics published concerning the general mortality from tuberculosis in the United States and Europe that we do not think it necessary to reproduce in detail any of the published tables, but will content ourselves with some general statements. It is now universally admitted that tuberculosis is the most frequent cause of death. According to some statistics every seventh, according to others every sixth, death is due to tuberculosis in one form or other. According to Dr. George F. Keene, of Rhode Island, who is a very close observer, the annual tribute of the United States to this scourge is over 100,000 of its inhabitants. Each year the world yields up 1,095,000, each day 3,000, each minute 2 of its people as a sacrifice to this plague.

Tuberculosis occurs most frequently in its pulmonary form, commonly known as consumption. According to the Imperial Sanitary Office of Berlin, 13 per cent. of the deaths (during the years from 1888 to 1892) were due to pulmonary consumption. However, it must be stated that of late the mortality from tuberculosis has decreased in some European and American cities (Berlin, London, New York, Philadelphia, etc.), thanks to better

preventive measures and more rational methods of treatment. In one of the succeeding chapters we shall speak more in detail of public prophylaxis and special institutions for consumptives in the combat against tuberculosis. In relation to statistics we desire, lastly, to mention only some interesting facts gleaned from a pamphlet published last year by the Imperial Health Office of Berlin. According to this latest report the mortality from tuberculosis is greatest in Russia and Austria, being more than 3,500 per 1,000,000 inhabitants. It is lowest in England, being less than 1,500 per 1,000,000. Germany occupies about the middle, while France comes immediately after Austria.*

Congresses for the Study and Combat of Tuberculosis.

The researches of recent years have demonstrated that consumption and also many other forms of tuberculosis may not only be prevented, but can in many cases be arrested and lastingly cured. The Governments and the medical profession are aware of this, and have laboriously, energetically, and most unselfishly worked in the direction of solving this important problem, which means so much to the welfare of the people. The Congresses for the Study of Tuberculosis, which have met biennially since 1888 in Paris; the International Congress, which was convened at Berlin in May, 1899, under the protection of Her Majesty the Empress of Germany; the Italian Congress, which was called together for the same purpose last year in Naples, together with the recent British Congress on Tuberculosis, give the best proof of the zeal of the medical profession and the Governments to combat tuberculosis with all possible means.

But, as the motto of this essay expresses it, the intelligent cooperation of the people in this work is indispensable. To enable all men and women to participate intelligently in this combat against a common foe is the purpose of this essay.

We shall now give a brief description of the form of tuberculosis known as tuberculosis of the lungs, pulmonary tuberculosis, or consumption.

* The United States was not included in this table, but would probably come close to Germany.

CHAPTER I

WHAT IS CONSUMPTION?

Pulmonary consumption, or tuberculosis of the lungs, is a chronic disease caused by the presence of the tubercle bacillus, or germ of consumption, in the lungs. The disease is locally characterized by countless tubercles — that is to say, small rounded bodies, visible to the naked eye. The bacilli can be found by the million in the affected organ. It is this little parasite, fungus, or mushroom, belonging to the lowest scale of vegetable life, which must be considered as the specific cause of all tuberculous diseases. This parasite not only gradually destroys the lung substance through ulcerative processes, but gives off at the same time certain poisonous substances called toxins, which give rise to various, and often serious, symptoms.

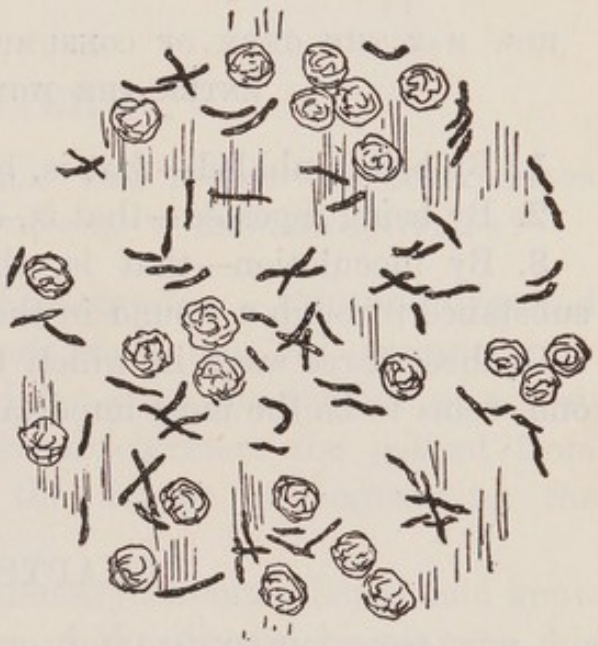

Fig. 1.—Tubercle Bacilli in Expectorated Matter. 1,200 times enlarged.

The important symptoms of pulmonary tuberculosis are cough, expectoration (spitting phlegm), fever (increased temperature of the body, especially in the evening hours), difficulty in breathing, pains in the chest, night-sweats, loss of appetite, hæmorrhages (spitting of blood), and emaciation (loss of flesh).

In the matter expectorated it is often possible to find the tubercle bacillus with the aid of the microscope and certain colouring matters. It appears in the form of small, slender rods. To give an idea of the minute size of these bacilli or bacteria, we reproduce here what is called a microscopic field

twelve hundred times enlarged; in other words, just what one sees after having prepared a small portion of expectorated tuberculous matter under the microscope. The rods represent the bacilli; the round or irregular bodies represent other substances which have been ejected along with the bacilli (Fig. 1).

CHAPTER II

HOW MAY THE GERM OF CONSUMPTION (BACILLUS TUBERCULOSIS) ENTER THE HUMAN SYSTEM?

1. By being inhaled—that is, breathed into the lungs.
2. By being ingested—that is, eaten with tuberculous food.
3. By inoculation—that is, the penetration of tuberculous substance through a wound in the skin.

Of these three ways in which the bacilli may enter, the first one seems to be the most important.

CHAPTER III

HOW DOES THE INHALATION OF THE BACILLI TAKE PLACE?

Multitudes of Bacilli in the Expectoration.

A CONSUMPTIVE individual, even at a period when he is not confined to his bed, may expectorate enormous quantities of bacilli. Now, if this expectoration, or spittle, is carelessly deposited here and there, so that it has an opportunity to dry and become pulverized, the least draught or motion in the air may cause it to mingle with the dust, and the individual breathing this dust-laden atmosphere is certainly exposed to the danger of becoming tuberculous if his system offers a favourable soil for the growth of the bacilli. By 'favourable soil for the growth of the bacilli' must be understood any condition in which the body is temporarily or permanently enfeebled. Such a condition may be inherited from parents, or acquired through alcoholism or drunkenness or other intemperate habits, through privation or disease.

Besides the danger arising from carelessly-deposited sputum,

or spittle, the inhalation or ingestion of the small particles of saliva which may be expelled by the consumptive during his so-called dry cough, or when speaking quickly or loudly, or when sneezing, must also be considered as dangerous for those who come in close contact with the invalid. These almost invisible drops of saliva may contain tubercle bacilli. Recent experiments in this direction have shown the possibility of infection by this means.

CHAPTER IV

WHAT MUST BE DONE TO CHECK THE SPREAD OF CONSUMPTION CAUSED BY THE EXPECTORATION OF PULMONARY INVALIDS?

(*a*) *Destruction of Tuberculous Expectoration.*—Consumptives and those living with them must know that all precautionary measures are instituted in the interest of the invalid as well as of his fellow-men. These measures protect the patient from reinfection and others from the danger of contracting the disease.

A patient suffering from pulmonary consumption should know that, no matter in what stage of the disease he may be, his expectoration or spittle may spread the germ of the disease if the matter expectorated is not destroyed before it has a chance to dry and become pulverized. The patient should, therefore, always spit in some receptacle intended for the purpose. It is best to have this vessel made of metal, so as not to break. It should be half filled with water or some disinfecting fluid, the main thing being to make it impossible for the expectoration to dry.

In factories, stores, railroad-cars, waiting-rooms, court-rooms, restaurants, saloons, meeting-places, theatres, menageries—in short, wherever many people congregate—there should be a sufficient number of spittoons well kept and regularly cleaned. They should be made of unbreakable material, and have wide openings. If such measures are carried out, there will be no excuse for anyone to expectorate on the floor, and thus endanger the lives of his fellow-men.

Spittoons. In the sick-room of a private home, at hospitals or sanatoria, only covered spittoons should be used, and it is better to have them placed on stands in niches, or in elevated boxes. We give an example of the last-named kind in Fig. 2, showing a blue enamelled iron spittoon in a box elevated on a stand. The spittoon is fastened by a clamp to the door of the box, and can be easily removed for cleaning. The stand is most convenient when about 3 feet in height. Such an arrangement, besides making it more sure that the sputum will all reach the inside of the spittoon, has the additional pleasant feature of being visible only while it is being used by the patient. The cover of the receptacle prevents flies and other insects from coming in contact with the sputum. It has been proved that insects, especially flies, often carry the bacillus out of the sick-rooms of consumptives when sufficient care is not taken to cover the expectoration. The fly which has come in contact with tuberculous matter may spread the disease in three ways. First, it may carry small particles of spittle on its feet, and leave them wherever it may alight. Secondly, if it has partaken of tuberculous matter, it deposits its excrement at the next opportunity on some article of food, and thus the bacilli find their way into the digestive organs of man or beast. Thirdly, these insects may dry and crumble to dust, which contains the bacilli, and the germs of the disease may thus enter the lungs.

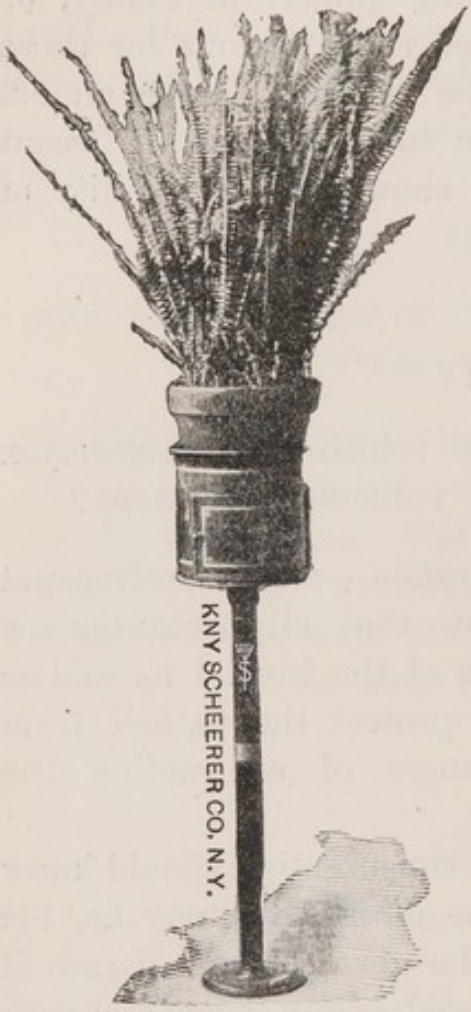

Fig. 2.—Elevated Spittoon.

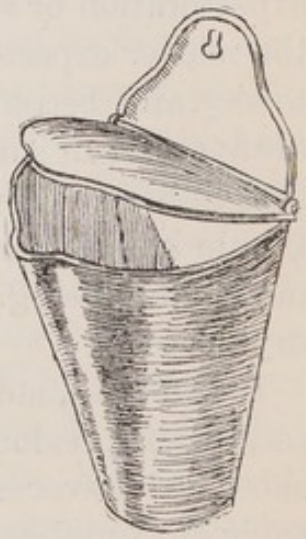

Fig. 3.—Predohl's Spittoon.

The spittoon of metal elevated and covered presents further advantages over the usual uncovered vessel of porcelain or earthenware. Animals, such as dogs, cats, etc., will not be able to reach the contents, and there is less danger of its bursting when placed outdoors at freezing temperature if enclosed in a box.

For factories, workshops, etc., Predohl's enamelled iron spittoon, 9 inches high, 8 inches in its largest and 3 inches in its smallest diameter, seems to answer all practical purposes. As the accompanying drawing (Fig. 3) indicates, it can be

FIG. 4.—DETTWEILER'S POCKET FLASK.

FIG. 5.—KNOPF'S ALUMINIUM FLASK (CLOSED).

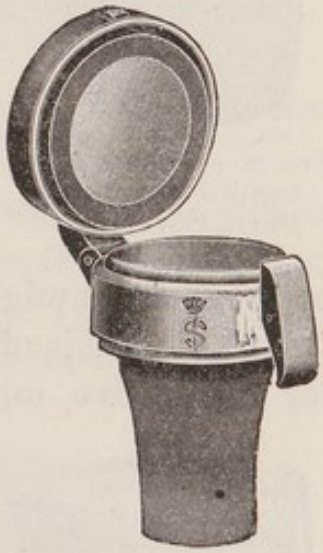

FIG. 5*a*.—FUNNEL AND COVER TO FIG. 5.

suspended at any height, and is very easily cleaned and disinfected.

Pocket Spittoons.

When outdoors, the patient should use a pocket flask to receive the spittle. There are numerous flasks in the market, and I reproduce a few of them: Dettweiler's, of blue glass and in three pieces (Fig. 4); Knopf's, made of aluminium (Figs. 5, 5*a*, and 6); Liebe's, of blue glass in two pieces (Fig. 8); and Barbour's, made of white glazed porcelain, perforated at the edges, enabling it to be lightly stitched inside a handkerchief, and thereby offering a disguise to its use (Fig. 7). The

directions for use usually accompany each flask. The more expensive ones (Figs. 4 and 5) can be manipulated with one hand. The cleaning of all of them is easy. The expectoration received in any receptacles, large spittoons or pocket flasks, should be so disposed of that the bacilli are killed. Where there is a good sewerage system the contents of these cuspidors may, without danger, be poured into the water-closet. Where there are no running water and perfect sewerage, it is better to boil the contents of the spittoons before pouring them into the water-closet, or disposing of them otherwise. Thus, whenever possible, the tuberculous expectoration —that is to say, the entire contents of all classes of cuspidors—should be placed in a pot kept for that purpose, which is partially filled with water. Every twenty-four hours or so this pot should be put on the fire and the contents brought to a boil. To raise the boiling-point it might be well to add to each quart of water one or two teaspoonfuls of washing soda. After the mixture has boiled for about five minutes, it can be considered totally harmless, for all the bacilli will have been killed. The disinfection of tuberculous expectoration by carbolic acid

FIG. 6.—KNOPF'S ALUMINIUM FLASK WITH PLAIN COVER.

FIG. 7.—BARBOUR'S PORCELAIN POCKET SPITTOON.

FIG. 8.—LIEBE'S POCKET SPITTOON.

FIG. 9.—SPIT-CUP OF ALUMINIUM OR PORCELAIN.

(5 per cent.), or mercurial solutions (1 : 2,000), is not so certain, since these substances cause the albumin in the expectoration to coagulate, and thus form, in a measure, a protective cover for the bacilli, and make their total destruction more difficult. Ordinary commercial wood vinegar is a better and more convenient disinfectant, and need not be diluted when used. **Disinfection and Destruction of Tuberculous Matter.**

When people are so situated as not to be able to dispose of the contents of the pocket spittoons by boiling or disinfection, we would recommend the following method: Pour the contents of the flask on to several layers of newspaper, gathering up the edges and being careful not to spill any, and throw the whole at once into the fire.

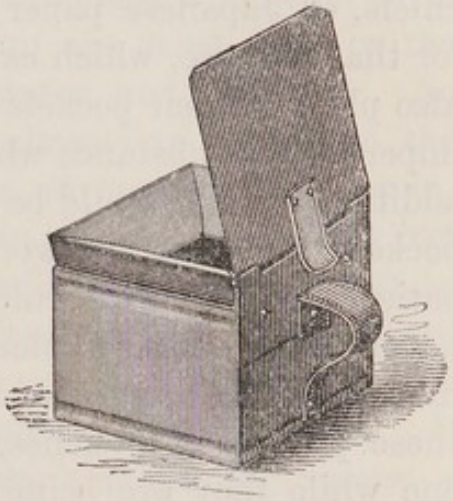

FIG. 10. — FRAME OF SEABURY AND JOHNSON'S SPITTING-CUP.

A handkerchief should never be used as a receptacle for sputum. Patients who are too sick to make use of light porcelain or aluminium cups (Fig. 9), Seabury and Johnson's spitting-cup of pasteboard (Fig. 10), or the Kny-Scheerer pressed-paper cup (Fig. 11), should have a number of

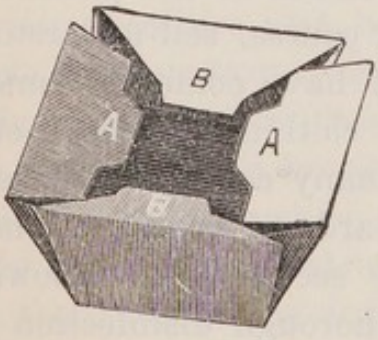

FIG. 10*a*.—FOLDED CARDBOARD, TO BE BURNED AFTER USE.

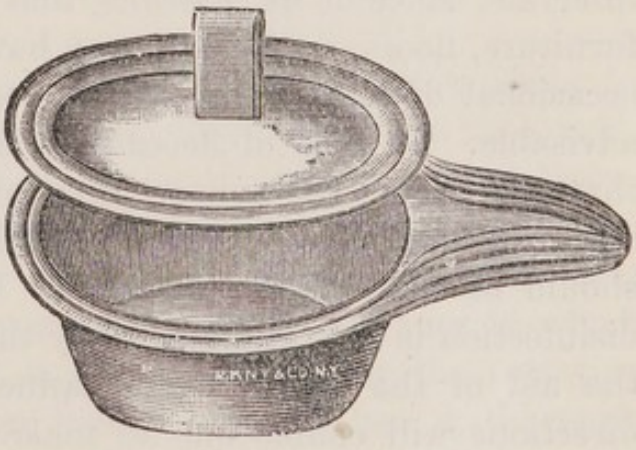

FIG. 11.—KNY-SCHEERER'S SANITARY SPITTOON CUP.

moist rags within easy reach. Care should be taken that the rags always remain moist, and that the used ones are burned before they have a chance to dry. The paper spit-cups, with their contents, should, of course, also be destroyed by fire.

There will always be some consumptives who cannot be persuaded to use the pocket flask, for the simple reason that they do not wish to draw attention to their malady. For these Barbour's 'handkerchief' flask lends a remedy, or, again, they may use squares of soft muslin, cheese-cloth, cheap handkerchiefs, or Japanese paper handkerchiefs specially manufactured for that purpose, which can be burned after use. They should also place in their pockets a removable lining of rubber or other impermeable substance which can be thoroughly cleaned. This additional pocket could be fastened to the inside of the ordinary pocket by clamps, and would thus be of no inconvenience to the patient. A pouch of vulcanized rubber or an Oriental tobacco-pouch may be used in place of the extra pocket of impermeable material. In any case, it is well to have more than one of these pockets or pouches, so that the patient is never without one while they are being cleaned and immersed in some disinfectant solution or boiling water. Of course, all invalids using handkerchiefs, rags, or Japanese paper as receptacles for expectoration are in danger of infecting their hands, and should always wash them thoroughly before touching food.

(*b*) *Disinfection of the Sick-room.*—The rooms occupied by a tuberculous patient should be thoroughly disinfected at regular intervals, since it is possible that even with great care the furniture, floors, walls, etc., may have been infected. Even the occasional disinfection of the personal effects of the patient is advisable. In case of decease it is, of course, self-understood that everything the consumptive might have come in contact with, particularly furniture, bedding, clothing, books,* etc., should be thoroughly disinfected. In many communities such disinfection is now attended to by the boards of health. Where the aid of the health board cannot be secured, the following directions will enable one to make a thorough disinfection by formaldehyde gas: (1) All cracks or openings in the plaster, in the floor, or about the doors and windows, should be calked tight with cotton or strips of cloth. (2) The linen, quilts,

Formaldehyde Disinfection of Rooms, etc.

* The possibility of transmitting tuberculosis through books has been demonstrated, particularly if the patient has been in the habit of moistening his fingers with saliva while turning the leaves.

blankets, carpets, etc., should be stretched out on a line, in order to expose as much surface as possible to the disinfectant. They should not be thrown into a heap. Books should be suspended by their covers, so that the pages will fall open and be freely exposed. (3) The walls and the floor of the room and the articles contained in it should be thoroughly sprayed with water. If masses of matter or sputum are dried down on the floor, they should be soaked with water and loosened. No vessel of water should, however, be allowed to remain in the room. (4) One hundred and fifty c.c. (5 ounces) of the commercial 40 per cent. solution of formalin for each 1,000 cubic feet of space should be placed in the distilling apparatus, and be distilled as rapidly as possible. The keyhole and spaces about the door should then be packed with cotton or cloth. (5) The room thus treated should remain closed at least ten hours. If there is much leakage of gas into the surrounding rooms, a second or third distillation of formaldehyde should be made at intervals of two or three hours.

To be sure that the work is well done, it is always best to have it supervised by a physician. To managers of hotels and boarding-houses in health resorts, this method of disinfection is particularly to be recommended, and the disinfection of rooms occupied by consumptive guests should always take place immediately after their removal.

Permanently Infected Houses.

In some cities and villages tuberculosis seems to cling to certain localities and houses. The disease appears in a veritable endemic form—that is to say, it is always present there, either from the fact that careless tuberculous patients have lived for years in these houses, or owing to the equally important fact that the soil on which they are built, or the manner in which they have been constructed, is such as to favour the retention of the tuberculous infection indefinitely. When a thorough sanitary overhauling does not suffice to stamp out these sources of infection, the destruction of such dwellings seems the only remedy.

CHAPTER V

WHAT CAN BE DONE TO PROTECT OURSELVES FROM THE SMALL PARTICLES OF SALIVA CONTAINING BACILLI THROWN OUT BY THE CONSUMPTIVE DURING DRY COUGH, LOUD SPEAKING, OR SNEEZING?

THERE is real danger from this source of infection only when one remains a considerable length of time very near the tuberculous patient while he coughs or speaks. At a distance of 3 or 4 feet the danger practically ceases. The relatively few bacilli which are expelled with the saliva during the dry cough, sneezing, or loud speaking, are probably never thrown farther than 3 feet, and fall rapidly to the ground.

Arrangement of the Consumptive's Room.

But even the lesser danger which may arise from the bacilli having fallen to the floor with the particles of saliva must be prevented. They must not be allowed to accumulate and so be blown up with the dust into the air. Therefore, the floor of the room of a tuberculous patient should never have any fixed carpet; and even the wooden floor should never be swept with a broom, but should be frequently wiped up with a wet cloth or with crude oil. Dusty furniture should be cleaned in the same way. Plush, velvet, or cloth-covered furniture, heavy curtains, or other fancy decorations, which might serve as dust-catchers, should not be allowed in the room of a tuberculous patient. Leather-covered, rattan, and plain wooden furniture are certainly the best, and the curtains should always be of washable material. Fancy curtains of cloth, velour, or silk, which accumulate dust and keep the air and sun out of the rooms, should be discarded.

If at all possible, every patient should have his own room, but he should always have his own bed. For a well person to sleep in a bed very close to a tuberculous patient is almost as dangerous as to sleep together in one bed.

Precautions to be taken by Nurses.

Friends, relatives, and nurses should not remain very near the patient longer than necessary, and the tuberculous invalid should be urged always to hold a handkerchief before his mouth and nose while coughing or sneezing. He should, furthermore,

be advised to carry two handkerchiefs with him always: one to hold before his mouth and to wipe it with after having expectorated; the other to use only to wipe his nose. By being careful with the use of his handkerchiefs, the danger of infecting his nose and bronchial tubes will be materially lessened.

All dirty linen (sheets, pillow-cases, underwear, napkins, handkerchiefs, etc.) used by the consumptive should not be handled more than necessary, but should be placed in water as soon as possible after removal from bed or body. It is better to wash these articles separately, and only after having been thoroughly boiled should they be put with the common laundry. Wherever it is not possible to carry out these precautionary measures in their entirety, one should strive to follow them as far as it is in one's power.

Precautions with the Washing.

CHAPTER VI

HOW MAY MAN GIVE TUBERCULOSIS TO ANIMALS?

In one of the preceding chapters we have spoken of the importance of elevated spittoons to protect domestic animals, such as cats, dogs, etc., from the danger of becoming tuberculous by licking up tuberculous expectoration. By the careless expectorating of consumptives in meadows, fields, or stables, animals may become infected with the disease.

Now, although it is true that the sun and the air ultimately destroy the germs of the tuberculous sputum, it is not wise to rely upon this. Tuberculous substances may do harm by being licked up by animals before the sun and air have had time to kill the bacilli, and in dark and damp places it often takes a long time before atmospheric influence renders the tuberculous matter absolutely inoffensive.

The stools of patients suffering from tuberculosis of the intestines should be disinfected by a 5 per cent. solution of carbolic acid. The superficial burying of tuberculous meat or tuberculous expectorations without previous thorough disinfection must be considered as dangerous.

Danger of Superficial Burial of Tuberculous Substances.

CHAPTER VII

HOW CAN WE GUARD AGAINST GERMS OF TUBERCULOSIS IN OUR FOOD?

WHENEVER one is not reasonably certain that the meat he eats has been carefully inspected and declared free from disease germs, it should be very thoroughly cooked. By this means one is certain to kill all the dangerous micro-organisms.

Boiling or Sterilizing Milk.

Unless one can be reasonably sure that the cows from which the milk is derived are healthy and not tuberculous, the milk should be boiled or sterilized before use, more especially when it is intended as food for children. Milk obtained from stores and from milk-pedlars should invariably be submitted to boiling or sterilization. When milk is kept slowly boiling for five minutes all the bacilli are killed, and the same result is obtained by the sterilizing process—that is to say, to keep the milk heated for at least half an hour at a temperature of about 70° C. or 160° F. There are now in the market a number of cheap and practical apparatuses for sterilizing milk, which can be obtained at almost any drug store.

CHAPTER VIII

IN WHAT OTHER WAYS MAY THE BACILLI OR GERMS OF CONSUMPTION ENTER THE INTESTINAL TRACT?

Infection by Saliva.

SINCE the tubercle bacillus may be found in the saliva of a tuberculous patient, it is best never to kiss such a person on the mouth. The habit of caressing or kissing domestic animals (parrots, canary-birds, dogs, cats), many of whom are tuberculous, is equally dangerous, for through such habits these animals may transmit tuberculosis to man.

Tuberculous patients should have their own drinking-glasses, spoons, forks, etc.; or, at least, all table utensils which have served the tuberculous patient should be boiled after use.

Danger of Swallowing Tuberculous Sputum.

The patient should never, out of false modesty, swallow his expectoration. He will thus avoid the danger of contracting intestinal tuberculosis. How important this warning is may become evident from observations of the tuberculous insane. These unfortunate people, with whom hygienic education is impossible, often swallow their expectoration, and as a consequence intestinal tuberculosis or consumption of the bowels is very frequent among them. Every consumptive patient should remember never to touch food before having washed his hands very thoroughly. Even with the greatest care it is possible that he may have soiled his hands with tuberculous expectoration.

CHAPTER IX

HOW MAY TUBERCULOSIS BE CONTRACTED THROUGH INOCULATION (PENETRATION OF TUBERCULOUS SUBSTANCES THROUGH THE SKIN)?

Care to be Taken in Cleaning Spittoons.

Inoculation of tuberculosis happens, perhaps, most frequently through injuries received while cleaning nicked or chipped glass or porcelain spittoons which had been used by consumptives. It is also possible for the bacilli to enter the circulation if the person cleaning the spittoons happens to have a wound or open sore on his hand. Persons entrusted with the care of the spittoons in a private home or an institution for consumptives should wear rubber gloves while cleaning these vessels.

At times the patient may inoculate himself by placing an accidentally injured finger in his mouth, or by carelessly soiling an open wound with his expectoration.

Physicians, students of medicine or veterinary science, butchers, etc., are also exposed to the danger of wounding themselves with instruments which may have come in contact with tuberculous matter. Extreme care is the only remedy for all persons thus exposed.

If one has been unfortunate enough to receive an injury, and tuberculous inoculation is feared, the best thing to do is to let the wound bleed freely, wash it thoroughly with water that has been boiled, with a 5 per cent. solution of carbolic acid, or with

pure alcohol, dress the wound with a clean rag dipped in any of these liquids, and seek as soon as possible the advice of the physician.

By tattooing tuberculosis has been transmitted in various instances because the operator was a consumptive. Men who follow the profession of tattooing have, as a rule, the habit of dissolving the colours necessary for their work with their own saliva; hence the infection. The best thing, therefore, is never to permit such barbaric decorations on one's body.

CHAPTER X

WHAT OTHER FORMS OF TUBERCULOSIS EXIST, AND WHAT ARE THEIR PRINCIPAL SYMPTOMS?

In the foregoing chapters we have treated of the bacillus of tuberculosis, its mode of entrance into the system, and of the symptoms of the most frequent form of the disease—that is to say, consumption or pulmonary tuberculosis. Now we will consider some of its other forms or manifestations.

Tuberculosis of the Throat.

More closely related to consumption than any other form of tuberculosis is laryngeal tuberculosis, also called tuberculosis of the larynx, or tuberculosis of the throat. This disease is not nearly so frequent as pulmonary tuberculosis, but sometimes occurs with it. Besides all the symptoms which tuberculosis of the throat has in common with tuberculosis of the lungs, such as fever, night-sweats, emaciation or loss of flesh, difficulty in breathing, cough, etc., there are in this disease additional symptoms, such as more or less pronounced hoarseness and frequent and intense pain during the act of swallowing, which makes eating bread, meat, and other solid food exceedingly difficult. The internal appearance of the throat shows little tuberculous growths and ulcers in the region of the vocal cords and neighbouring tissue.

Tuberculosis of the Bones.

Tuberculosis of the bones, which not infrequently leads to a total necrosis—that is, a softening and final decay of the bones—is not a rare disease. If the seat of the disease is the spinal

column, the decay of one or more vertebræ may result in the deformity commonly known as hunchback. If through this breaking down there should result a compression of the spinal marrow, paralysis of arms or legs, and other disturbances, such as difficulty in retaining the urine and the stools, may be observed.

While tuberculosis of the bones and joints is almost painless at the beginning, it may gradually lead to loss of the use of the joints, to maturation and destruction, which may become extensive enough to make even amputation necessary.

Tuberculous Meningitis.

In younger children tuberculous spinal meningitis is not rare, and, alas! very often proves fatal. The essential symptoms of this disease are digestive disturbances (vomiting or constipation), uneasiness and depression, later on paralysis of the extremities, delirium, and sometimes coma (profound insensibility).

Consumption of the Bowels.

More frequent and almost as dangerous as tuberculous meningitis in children is tuberculosis of the intestines and the peritoneum (the lining of the abdominal cavity). This affection is sometimes also called consumption of the bowels. The most pronounced symptom in such cases is very often a protracted diarrhœa, which cannot be easily controlled by dieting or medication.

Hasty Consumption.

At times the whole body is invaded by the tuberculous disease, and countless little tubercles are distributed in all the organs. This disease is then called 'miliary tuberculosis,' because the tubercles are like millet seeds. The origin of this disease is probably always due to the sudden outbreak of a localized tuberculous lesion, which had been at a standstill before. The first symptoms of miliary tuberculosis resemble those of typhoid fever. They are generally depression, lassitude, and fever. This is also one of the forms of tuberculosis which often prove fatal.

Lupus.

Of the so-called localized tuberculous diseases, we must mention the form which manifests itself as a skin disease, and is known as lupus, showing itself as ulcerous patches mainly on the face.

Scrofula.

So-called scrofulosis, or scrofula, is now considered also as a form of tuberculosis. It appears almost exclusively during child-

hood. It is a milder disease than the other forms of tuberculosis, and manifests itself mainly in swelling of the glands, eruption of the skin, and inflammation of eyes and ears.

CHAPTER XI

WHAT PROTECTS THE HEALTHY INDIVIDUAL FROM CONTRACTING TUBERCULOSIS ?

After all that we have said of the contagiousness—or, rather, the communicability—of tuberculosis, and consumption in particular, one must not think that a breath in an atmosphere accidentally laden with bacilli would certainly render a healthy individual consumptive, or that by a swallow of tuberculous milk or a little injury from a broken spittoon one must necessarily become tuberculous. The secretions of our nasal cavities, doubtlessly also the blood, and the secretions of the stomach of a healthy individual, have bactericidal properties—that is to say, they kill the dangerous germs before they have a chance to do harm. Therefore, the healthy man and woman should not have an exaggerated fear of tuberculosis, but they should, nevertheless, not recklessly expose themselves to the danger of infection.

CHAPTER XII

HOW MAY ONE SUCCESSFULLY OVERCOME A HEREDITARY DISPOSITION TO CONSUMPTION ?

Hygiene and Dress for Tuberculous Mothers.

The mother who fears for her future child a hereditary disposition to tuberculosis should lead a very healthful life. She should be as much in the open air as possible, breathe deeply, and eat regularly of plain but nourishing food. Never should she wear garments which constrict any of her chest or abdominal organs. She should replace the corset by a comfortable waist, which permits free and deep respiratory movements. Instead of tying her skirts round her waist, she should have them suspended from the shoulders, which can easily be done by attaching buttons to the waist. By wearing a close-fitting union suit for

underwear, of wool or cotton, according to the season, it will be possible to get along with less skirts, and thus lessen the weight around the waist. The whole dress of the mother should be so arranged that there are no constricting bands, and that no organ in the body should be hindered in its free physiological functions. How important a more healthful and natural dress really is for the welfare and development of mankind in general a mother seldom realizes either for herself or for her daughters. They are all only too often the slaves of fashion. The tightly-laced corset should be banished for ever from the dress of women. Not only is free and natural breathing interfered with by this article of dress, but indigestion and disturbances in the circula-

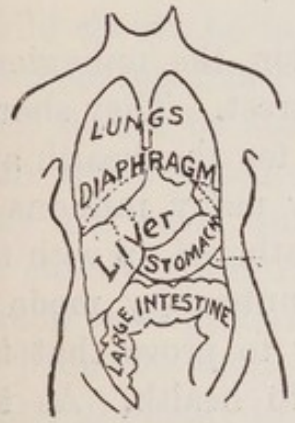

Fig. 12.

Fig. 13.

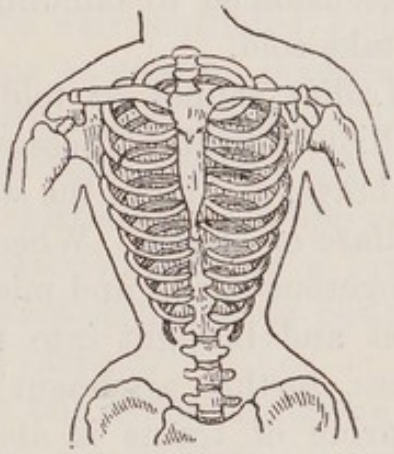

Fig. 14.

tion follow excessively tight lacing. Anæmia, or poverty of the blood, so often observed in young girls, can very frequently be ascribed to this unnatural mode of dress, which does not permit either a free circulation or sufficient oxygenation of the blood.

Tight Lacing.

We reproduce here three pictures better to illustrate the result of excessive lacing. Fig. 12 shows the situation of the organs in chest and abdomen in a normal thorax. Fig. 13 shows lungs, heart, and intestines as they appear in a thorax constricted by wearing a tightly-laced corset for a number of years. Fig. 14 shows the skeleton of a chest deformed by tight lacing.

Belts.

The wearing by men of belts instead of suspenders is not to be recommended. In order to keep the trousers in place the belt must be considerably tightened; the result is constriction of the abdomen, hindering the natural action of the intestines,

which is essential to good digestion. Hernias (ruptures) may also be the result of this mode of dress. It cannot be insisted upon too often that in an individual predisposed to tuberculosis nothing can be more injurious than an interference with proper digestion and assimilation. To keep stomach and bowels in good order is one of the best safeguards against taking the disease.

Neckwear. Neckwear, for men as well as for women, should be loose. Tight and constricting collars or bands around the neck may cause an insufficient air-supply, congestion of the arteries of the brain, and subsequently headache and dizziness. To dress the neck too warmly lessens the power to resist taking cold when there happens to be a change in the atmosphere. The less one is accustomed to bundling up the neck, the less liable will he be to take cold.

Trailing Skirts. Ladies cannot be told too often to abandon the unhygienic fashion of trailing dresses—at least, in the street. They should be brave, and show the world that they care for the health and welfare of others. When one considers how many millions of dangerous bacilli and micro-organisms are gathered up with the dust and brought into the house by this unhealthy mode of dress, further argument is hardly necessary to prove that the wearing of trains is absolutely dangerous to health. As the poet of the London *Truth* puts it in his 'Song of the Skirt,' why should dresses be made to do 'the scavenger's dirty work'?

'Sweep—sweep—sweep—
Where the waste of the street lies thick,
Sweep—sweep—sweep—
However our path we pick;
Dust, bacillus, and germ,
Germ, bacillus, and dust,
Till we shudder and turn from the sorry sight
With a gesture of disgust.

'Oh, men with sisters dear!
Oh, men who have well-dressed wives,
It is not alone an expensive mode,
It is one that hazards lives!
For malignant microbes swarm
In the triturated dirt,
And the dress that sweeps it up may prove
A shroud as well as a skirt!'

Footwear is also a matter of importance. Shoes should never be worn too tight. They not only hinder free movements, but the constriction of the bloodvessels causes impaired circulation and coldness of the extremities. **Footwear.**

If it is found necessary to wear underwear at night, a different set should be kept for that purpose, which, with the night-dress or night-shirt, should be well aired during the daytime.

Hygiene and Care of the Child of a Tuberculous Mother.

Whenever a mother has a tendency to tuberculous disease, the child should be given a healthy wet-nurse or be fed artificially with modified cow's milk. The advice of the physician is indispensable under such circumstances. The child should have its own bed, and should never, never sleep in the same bed with the mother. The bedroom should always be well ventilated, and the child should be taken into the open air as soon as practicable. The old-fashioned habit of enveloping the child's head in a thick veil should be abandoned. It is a good plan to let the little one run about naked, or with only a little shirt on, for a while every day in a warm, sunny room. A bare wooden floor or a square of closely-woven matting, that can be kept scrupulously clean, is much to be preferred to dust-collecting carpets.

Sun and Air Baths for Little Children.

Use of Cold Water.

From the tenth to the twelfth month one should accustom the child gradually to cold baths. The best way to begin is after its daily warm bath to rub the child a few times with the hands dipped in cold water, and then wipe it rapidly. By-and-by one may begin with cold sponging, and later on with a little douche. In the use of cold water it is absolutely necessary that the reaction should rapidly follow. This reaction is manifested by a pleasant warmth perceived by the child, and externally is made visible by a reddish appearance of the skin. Whenever cold water is applied to the skin, one will notice at first a certain whiteness or pallor, which is caused by a contraction of the external bloodvessels. The return of the blood to the external surface causes the reddening of the skin. Whenever reaction is lacking or tardy, the advice of the physician should be sought.

Though the application of cold water is beneficial, one should never forget that there are people whose constitutions differ, and that a routine treatment is not applicable to every individual. The careful, judicious, and regular application of cold water is

perhaps one of the best preventive measures against taking cold, for children as well as adults, and its use generally should be more recommended. Persons not accustomed to the use of cold water can easily become so by being rubbed every day with alcohol for a week or so. During the second week they should be rubbed with half alcohol and half water, and the third week with water alone. By this means one gradually educates one's self to the use of cold sponge-baths, ablutions, and douches.

Douche.

Every family does not have the luxury of a douche apparatus, and sometimes not even a bathroom. For such I wish to describe a simple method which will answer the purpose. Take a large circular English bath-tub, about 3 feet in diameter and 10 inches high, and pour about 5 inches of cold or tepid water into it. The bather jumps into the water, keeping his feet in motion for a few seconds, and pours one or two pitcherfuls of water quickly over each shoulder, thoroughly wetting the whole body. It is not at all essential that the head should be wet at the same time. The douche can be made easier by the help of a second person to pour the water from the pitcher or watering-pot. If a hose can be attached to a near-by faucet, a douche, needle-bath, or direct jet can be improvised. The temperature of the water may vary from 60° to 40° F. The room in which the bath is taken should be warmed in cold weather. The best and, perhaps, also most convenient time to take a cold bath is in the morning before dressing, or in the evening before retiring. Whenever reaction is feeble—that is to say, when a pleasant feeling of warmth after the bath does not come quickly enough—one should proceed as follows: If the bath is to be taken in the morning, rise half an hour earlier, cover the bed so that the warmth is retained; then, after the application of cold water has been made rapidly in the manner above described, rub with a rough Turkish towel, and return as quickly as possible to the warm bed. If it is not practicable to take the bath in the morning, one can obtain the same result by going to bed half an hour earlier, and when the bed is warm rise again to take the cold-water application. In most cases the return to the warm bed will assure a thorough reaction; but if these precautions, in addition to vigorous friction after the bath, do not suffice to produce a

How to help Reaction.

proper reaction, it is a sign that the body has not enough resistance for this kind of treatment, and the physician should be consulted.

Cold baths, especially bathing in a river or in the ocean, are, of course, to be recommended in warm weather. Weakly and elderly persons should not take cold baths, no matter at what season, unless permitted to do so by their physician.

To keep the skin clean and in good condition, cold baths, even when taken every day, are not always sufficient, and soap and warm water should be used at least once a week. The warm bath should always be followed by a rapid sponging off with cold water.

Warm Baths.

As soon as the intelligence of the growing child will permit, it should be taught to breathe deeply, and later on be taught to take the following breathing exercises, which the child should learn to love as the average boy or girl loves general gymnastics. In front of the open window or out of doors assume the position of the military 'attention,' heels together, body erect, and hands on the sides. With the mouth closed take a deep inspiration—that is, breathe in all the air possible—and while doing so raise the arms to a horizontal position. Remain thus holding the air inhaled for about three seconds, and while exhaling (breathing out) bring the arms down to the original position. This act of exhalation, or expiration, should be a little more rapid than the act of inspiration. When the first exercise is thoroughly mastered, and has been practised for several days, one may begin with the second exercise, which is like the first, except that the upward movement of the arms is continued until the hands meet over the head.

Respiratory Exercises with Movement of Arms.

The accompanying illustration (Fig. 15) shows the positions which are to be taken during those two exercises. The third breathing or respiratory exercise, which requires more strength and endurance, should not be undertaken until the first two have been practised regularly several times a day for a few weeks, and until an evident improvement in breathing and general well-being has been observed. We will endeavour to make this third exercise, which might be called a dry swim, more comprehensible by the illustration (Fig. 16). Take the

same military position of 'attention,' and then stretch the arms out as in the act of swimming, the backs of the hands touching each other. During the inspiration move the arms outward until they finally meet behind the back. Remain in this position a few seconds, retain the air, and during exhalation bring the arms forward again. This somewhat difficult exercise can be facilitated and be made more effective by rising on the toes

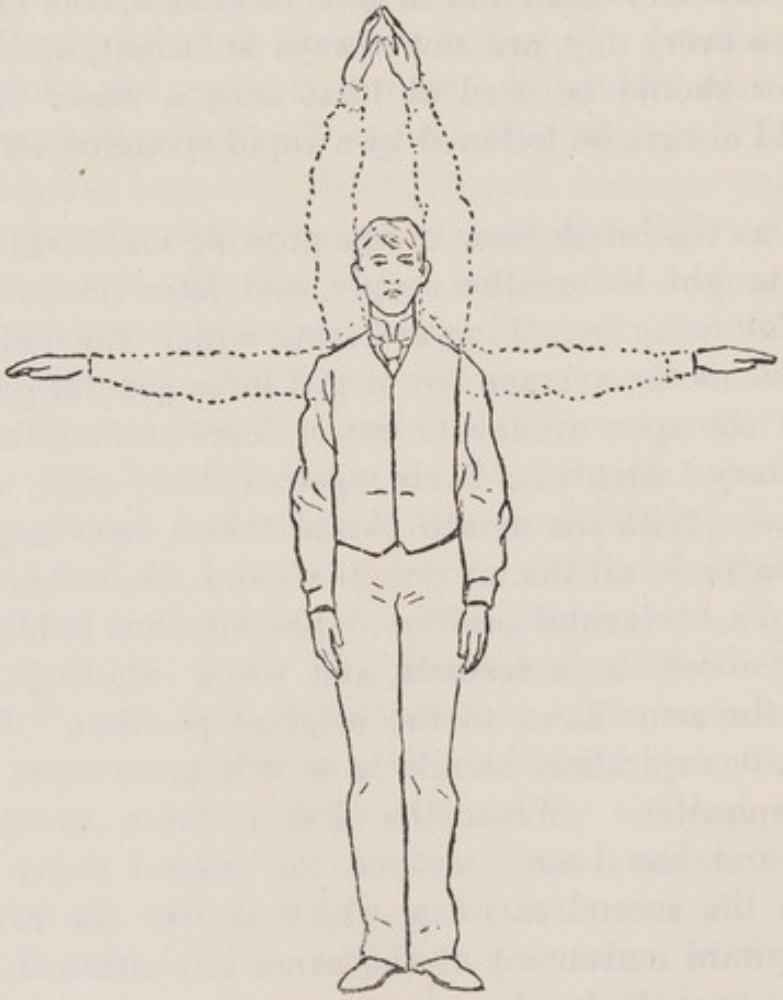

FIG. 15.—FIRST AND SECOND BREATHING EXERCISES.

during the act of inhalation, and descending during the act of expiration.

Respiratory Exercises without Movement of Arms.

Of course, when out of doors, one cannot always take these exercises with the movement of the arms without attracting attention. Under such conditions raise the shoulders, making a rotary backward movement during the act of inhaling. Remain in this position, holding the breath for a few seconds, and then exhale while moving the shoulders forward and down-

ward, assuming again the normal position. This exercise (Fig. 17) can be easily taken while walking, sitting, or riding in the open air.

Young girls and boys, and especially those who are predisposed to consumption, often acquire a habit of stooping. To overcome this, the following exercise (Fig. 18) is to be recommended. The child makes his best effort to stand straight,

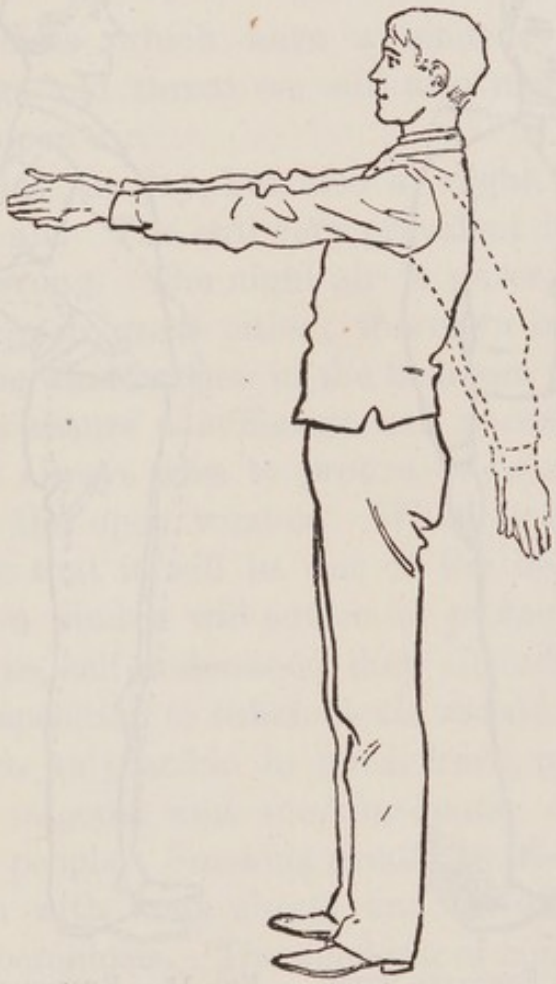

Fig. 16.—Third Breathing Exercise.

places his hands on his hips with the thumbs in front, and then bends slowly backward as far as he can during the act of inhaling. He remains in this position for a few seconds while holding the breath, and then rises again somewhat more rapidly during the act of exhalation.

The following general rule concerning breathing exercises should always be remembered: Commence with the easier exercises (Figs. 15 and 17), and do not begin with the more

General Rules Concerning Respiratory Exercises.

difficult ones (Figs. 16 and 18) until the former are completely mastered. Take from six to nine deep respiratory exercises, either of one kind or the other, every half hour, and continue this practice until deep breathing has become a natural habit. These exercises should always be taken in an atmosphere as fresh and as free from dust as possible. Never take these

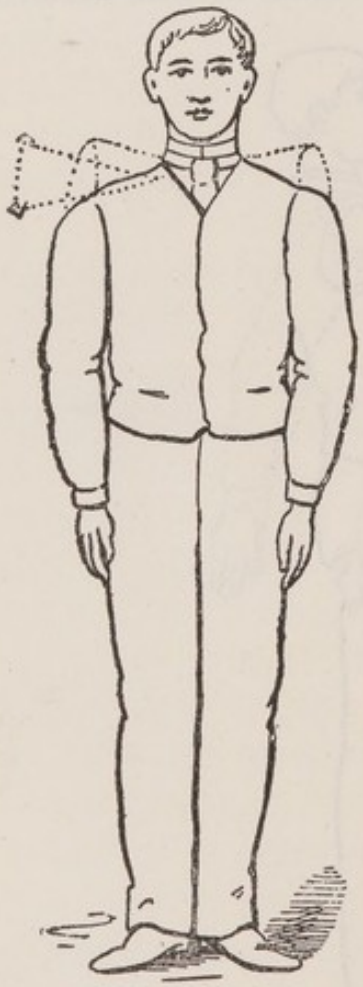

FIG. 17.—BREATHING EXERCISE WITH ROLLING OF SHOULDERS.

FIG. 18.—EXERCISE FOR PEOPLE IN THE HABIT OF STOOPING.

exercises when tired, and never continue so long as to become tired.

Causes of Mouth-Breathing.

Mouth-breathing in children, and sometimes in adults, is often caused by certain growths in the throat (adenoid vegetation), by enlarged tonsils, or by growths in the nose (polypi, etc.). The removal of these obstructions by surgical aid is perhaps the only rational method to assure natural breathing. Incidentally, we may be permitted to say that these operations are not at all

dangerous; but by the presence of these vegetations in the throat (retro-pharynx) the hearing and the intellectual and bodily development of the child may become seriously impaired. The early removal of such growths should be earnestly recommended. The respiratory exercises just described are particularly useful for such children after operation, otherwise they might retain the habit of imperfect breathing which they had acquired.

Among exercises which have a tendency to develop and strengthen lungs and throat we will also mention singing and reciting in the open air.

Relative Purity of Night Air.

Not only during the day, but also at night, there should be a desire for fresh air. The still very prevalent idea that night air is injurious is wrong. The night air is purer than that of the day, particularly in great cities; therefore one should always keep at least one window open in the bedroom or in an adjoining room, and thus assure a sufficient and permanent ventilation. Of course, it is always wise to protect one's self against direct draughts from the open window. When it is not possible to place the bed so that it will be out of the draught, a screen in front of the open window will suffice for protection.

Crowded Rooms and Smoking.

It is, of course, self-understood that all individuals who have an inherited disposition to tuberculosis should always endeavour to live as much as possible in good, fresh, pure air. To visit dancing-halls, saloons, and smoking-rooms can only be deleterious to such people. Smoking should be absolutely prohibited for young men with weak chests, and for all people having a tendency to tuberculosis. The smoking of cigarettes is particularly dangerous, since the habit, once acquired, tends to undermine even a strong constitution.

Raising and Educating Predisposed Children.

The proper bringing-up of children that have a tendency to become tuberculous is of the greatest importance. Many are poor eaters from the day of their birth. Discipline, not to allow too many sweets, to observe regular meal-times, and to keep the bowels in good condition, are the best means to combat a dislike for eating. As early as possible children should be taught to clean their teeth thoroughly after each meal, for a good digestion is dependent upon the condition of the teeth. The dislike to

play outdoors, which is so characteristic of the little candidates for tuberculous diseases, can also only be overcome by discipline. To dress them too warmly and bundle them up all the time is as injurious as having them remain most of the time indoors. Such children should not work too hard during their school age. To spend too many hours sitting down, to do too much brain-work, to spend too much time at the piano or in other musical studies, have a tendency often to weaken seriously the child predisposed to tuberculosis.

Gymnastic exercises should be recommended to young people of both sexes, and young girls especially should continue their healthful outdoor sports after they have left school. Of course, excesses are injurious in everything, and we wish to say here that, no matter how healthful a sport may be, if carried on too violently or for too long, it must ultimately prove injurious. To be cheerful, to live a regular life, to eat plain but good food, to avoid all alcoholic beverages, to see that the bowels move freely every day, to keep the whole body clean, and to sleep at least eight hours out of twenty-four, is the best way to remain well.

Once more we desire to call attention to the clothing of growing girls and boys. The thickness of the garments should be according to the season, and they should always be made so that every movement of the body may be free, and none of its functions, such as respiration, digestion, etc., in any way interfered with.

Choice of Occupation.

When the time comes to choose a profession or trade for a young man who has a tendency to tuberculosis, one should bear in mind that gardening, farming, forestry, and all occupations which demand an outdoor life, are the most likely to make him a strong man and a useful member of society.

Hereditary Consumption as Curable as Acquired Consumption.

In connection with the precautions which should be taken to combat a tendency to tuberculosis, we must say a few words concerning the curability of consumption or pulmonary tuberculosis. The old idea—still, alas! very prevalent and deeply rooted in the minds of many people—that a tuberculous individual who has seemingly inherited his tendency to the disease can have no hope of cure is wrong. We desire to emphasize the fact that

the chance for a cure of the consumptive individual does not at all depend upon whether he has a hereditary tendency or has accidentally acquired the disease. There are hundreds of cases of healed tuberculosis in men and women who have lived to old age, and nevertheless their fathers or mothers had succumbed to consumption.

Hereditary Transmission.

The assumption that tuberculosis is often directly transmitted from parent to child is equally erroneous. Of course, there are in medical literature a few cases which show that such direct transmission is possible, but they are exceedingly rare. When little children have become tuberculous the infection can almost always be traced to the child having slept or been much in contact with a consumptive mother or other consumptive individuals, having been kissed on the mouth, or having played on the dirty, infected floor, etc. All this shows the importance of absolute cleanliness and the strictest hygiene from early infancy.

CHAPTER XIII

HOW CAN A PREDISPOSITION TO TUBERCULOSIS, OTHER THAN HEREDITARY, BE CREATED OR ACQUIRED?

1. By the intemperate use of alcoholic beverages, a dissipated life, excesses of all kinds, etc.

2. By certain diseases which weaken the constitution; for example, pneumonia, typhoid fever, small-pox, measles, whooping-cough, syphilis, influenza, etc.

3. By certain occupations, trades and professions, such as printing, hat-making, tailoring, weaving, and all occupations where the worker is much exposed to the inhalation of various kinds of dusts, as bakers, millers, confectioners, cigar-makers, chimney-sweepers, and the workers in lead, wood, stone, metals, etc.

CHAPTER XIV

HOW MAY AN ACQUIRED PREDISPOSITION BE OVERCOME, AND SEEMINGLY UNHEALTHY OCCUPATIONS MADE RELATIVELY HARMLESS?

Tuberculosis and Venereal Diseases.

All persons who have been weakened through intemperance or excesses, who are convalescent from serious diseases, or who are suffering from the effects of harmful occupations, should not associate with consumptives. For the intemperate man, the fast liver, or one inclined to excesses, there is no remedy except to change his mode of life. The unfortunate who by his own fault or the carelessness of others has fallen a victim to a venereal disease (syphilis, etc.) we would urgently recommend to submit himself to thorough treatment by a competent physician. For the comfort of these unfortunate sufferers, we desire to say that all venereal diseases can be successfully treated when the patient seeks timely medical advice and obeys the physician's instructions faithfully. Since venereal diseases are highly contagious, the physician's instructions will also protect others from becoming infected, and the patient himself from reinfection. The necessity of seeking medical advice holds good for all those who by intemperance or excesses of any kind have undermined their constitution, and thus diminished their natural resistance to the invasion of the tubercle bacilli.

Hygiene in Factories, Workshops, etc.

Wise laws now exist whereby the sanitary conditions of factories, workshops, department stores, etc., are assured. Of course, there is room for much improvement in this respect, especially in regard to light and sufficient ventilation in factories where dust and gases are a constant menace to the labourer. Whenever practicable, respiratory masks for protection against particularly irritating dust should be worn. People much exposed to the inhalation of flour-dust should clean their teeth thoroughly (the inside as well as the outside). By removing the flour-dust from the spaces between the teeth, the formation of glucose (sugar) through the action of the saliva on the flour is avoided, and thus the germs of fermentation are deprived of a favourable soil for development.

Self-help of the Labourer.

In all these matters the labourer can help himself a good deal by his own efforts to make a seemingly dangerous occupation more safe. During the hours of recess, and before he goes to work as well as afterward, he should always strive to be as much as possible in the open air, drink plenty of pure, clean water, keep early hours, live as regular a life as possible, avoid the saloon, and never take alcoholic beverages.

All the other hygienic precautions and means of improving the general health of which we have spoken in Chapter XII.—'How may one successfully overcome a hereditary disposition to tuberculosis?'—such as breathing exercises, the use of cold water, etc., are, of course, just as essential to combat a disposition to tuberculosis which has been acquired.

CHAPTER XV

WHAT CAN WELL-MEANING AND CONSCIENTIOUS EMPLOYERS IN CITY AND COUNTRY DO TO HELP COMBAT TUBERCULOSIS?

Sanitary Dwellings.

All who employ a number of people and provide their lodgings should bear in mind that unhealthy, dark, damp, and badly-ventilated rooms are powerful factors in the propagation of tuberculosis. The soil upon which a dwelling for human beings is to be built should be dry, free from miasms and dangerous exhalations. High, porous ground is particularly to be recommended. It is sometimes possible to render a damp soil healthful by thorough drainage and cementing. The house should always be built of good material, and all the rooms should receive the light of day and as much sunshine as possible. In winter the rooms should be well warmed, but not overheated, and at the same time free ventilation should be made possible. Bath-rooms in sufficient number should be in all model tenement houses, and each family should have its own water-closet, which, of course, must always be kept in good condition.

Bathing Facilities.

In labour colonies and densely-populated tenement districts, where modern bathing facilities cannot be easily installed, there should be public places where, for a moderate price, people can

enjoy the cleansing and refreshing luxury of a warm or cold bath.

In factories, workshops, big stores, etc., there should always be a sufficient number of spittoons, preferably elevated and of unbreakable material. Wherever such precautions are taken and some conspicuous signs forbidding expectorating on the floor put up, and, if necessary, making it punishable by law, promiscuous spitting will soon cease, and an important point in the combat of tuberculosis will be gained.

Regularity of Meals.

All employés, men and women of whatever class, should be allowed ample and regular time for their meals, which should never be taken in the workshops. Special rooms should be kept for that purpose. Opportunity should be given to the workers to rest or walk in the open air for a little while after their meal. It is also of importance for the health of the labourer to wash his hands thoroughly before touching food, and proper conveniences should be provided for that purpose. Factories, workshops, large stores, etc., should, of course, be well ventilated, but it is particularly necessary that they should be thoroughly aired after working hours. These precautions apply not only to large establishments, but to the smallest concern with one or two employés as well, and every employer should bear in mind that a healthy labourer is of greater value than one who is overworked, underfed, or badly housed. Lastly, employés should not be

Overwork.

overworked. There should be reasonable hours for all, so that the labourer may enjoy the bodily and mental rest which is essential to the preservation of health. The germs of any disease, but particularly those of tuberculosis, will always find a more congenial soil for development in an overworked and enfeebled system. Child-labour—that is to say, the employment of children under fourteen years of age—in factories, workshops, mines, etc., should be prohibited by law. The child is more susceptible to tuberculosis than the adult, especially when its delicate growing organism is subject to continued physical strain.

Child-labour.

CHAPTER XVI

WHAT ARE THE OCCUPATIONS IN WHICH TUBERCULOUS INVALIDS, EVEN IN THE FIRST STAGES OF THE DISEASE, SHOULD NOT BE EMPLOYED?

THERE are certain occupations, especially those that require a long sojourn in the open air every day without too much bodily exertion, which tuberculous invalids in the first stages of the disease may be permitted to follow in their own interest as well as in that of their fellow-men. There are, on the other hand, certain occupations which should never be permitted to consumptives. This is especially applicable to milk-dealers, butchers, cooks, bakers, confectioners, and all who have to do with the preparation or sale of food substances. For bread to be handled by tuberculous bakers or bread-dealers is dangerous. The possibility of infection is evident when one considers through how many hands the bread passes before it enters the mouths of the consumers, and that probably nobody ever thinks of cleaning the bread before eating it. A very recommendable practice is now in vogue in some of the large bakeries in connection with the handling and transporting of bread. The moment the bread comes out of the oven, while it is still too hot to be handled, it is placed, by the aid of a shovel, upon a piece of wrapping-paper large enough to envelop the whole loaf. By twisting the two ends of the wrapper the bread is completely enclosed.

Handling of Food Substances, Bread, etc.

The most scrupulous cleanliness should be practised wherever articles of food are handled or exposed for sale. We have already mentioned in Chapters XIII. and XIV. that certain occupations, such as those of stone-cutters, printers, and cigar-makers, render weak individuals particularly prone to consumption; therefore, anyone inclined to this disease should, in his own interest, never pursue such an occupation.

Lastly, we must mention one more occupation in which tuberculous individuals should never engage—namely, that of keepers of animals in menageries. Large animals, such as lions and tigers, also the larger and smaller classes of apes, are subject

Tuberculosis among Caged Animals.

to tuberculosis when in captivity. There is no doubt that an ape-house, visited by thousands of people, old and young, every day, must be considered dangerous and capable of propagating the germs of tuberculosis among the visitors if some of the animals should be tuberculous.

CHAPTER XVII

WHAT ARE THE MAIN SIGNS AND SYMPTOMS OF THE BEGINNING OF TUBERCULOSIS OF THE LUNGS, OR CONSUMPTION?

THESE symptoms are often so obscure and show themselves so gradually that they are frequently overlooked by the patient as well as by his friends. Since, however, the cure of the patient depends upon the early discovery of the disease and a timely treatment, we will here describe such symptoms as may be recognised by the layman.

Importance of Early Detection of Consumption.

The man, woman, or child with a hereditary predisposition to consumption often has a narrow chest and stooping shoulders. While a slow, gradual emaciation and loss of weight may at times be observed, this is by no means a rule. One occasionally sees tuberculous patients who present a relatively good appearance during the first stage of the disease. Paleness of the skin, at times with bright red cheeks, is, however, a rather common early sign. A marked inclination to frequent catarrh is often present, and the character and disposition of the individual may change when the disease comes to an outbreak. There is a dislike to work, also to the pleasures and occupations which the invalid formerly loved to pursue. He will probably also complain of getting tired easily. In the afternoon hours he will have a light fever, and a hacking cough in the morning or evening. Dyspepsia and loss of appetite, palpitation of the heart, and pains in the chest, are also symptoms of importance. Of course, some or several of these signs and symptoms may also be the indication of the approach of other diseases than tuberculosis of the lungs. The presence of such symptoms should, however, serve to all, whether predisposed to tuberculosis or not, as a warning to seek

medical advice. Especially persons who cough more or less continually should submit themselves to a thorough examination. The science of medicine has made such progress that the recognition of a beginning tuberculosis of the lungs no longer presents any difficulty; therefore, whenever there is a suspicion of the beginning of consumption, the calling in of a physician may assure cure and restoration to health, and if no tuberculosis be present the medical examination will quiet unnecessary fears.

CHAPTER XVIII

WHAT ARE THE EARLY SYMPTOMS OF OTHER FORMS OF TUBERCULOSIS?

Early Symptoms of Throat Tuberculosis.

In case of tuberculosis of the throat, the general symptoms are about the same as those just described for the beginning of consumption of the lungs, but in addition there will be a certain hoarseness and roughness of the voice. Pain in swallowing very hot and cold liquids or hard food may also sometimes be observed in the early stage of this disease.

The early symptoms of tuberculosis of the bones and joints manifest themselves in lameness and easy tiring of the arm or leg affected. A light pressure in the region of the joints causes a sudden severe pain. If the spinal column is affected, the symptoms will depend upon the location of the vertebra which is attacked by the disease. For example, if this should be in the region of the neck, there will be difficulty in swallowing, in breathing, or a frequent dry cough. If any one of the vertebræ in the region of the chest is affected, a feeling of constriction like a tight band around the chest will be observed, accompanied often by digestive troubles. If the seat of the disease is the lower portion of the spinal column, there will be irritation of the bladder and lower bowels, an inclination to much urinating, and radiating pains toward the hips.

It is, of course, self-understood that when any of these symptoms are discovered the physician should be called in, for

only through the most careful treatment can a patient be saved from a lasting deformity.

Early Signs of Scrofula.

The bone-and-joint tuberculosis is most frequent during childhood. The same may be said of that form of tuberculosis which is known as scrofula, and which might be considered almost exclusively a disease of children. The scrofulous child is usually pale, with flabby skin and muscles. The glands around the neck are swollen, and skin disease, sore eyes, and running ears are frequent symptoms. The little patient usually manifests a phlegmatic condition, but we may also find some that are nervous and irritable. The latter often have a particularly white, delicate skin, which makes the veins visible. Fever may be observed in some children. In view of the happily very curable nature of scrofulous affections, the importance of the early recognition and of the timely and judicious treatment is, of course, self-evident.

CHAPTER XIX

HOW CAN CHILDREN BE PROTECTED FROM SCROFULA AND OTHER FORMS OF TUBERCULOSIS?

Hereditary Causes of Scrofula.

Scrofula may be either hereditary or acquired. The hereditary type comes from parents who are scrofulous, tuberculous, or syphilitic. It has also been proved that when one or both of the parents were alcoholics—that is to say, addicted to the chronic use of intoxicants—their offspring has become scrofulous.

All this shows how dangerous it is for weakly and sickly persons, or those afflicted with any of the above enumerated diseases, to marry and have children before being completely restored to health. We wish to state again that all these diseases can be cured by timely medical treatment. To be cured from alcoholism the physician's help is not always necessary; in most cases it requires only the earnest and honest endeavour to abstain.

Acquired Causes of Scrofula.

The causes of acquired scrofula in children are to be sought in unhygienic environments and conditions, such as unhealthy dwellings, damp, crowded, unclean, and badly-ventilated rooms,

much indoor life, underfeeding, exposure, and colds brought about by insufficient clothing and lack of care. In fact, one may say the same conditions which produce favourable soil for the invasion of the germs of consumption in the adult are conducive to the development of scrofula in children. How these conditions are to be overcome we have endeavoured to explain in Chapters XII., XIV., and XV., and we will speak of them in their sociological aspect in Chapter XXVIII.

On page 41 we stated that it is extremely rare for tuberculosis to be directly transmitted, and that in children the contagion nearly always takes place while they are very young. We will now explain the various ways in which a healthy child may become tuberculous, and learn therefrom how to protect it from the danger of getting the disease, either by inhalation, ingestion, or inoculation.

Tuberculous Infection during Early Childhood.

The most common modes of infection during early childhood are perhaps the following: The consumptive mother caresses the child and kisses it on the mouth; she prepares the food, tasting it to judge its temperature and flavour through the same rubber nipple or with the same spoon the child uses, and thus unconsciously conveys the germs of her disease from her own mouth to that of the child. Later on the child will play on the floor of the room, and should there be a consumptive in the family who, from carelessness or ignorance, is not prudent in the disposal of his expectoration, the child is indeed likely to be infected. The little one, while playing on the floor, may with great facility inhale the bacilli floating with the dust in the air, and can thus acquire tuberculosis by inhalation, the full development of which may only take place in later years, when the origin will not be thought of. Again, the little child touches everything it can take hold of, infecting its fingers thoroughly, and by putting them in its mouth tuberculosis by ingestion may result, and gradually develop into consumption of the bowels. Lastly, should the child's nails be neglected, it may scratch itself with the infected fingers, and thus inoculate its system with the disease. Tuberculosis of the skin, or lupus, may result from such an unfortunate accident.

To prevent these infections during childhood is certainly

possible by taking the following precautions: Not only should consumptives be religiously careful with their expectoration, but they should associate as little as possible with young children, and stay away from playrooms and playgrounds. We repeat that to kiss children on the mouth should never be allowed, and the little ones should be taught never to kiss nor be kissed by strangers. They should be kissed by their own friends and relatives as little as possible, and then only on the cheeks. The floor on which the child plays should be kept scrupulously clean. Carpets in such a place are an abomination; they only serve as dust and dirt collectors, and not infrequently harbour the germs of contagious diseases. The hands and nails of little children should be kept as clean as possible.

Kissing Unsanitary.

Clean Playgrounds.

Expectorating on playgrounds should be considered a grave offence, and should be punished accordingly. These playgrounds should be kept clean, as free from dust as possible, and daily strewn with clean sand or gravel.

CHAPTER XX

CAN TUBERCULOSIS, ESPECIALLY IN ITS PULMONARY FORM, OR CONSUMPTION OF THE LUNGS, BE CURED?

Celebrated Men who were Cured of Consumption.

THIS question can be answered with a very decided 'Yes.' Of eminent men of the past and present who in their youth or early manhood were declared to be consumptive, but who attained, nevertheless, a more or less advanced age, may be mentioned the German poet Goethe, Napoleon I., and our own Peter Cooper. Dr. Hermann Brehmer, one of the foremost German physicians, was a consumptive when he started the first sanatorium for tuberculous patients in 1859, over which he presided for more than thirty years with great success. His most celebrated pupil, Dr. Dettweiler, entered his sanatorium as a consumptive, became Brehmer's assistant, and has since been for twenty-five years active as the medical director of the Falkenstein Sanatorium. The late Dr. Péan, of Paris, who died at the age of sixty-five, was declared phthisical when twenty.

Francis Coppée, one of the greatest poets of modern France, takes delight in telling that more than twenty years ago a life insurance company refused to insure him because he was declared consumptive, and how badly the company ought to feel now, having lost his premiums for over twenty years! There are thousands of such cases where people, once declared consumptive by competent physicians, have ultimately recovered, and pursued their vocations in life with unimpaired vigour for many years afterward.

Results Obtained in Sanatoria.

The statistics from sanatoria for consumptives, where patients in all stages of the disease are received, show that 25 per cent. leave as absolutely cured, and 40 to 50 per cent. leave much improved, many of them being again capable of earning their living. In institutions where only patients in the early stages of the disease are received, as many as 70 to 75 per cent. have been cured.

CHAPTER XXI

HAVE THE FORMER PATIENTS WHO LEFT SANATORIA OR SPECIAL INSTITUTIONS FOR THE TREATMENT OF CONSUMPTION AS CURED REMAINED LASTINGLY SO?

That a lasting cure of consumption is possible we have shown in the preceding chapter by enumerating the names of some great men who were consumptive in their youth, but were cured, and lived a long and useful life, some even attaining a ripe old age.

Reports from Dettweiler, Wolff, Hauffe, Von Ruck, and Baldwin.

Concerning the duration of cures accomplished in sanatoria and special hospitals for consumptives, we will reproduce some of the statistics published in recent years. Among 99 patients discharged from the Falkenstein Sanatorium as cured, 72 were well at the time the inquiry was made, which was three to nine years after the patients had left the sanatorium. In 15 cases a relapse had occurred, but 12 of these patients had improved again; 12 of the 99 had died. Dr. Wolff's inquiries concerning 95 patients discharged as cured from Brehmer's institution in Goerbersdorf, resulted in the following: 5 were alive and well

after a period of from 21 to 29 years; 52 were well after a period of from 12 to 21 years; and 38 were well after a period of from 7 to 12 years. Dr. Hauffe, of the St. Blasien Sanatorium in Germany, wrote in 1891 to 324 former patients who had left the institution between 1879 and 1889. Forty-six did not reply, 5 were reported dead, 12 had grown worse, 201 thought themselves still relatively cured, and 72 were absolutely cured. Dr. von Ruck, of Asheville, N.C., reported to the author of this essay that he had written to 650 of his former patients who had left the sanatorium from one to three years before; 457 responded, directly or through friends. Of these, 67 felt absolutely cured, 70 felt relatively cured, 258 felt still improved, 62 got worse or had died. Dr. E. R. Baldwin, of Saranac Lake, N.Y., reported recently that at the Adirondack Cottage Sanatorium they were in constant correspondence with 115 patients who had been discharged within the last ten or twelve years, and while a few had relapsed slightly, the majority were well at their homes. Of course, these reports do not, and cannot, correspond exactly. With the exception of the last-named institution (Adirondack Cottage Sanatorium), which only takes patients in the earlier stages, those sanatoria receive patients for treatment in all stages of the disease. But, as a whole, these statistics are certainly encouraging, and the question, 'Can consumption be lastingly cured?' may also be answered with a decided 'Yes.'

Pathologic Proofs of the Curability of Consumption.

Not only the living but even the dead give us absolute proof of the curability of tuberculosis of the lungs. In the autopsies (post-mortem examinations) of many individuals who have died of other diseases than consumption, healed scars are found in the lungs, giving the visible evidence of a healed tuberculosis. Statistics concerning this occurrence show that the number of cases of healed tuberculosis of the lungs, discovered at autopsies, is nearly 25 per cent.

Other Forms of Tuberculosis also Curable.

Other forms of tuberculosis are also curable, particularly the forms which manifest themselves as scrofula, or diseases of the bones or joints in children. The results which have been obtained in sea-coast sanatoria and special hospitals, of which a number exist in France, Germany, Holland, and Italy, are well-nigh surprising. According to a recent report of the general

secretary of the Society for the Creation of Sea-Coast Sanatoria for Scrofulous and Tuberculous Children in Germany, no less than 50 per cent. of these little ones leave those institutions perfectly cured.

We do not think it an exaggeration to say that of all chronic diseases tuberculosis is the most curable, and, of late years, the most frequently cured. After these glad tidings concerning the curability of tuberculosis in general, and particularly of the once so very much feared tuberculosis of the lungs, or consumption, let us ask *how* consumption is treated and cured.

CHAPTER XXII

WHAT ARE THE MODERN METHODS TO TREAT AND CURE CONSUMPTION?

It is not cured by quacks, by patent medicines, nostrums, or other secret remedies, but solely and exclusively by scientific and judicious use of fresh air, sunshine, water, abundant and good food (milk, eggs, meat, vegetables, fruit), and the help of certain medicinal substances when the just-mentioned hygienic and dietetic means do not suffice in themselves to combat the disease.

The thorough and constant supervision of the pulmonary invalid, the immediate intervention when new symptoms manifest themselves, or old ones become aggravated or do not disappear rapidly enough, the prescribing of proper food and drink, can only be done by the thoroughly trained physician. Therefore, here let us sound a note of warning—namely, that not the most beautiful climate nor the most delightful resort can cure the consumptive patient if he is not wisely guided in his treatment.

Sometimes this class of patients think that they feel well enough no longer to need to submit themselves to the control of their physician. They think that they may safely pursue pleasures, sometimes even excesses, or take up work just as well as healthy people. Such carelessness on the part of a

recovering consumptive has many a time resulted in a serious relapse.

Strict Medical Supervision Essential to Cure.

The thorough belief in the curability of pulmonary tuberculosis, and the conviction that the hygienic and dietetic treatment under constant medical supervision could be most successfully carried out in an institution exclusively intended for that purpose, caused Hermann Brehmer, the German physician mentioned above among the illustrious men cured of consumption, to establish the first sanatorium for consumptives, at Goerbersdorf in Silesia (1859), although it must be said, in justice to the English medical world, that special hospitals for consumptives were erected in or near large cities as far back as sixty years ago. These 'special hospitals' for consumptives in former years did not differ much from general ones, while a sanatorium for consumptives has many features by which it differs entirely from a hospital. Brehmer, in his day, maintained that such institutions should have particular climatic conditions, and should always be situated at a considerable elevation above the sea, in order to obtain satisfactory results. The experience of more recent years, however, in Europe as well as in the United States, has shown that properly-conducted sanatoria, or modern special hospitals, erected in regions with no claims for special climatic advantages, obtained just as good results in the end as institutions situated in typical climatic resorts.

Special Climatic Advantages not Essential to Cure.

To give the layman an idea of what is understood to-day by a closed institution or sanatorium, exclusively intended for the treatment of consumptives, we will answer the following questions.

CHAPTER XXIII

WHAT IS A MODERN SANATORIUM FOR CONSUMPTIVES? AND CAN SUCH A SANATORIUM BECOME A DANGER TO THE NEIGHBOURHOOD?

A MODERN sanatorium* for the treatment of consumptives is an institution usually situated in a healthy locality, somewhat

* The word 'sanatorium' is used in this essay in preference to the word 'sanitarium' for the following reasons: Brehmer, the founder of the first

elevated, relatively free from dust and traffic. Only patients suffering from tuberculosis are received. The greatest care is exercised everywhere, in buildings and surroundings, to avoid the possible transmission of the disease to employés, visitors, or the neighbours of the institution, and equally great care is exercised to prevent a reinfection of the patients themselves. All the precautions enumerated in Chapters IV. and V., which provide for the destruction of the infectious expectoration, are carried out with the utmost vigour in the sanatorium. A voluntary violation of rules relating to the disposal of the expectoration is followed by immediate dismissal of the offender.

Hygiene in the Sanatorium.

The hygienic and preventive measures in these modern sanatoria are so thorough that it may be said one is in less danger of becoming infected with the germs of consumption there than anywhere else. It is of the rarest occurrence that any of the physicians, nurses, or employés in such an institution contract tuberculosis. It seems to us that this is a very good proof of how easily infection can be avoided when physician and patient work together to combat the tubercle bacillus, this great foe of mankind.

Mortality Statistics of Goerbersdorf and Falkenstein.

Another very interesting observation is that in localities where sanatoria for consumptives are situated, the mortality from consumption among the inhabitants of the respective villages has markedly decreased since the establishment of the institution. The splendid hygienic and preventive measures instituted in the sanatoria have been voluntarily imitated by the villagers, and as a result the mortality from pulmonary tuberculosis among the inhabitants has gradually decreased. Thus we are glad to be able to answer in the negative the question so important in the combat of tuberculosis as a disease of the masses, 'Are sanatoria for consumptives a danger to the neighbourhood?'

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institution of that kind, called it 'Heilanstalt,' which means a healing institution; and the word 'sanatorium,' from the Latin *sanare*, to heal, gives certainly a better equivalent to the German word than the word 'sanitarium.' This latter word is derived from the Latin *sanitas*, health, and is usually employed in this country to designate a place considered as especially healthy, a favourite resort for convalescent patients, or an institution for the treatment of mental or nervous diseases.

From well-conducted sanatoria for consumptives no danger can arise to the surroundings. To confirm this statement by exact statistics, we will reproduce the data taken from the official documents of the two villages, Goerbersdorf and Falkenstein, where five of the largest German sanatoria have been located for many years.

In Goerbersdorf the deaths from consumption were:

1790-99	 14	1840-49	 6
1800-09	 5	1850-59	 7
1810-19	 9	1860-69	 4
1820-29	 9	1870-79	 5
1830-39	 8	1880-89	 5

The sanatorium in Goerbersdorf was established in 1859, and since then the population of the village of Goerbersdorf has doubled.

In the village of Falkenstein deaths from tuberculosis:

Before the Establishment of the Sanatorium.		After the Establishment of the Sanatorium.	
1856-58	.. 17·2 per 100	1877-79	... 17·0 per 100
1859-61	... 7·7 „	1880-82	... 14·6 „
1862-64	... 22·6 „	1883-85	... 6·0 „
1865-67	... 14·0 „	1886-88	... 5·0 „
1868-70	... 16·7 „	1889-91	... 13·9 „
1871-73	... 21·0 „	1892-94	... 15·1 „
1874-76	... 33·3 „		

Prolonged Rest Cure in the Open Air.

The patients in such a sanatorium live, so to speak, day and night in the open air. During the day they lie on lounging chairs on the open verandas, and take walking and breathing exercises, and at night they sleep, of course, with the windows open. It is surprising how easily consumptives get accustomed to the prolonged sojourn in the open air. Neither change of weather—cold, rain, snow, nor even wind, providing it is not too strong—hinders the patients from spending most of their time on the piazza, porch, or rest-cure gallery. Observations made by the house physicians in sanatoria prove that the change of weather has little influence on the trained consumptive patient, and that the rest-cure on the galleries of the sanatorium can be

FIG. 19.—ROSTREVOR SANATORIUM, CO. DOWN, IRELAND.

successfully carried out in winter or summer, rain or shine. When it is very cold patients cover themselves a little more with blankets or furs. Dr. Andvord, of the Tonsaasen Sanatorium, reported that his patients remained in the open air from five to nine hours a day at a temperature of 13° F. below zero, and felt very well. Similar reports come to us from that excellent American institution, the Adirondack Cottage Sanatorium, under

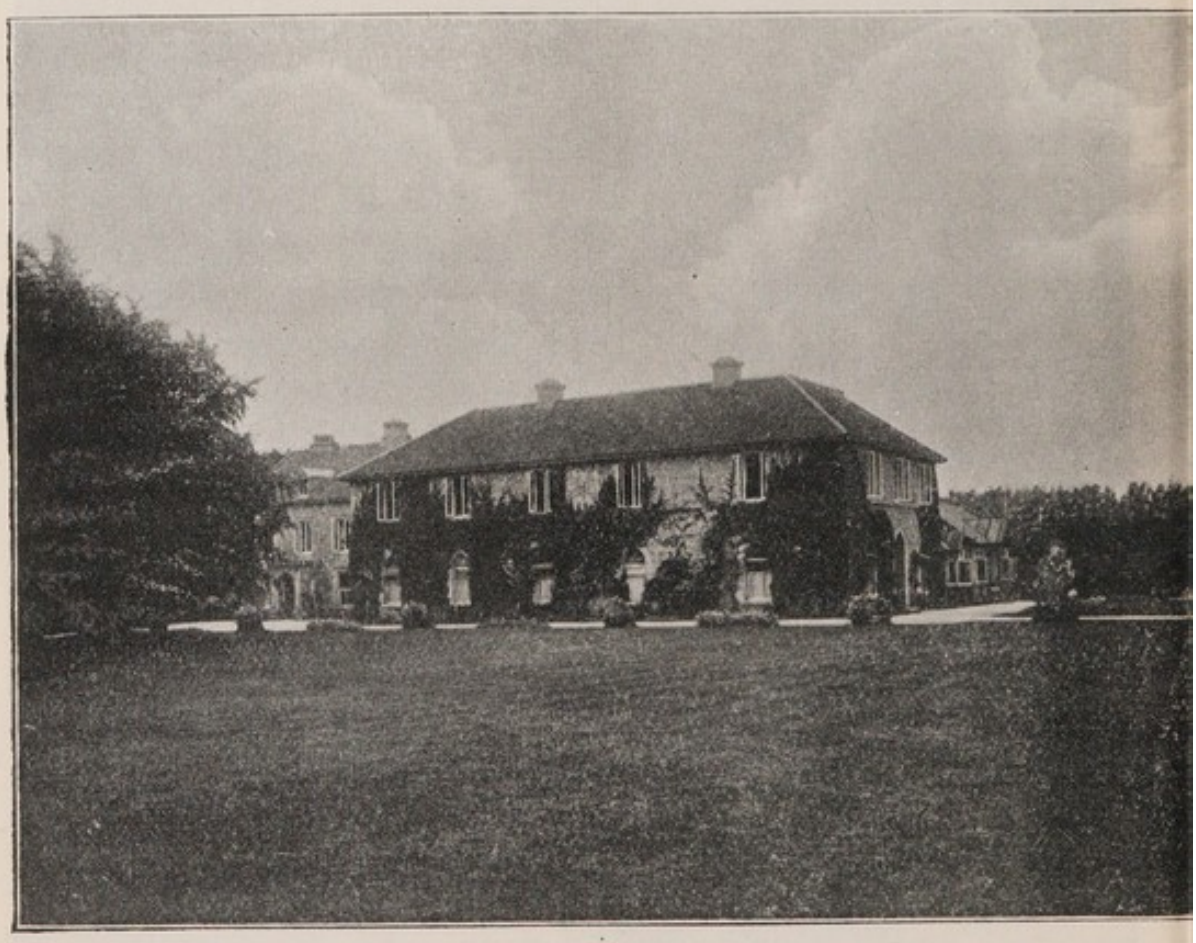

Fig. 20.—Nordrach-on-Mendip (Main Block), Blagdon, near Bristol.

the direction of Dr. Edward L. Trudeau, the pioneer of the sanatorium treatment in the United States. We reproduce a photograph (Fig. 21) taken on a winter day at that institution, showing how well and comfortable the patients are in spite of the cold. We also give a typical German rest-cure gallery or 'Liegehalle' (Fig. 22). One must not think these institutions dreary and cheerless places. The majority of the patients do well, as a rule, and progress favourably toward recovery. As a

FIG. 21.—ADIRONDACK COTTAGE SANATORIUM.

consequence they feel happy, and impart their joy and good-humour to the rest, thus helping to keep all the patients in good cheer.

Discipline. The discipline in these institutions deserves by no means to be considered an objectionable feature. Discipline in a sanatorium for consumptives is as essential in the interest of the patient as for everybody else. The rules and regulations of the institution are for the common good. The physicians and nurses have, as a rule, the patience, forbearance, and devotion

FIG. 22.—A GERMAN REST-CURE GALLERY.

which their calling requires; but when it is necessary in the interest of the patients and their environments, the physician must have the right to make his authority felt. A sanatorium should not only be a place where a patient becomes cured, but also a place where he should learn some lessons for the future. All that he will have learned from the rules and regulations, and the advice of the physician concerning how to protect himself and others from contracting the disease, how not to take cold, and how not to lose what he has gained, are precious lessons which he will take home with him.

The physician of the consumptive, whether in a sanatorium

Fig. 23.—Nordrach-on-Dee, Banchory, Scotland.

Relation of Patient and Physician.

or at home, must be the friend of the patient, and have his unlimited confidence. In all such questions as marriage, sexual relations, and childbirth, the physician's advice should be sought. Much unhappiness and family misfortune can often be avoided by asking and conscientiously obeying the physician's advice. One of the main features of sanatorium treatment is ample nutrition—one might even say overfeeding. The principal meals are usually taken in well-ventilated dining-rooms, the lunches on the piazzas or on the rest-cure galleries. Many patients, in order that they may gain more rapidly in weight and strength, receive an additional quantum of fresh milk daily.

On arriving at the institution every patient is carefully examined and weighed by the physician, and this process is repeated at regular intervals during the entire stay of the patient at the sanatorium. The physician in charge or one of his assistants keeps regular office hours for the convenience of the patients. Those who are unable to be up are visited twice a day by one of the physicians of the institution. Specially constructed rooms for the application of cold water—one of the means of treatment—are usually located in the basement, or the apparatus is installed in a neighbouring building. A pharmacy, a laboratory, and a room for the treatment of throat diseases, usually completes the equipment of a large sanatorium.

To enable the poorer classes to avail themselves of the advantages of institution treatment for consumptives, noble-minded men and women, philanthropists, statesmen, and physicians, have in recent years been instrumental in creating in many parts of Europe and in some parts of the United States so-called State or people's sanatoria (Volksheilanstalten).

CHAPTER XXIV

WHAT ARE STATE SANATORIA? AND WHAT ARE 'VOLKSHEILANSTALTEN' OR PEOPLE'S SANATORIA?

A State sanatorium in the United States means an institution for the exclusive treatment of patients suffering from pulmonary

tuberculosis, created by the funds of the State and supported entirely or in part by the State. The first State sanatorium in America was erected a few years ago near Rutland, Mass. In this institution patients pay fifty cents per day. Recently other States, New York, New Jersey, Iowa, Illinois, Maine, etc., have projected the building of similar institutions.

People's sanatoria in the United States are institutions intended for the poor and people in moderate circumstances, erected and maintained by private philanthropy. While in some institutions patients receive medical treatment and board gratuitously, in others they are supposed to pay part of the expense.

People's sanatoria in Germany have a somewhat different meaning. There, the moment an individual enters upon the career of an ordinary labourer or servant, he is obliged to be insured against sickness, accidents, and old age. If he develops tuberculosis, he is immediately sent to one of the many sanatoria of that country. The Government authorities, who are at the head of these State insurance companies, have long since learned that by timely treatment in a sanatorium the tuberculous individual is most speedily and lastingly cured, and consequently with the least expense.

State Insurance of Consumptives.

Thirty-seven of these Government insurance companies have, according to their published figures for 1897, collectively assisted 4,480 consumptives, of whom 4,432 were sent to subsidized sanatoria. Nearly all these State insurance companies contribute to the funds of such establishments; some have found it to their advantage to erect special sanatoria of their own. For the year 1897 these State insurance societies of Germany invested altogether 1,300,000 marks in sanatoria for consumptives, and in 1898 a fund of between three and four millions was destined for that purpose.

Urgent Need of State and People's Sanatoria.

In England the movement has aroused widespread public interest, and already London, Liverpool, and several 'county' sanatoria owe their existence to public subscription. Conspicuous among these latter stands the munificent gift of £200,000 placed by Sir E. Cassel at the disposal of His Majesty the King, who wisely apportioned it for public sanatoria needs.

While it is most gratifying to note that some countries have

undertaken to care for their consumptive poor, and while noble men and women have privately undertaken to care for some of those unfortunate sufferers, there is yet a great deal to be done. In view of the great number of consumptives with little or no means in our thickly populated districts, it is evident that the existing institutions are like a 'drop of relief in an ocean of woe.'

CHAPTER XXV

WHAT EVIDENCE EXISTS THAT BY TAKING CARE OF CONSUMPTIVES IN SPECIAL INSTITUTIONS, AND BY HYGIENIC MEASURES, TUBERCULOSIS AS A DISEASE OF THE MASSES CAN REALLY BE SUCCESSFULLY COMBATED?

In England there have existed special institutions for the treatment of consumptives, that is to say, hospitals and sea-coast sanatoria, in relatively large numbers, for over fifty years. As a result of the maintenance of these institutions and the enforcement of a most excellent general public hygiene, it was possible to reduce the mortality from tuberculosis during the last years in a most surprising manner, and more rapidly than in any other country of the world. According to the following statistics, compiled by Dr. Tatham, the statistical superintendent in the Registrar-General's office, the mortality from tuberculosis among the population of England and Wales has been reduced to well-nigh half of that which it was thirty years ago.

The death-rate per million of the population of England and Wales from pulmonary tuberculosis was in—

1870	2,410	1893	1,468
1875	2,202	1894	1,385
1880	1,869	1895	1,398
1885	1,770	1896	1,307
1890	1,682		

These figures are perhaps the best answer to the question asked at the head of this chapter.

CHAPTER XXVI

CAN THE TREATMENT OF CONSUMPTION BE CARRIED OUT WITH SATISFACTORY RESULTS OUTSIDE OF AN INSTITUTION?

This question, too, may be answered in the affirmative, for the cure of a consumptive patient is certainly also possible outside of a sanatorium. The conditions essential to success in such a case are that the social position of the patient and the general environments are such that all the hygienic and dietetic measures so essential in the modern treatment of consumption are at the

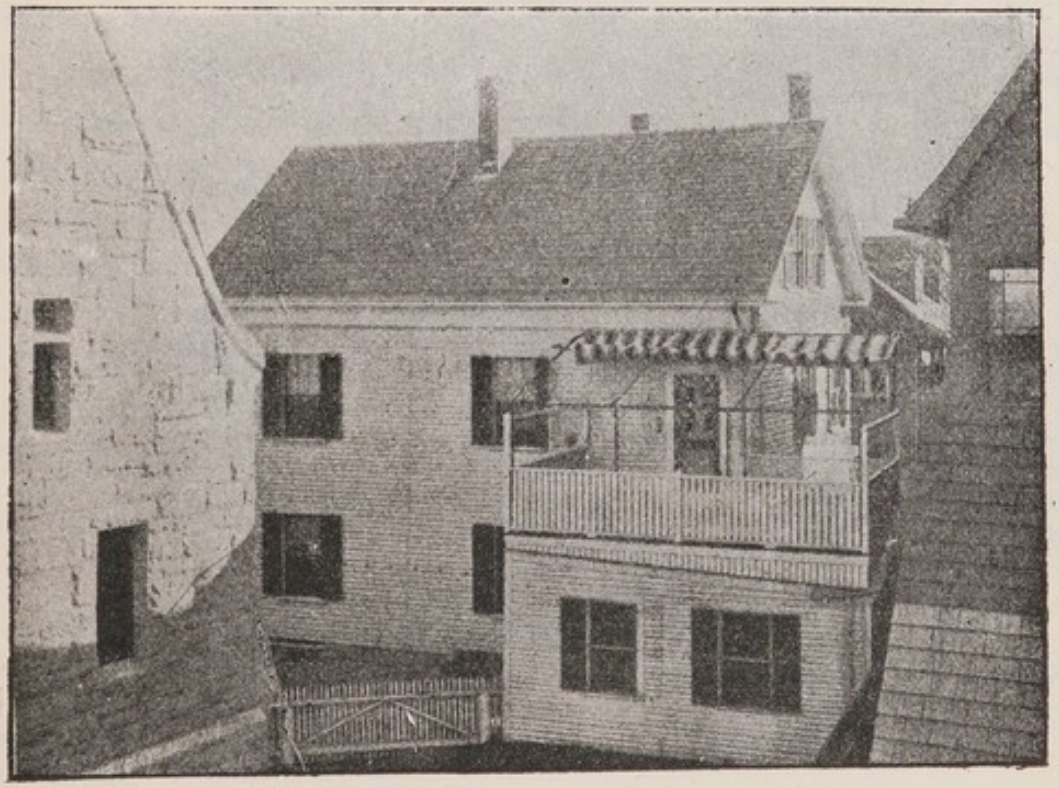

Fig. 24.—Arrangement for Open-Air Treatment at Home.

disposal of the physician. The latter, however, though he may be well trained and exceedingly skilful, cannot hope for success unless the patient is obedient and willing to carry out every detail of the treatment.

Sanatorium at Home.

We give here an illustration (Fig. 24) of how the patient in his own house may arrange for permanent open-air treatment by building a small addition with galleries and awnings where he can spend the greater part of the day, and where in warmer

weather he may sleep at night. Another simple method for carrying out the rest cure in the open air might be accomplished in the following manner: A large beach chair of wicker-work, such as is seen at our fashionable seaside resorts, is procured. After the seat has been removed the inner walls are lined with padding. A reclining chair is placed with its back in the interior, and the whole arranged so that the patient is protected from the

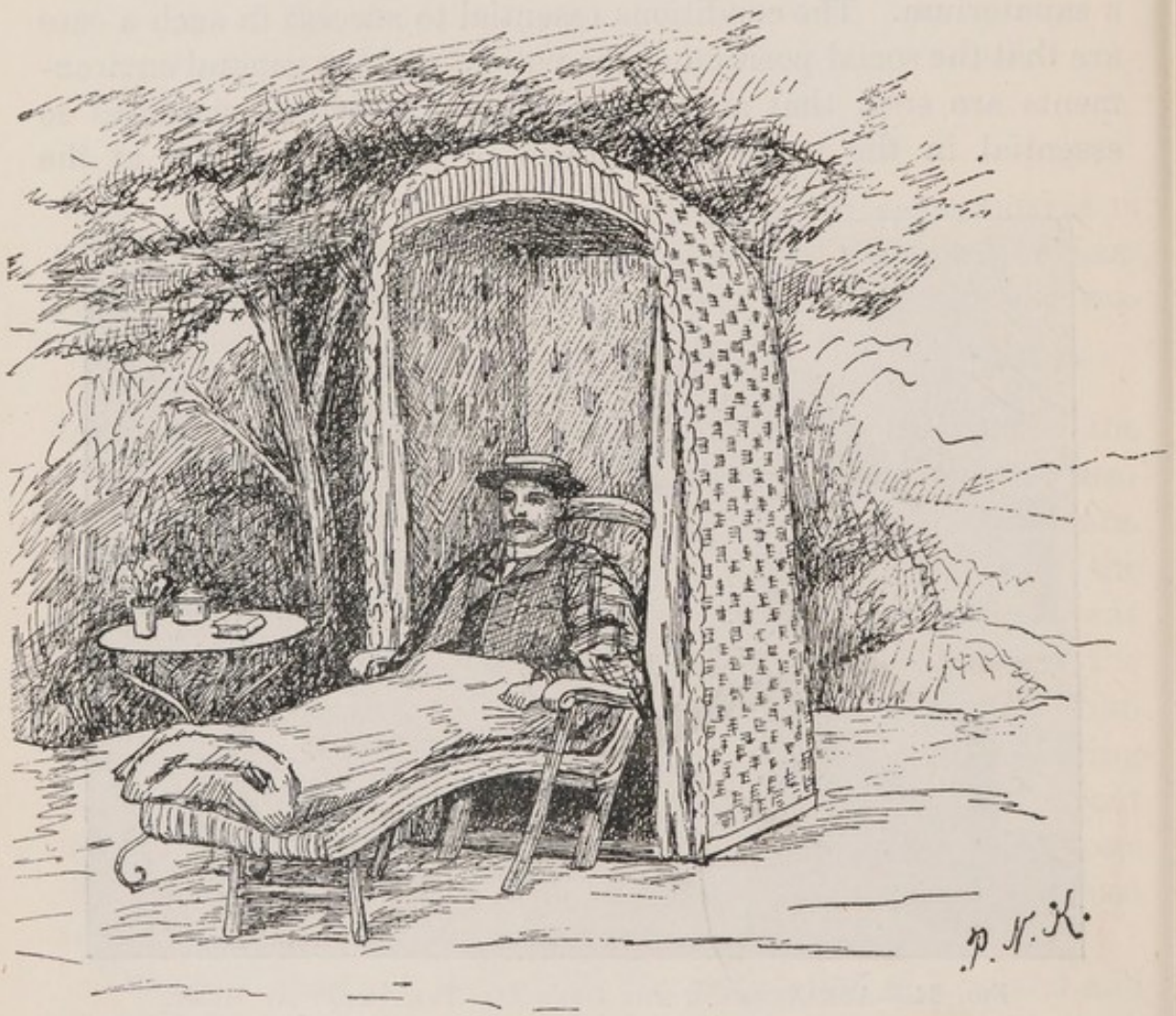

FIG. 25.—REST CURE AT HOME.

wind and sun. There the patient instals himself for the day, with his books and writing materials at his side, placed on a little table, on which his meals may also be served. Being light, the whole can be shifted whenever the wind changes and according to the different time of day, so that the invalid's body may be bathed by the rays of the sun, while his head remains in the shade (Fig. 25).

Poorer patients, who for financial reasons cannot have such conveniences and who cannot be received in a sanatorium, must be advised to ask the help of a physician, and under his guidance imitate as far as possible and practicable the sanatorium instalment and treatment at home. During the day the lounge or reclining chair should be moved near the open window if there is no porch or balcony. In summer, or on not too cold or windy days in winter, the patient may be placed, warmly wrapped, on his chair on the flat roof, protecting his head from the sun by an umbrella or a small improvised tent. If there is a yard or garden, a small platform of boards may be arranged for the chair in a spot sheltered from the wind. A plain steamer chair, padded with a quilt or blanket, will answer the purpose just as well as a costly reclining chair. How to arrange for the cold-water treatment at home we have already described on p. 34.

The hygienic precautions concerning the expectoration must, of course, be carried out in the private home as rigorously as in the institution. Thus, if the patient has an earnest determination to do his duty, confidence in his physician, and the goodwill of the friends and relatives who live with him, it is possible to make even a modest home temporarily suitable for the sanatorium treatment.

CHAPTER XXVII

WHAT CAN PHILANTHROPISTS AND OTHER MEN AND WOMEN OF GOODWILL DO TO HELP COMBAT TUBERCULOSIS AS A DISEASE OF THE MASSES?

In Chapter XXIV. we have spoken of the most urgent need of sanatoria for the consumptive poor. These institutions are particularly wanted in large centres of population. In nearly all of our large cities there are thousands of poor consumptives living without care or treatment in their dark, filthy tenement houses, and spreading their disease to their kin and neighbours. Perhaps not one of all our great cities at the present time can offer sufficient hospital facilities for the treatment or isolation of these unfortunate people. A very large percentage of these

patients could be cured or restored to health and made bread-winners of their families if they were taken away from their unhygienic surroundings in time and received proper treatment in a sanatorium.

What great good wealth may do in this respect, how much misery and suffering it may allieviate, and how many lives it may thus save, needs hardly any further demonstration.

Need of Sanatoria for Children.

But besides the sufferers from pulmonary tuberculosis, there is a large class of sufferers, especially among the children of the poorer classes, who are afflicted with other forms of tuberculous disease, particularly scrofula, and joint-and-bone tuberculosis. How very prevalent these scrofulous and tuberculous diseases are among children people in general have scarcely an idea. In Berlin, Germany, careful statistics are kept concerning the daily attendance of the children at the public schools. In one of them it was found that out of 125 boys and 132 girls who did not attend school regularly, not less than 114 of the former and 115 of the latter suffered from tuberculous or scrofulous troubles.

We have already spoken on p. 52 of the excellent result obtained in the treatment of tuberculous and scrofulous children in the sea-coast sanatoria of France, Germany, Holland, and Italy. The climate at the seashore, in addition to good nutrition and cold and warm sea-baths, seems to be particularly favourable for the cure of scrofula and tuberculosis in children. Institutions for this treatment, like sanatoria for consumptive adults, are important factors in combating tuberculosis as a disease of the masses. The creation of such institutions in our own country cannot be too warmly recommended to those who wish to help suffering little children.

The cure of tuberculosis in its various forms can be accomplished only by a thorough hygienic and dietetic treatment under strict medical supervision, in sanatoria, or, if circumstances permit, at the home of the patient.

General Causes of Tuberculous Diseases.

The prevention of tuberculosis as a disease of the masses, on the other hand, especially in the form of pulmonary tuberculosis or consumption, must be sought in combating the causes. In ignorance, lack of light, air, and sun, unhealthy tenements, unclean linen, lack of proper or sufficient food, excesses of all

kinds, and, above all, in the abuse of alcoholic beverages, must we recognise to-day the most important factors in the propagation of the disease.

To combat the ignorance in regard to hygienic modes of life in general, and the hygiene of tuberculosis in particular, among the masses must be the duty of the educated. Physicians, teachers, employers, and all men and women who have time, means, talent, and inclination, should unite to educate the masses by lectures and the distribution of pamphlets concerning the nature of diseases, particularly tuberculosis. The State and municipal governments, boards of health, or other sanitary authorities should not only favour these useful enterprises, but gladly co-operate in order to increase their usefulness.

To give to the poor people of large cities more air, light, and sun, it is essential not only to provide good sanitary dwellings, of which we shall speak in detail in the next chapter, but also to create a number of parks and playgrounds, by public means or private philanthropy, particularly in the more densely populated districts. Such parks and breathing-places are justly called the lungs of a great city.

Cleanliness and the beneficent influence of a bath must be practically taught to the ignorant. While it would be desirable that every family should have its own bath-room, it will be some time yet before this ideal condition will be obtained. In the meantime the establishment of a number of public baths, of which we made mention on p. 43 in speaking of labour colonies, will be one of the best means to improve the condition of the poor in this respect and render them less liable to disease.

Public Baths.

The causes of insufficient and bad nutrition, while they have often to be sought in the economical and social condition of the community, which we cannot discuss here, are just as, and perhaps more, frequently to be found in ignorance and inexperience. To make a good, plain, healthy, and tasty meal with relatively little expense is an art which must be taught to the young wife, leaving the factory or the position in the store to enter upon the duties of a housewife. Here is a field for noble-minded and experienced women who have made the art of cooking a study. By imparting their experience to their less

Some Causes of Bad Nutrition.

fortunate sisters, they will make a new household lastingly happy.

Of course, the establishment of public eating-houses, where especially the unmarried people of the working classes can obtain good and plain meals for a nominal price, is also a necessity. In connection with the subject of malnutrition, we wish to say one more word concerning poor school-children, especially in large cities. The majority of them very rarely go home for luncheon, and the provisions they bring along from home are often of the most meagre kind. In some cities of Germany the experiment has been made to provide these poor children with a lunch of good meat sandwiches and a glass of milk. The result of this most praiseworthy work among children badly fed at home has been simply surprising. Nearly every one of them gained in weight within a month's time, and all of them were certainly made happier and capable of doing better work at school.

Alcoholism and Tuberculosis.

Now one more word concerning alcoholism and drunkenness. There is no doubt that alcoholism must be considered the greatest enemy of the welfare of a nation, the most frequent destroyer of family happiness, the ruination of mind, body, and soul, and certainly the most active co-operator of the deadly tubercle bacillus or germ of tuberculosis (consumption).

To combat alcoholism (drunkenness or intemperance) requires above all education. Extreme prosecution and fanatical laws will do little good. From early childhood the dangers of intemperance and its fearful consequences should be taught. In schools and at home the drunkard should be pictured as the most unhappy of all mortals. While the very moderate use of feebly alcoholic drinks, such as light beers, may be considered as harmless to adults when taken with their meals, alcohol should never be given to children even in the smallest quantities.

In families in which there is a fear of hereditary transmission of the desire for strong drink, even the mildest alcoholic drinks should be absolutely avoided. It would also be best if all people so predisposed, or who may have acquired only the occasional desire for drink, should never smoke, for experience has taught

that attacks of dipsomania (periodical sprees) are often caused by an excessive use of tobacco. The young man starting out in life should take with him the moral training which will enable him to be a gentleman, and be considered a polite gentleman, though he absolutely refuses ever to enter a liquor saloon in order to treat or be treated to drink. It is this treating habit—alas! so prevalent everywhere—which has ruined many a young man and made him a moral and physical wreck. The creation of tea and coffee-houses where warm, non-alcoholic drinks, including bouillon, are sold in winter and cool ones in summer, are to be encouraged. It would be of additional advantage if some of these houses could also offer healthful amusements for old and young. Temperance societies, which through intelligent propaganda help to combat the fearful evil of alcoholism, should receive encouragement from everybody.

CHAPTER XXVIII

HOW MIGHT THE TUBERCULOSIS PROBLEM BE SOLVED BY JUDICIOUS LEGISLATION AND A COMBINATION OF PUBLIC AND PRIVATE PHILANTHROPY?

JUST as there exists in nearly all States or municipalities a commission or a number of special examiners for the purpose of determining who is a proper subject for State care in an asylum for the insane, so should there exist a commission for the determination of admission to a municipal or State institution for consumptives. Such a commission, composed of a certain number of general practitioners and health officers, should be aided in its work by the charity organizations. Each case should be investigated by a combined committee of physicians and laymen for the following purposes:

1. To determine the applicant's condition by a medical examination.

2. To visit his home if he has been found tuberculous, and to institute such hygienic measures as seem necessary (distribution

of pocket spittoons, disinfectants, etc., gratuitously, if the patient is poor).

3. To examine the other members of the family in order to find out if any of them have also contracted the disease, and if so, to counsel proper treatment.

4. To report in full to the sanitary authorities concerning the condition of the patient's dwelling. Its renovation or even destruction may be imperative when it is evident that tuberculosis has become 'endemic' there, owing to the condition of the soil or to other sanitary defects.

5. To determine the financial condition, whether the patient is or is not able to pay, and whether or not by his being taken to an institution the family will become destitute.

If the latter should be the case, it would be necessary for the municipality to provide for the family. In many cases a letter of inquiry, sent to the former medical attendant of the patient, would materially aid the work of the investigation committee.

Any individual should have the right to present himself for examination, and every physician should be at libery to recommend any person for examination to the board of his precinct or district.

The institutions needed to carry out this plan would be:

1. A centrally located reception hospital and dispensary. The dispensary should treat the ambulant tuberculous patients, whose admission into the sanatorium is impracticable, or has to be delayed for want of room. These dispensaries should also serve the patient discharged from the sanatorium as a place to seek counsel, and thus aid in his continued improvement and guard against the possibility of a relapse.

2. One or several city sanatoria located in the outskirts, and, if possible, in a somewhat elevated region, where the atmosphere is known to be pure. Here all patients should pass through a preparatory sojourn before being sent to the mountain sanatorium. The more advanced cases would all be retained here.

3. One or several mountain sanatoria at no greater distance from the city than from three to five hours by rail, at an

altitude, if possible, of between 1,000 and 2,000 feet, on porous ground, with southern exposure, as nearly as possible protected from the coldest winds by higher mountains, and preferably surrounded by a pine forest. A farm in the vicinity, where the thoroughly convalescent patients could do light work, might make the institution in a measure self-supporting. To this place the selected incipient and the improved cases from the city sanatorium should be sent to complete their cure. To the mountain sanatorium there should also be attached a department for children suffering from pulmonary tuberculosis.

4. Several seaside sanatoria for the treatment of children afflicted with tuberculous diseases of the joints and other tuberculous (scrofulous) manifestations.

5. A maternity sanatorium where tuberculous mothers should be received a few months previous to their confinement, and surrounded by the best hygienic and dietetic care. They should also remain in the sanatorium for some time after childbirth. It is only by taking away these mothers from their unsanitary tenement homes, and placing them under constant medical supervision in such an institution, some time before and after their confinement, that the fearful mortality among tuberculous mothers after childbirth can be reduced.

The beneficial effect on the woman's and child's constitutions through such an arrangement can hardly be over-estimated. Leaving aside the physical well-being thus largely assured to mother and child at a period when their organisms need the most tender care, the hygienic training which the mother will have received in such an institution will be of lasting utility to herself and child, to the family, and to the community.

Maternity Sanatoria.

These maternity sanatoria need not be situated at a great distance from the city. All that would be essential is that they should be erected on good porous ground, preferably somewhat elevated, and in a locality where the atmosphere is as pure as possible. The buildings should be constructed according to the requirements of modern ways of treating women in childbirth, and with ample facilities for rest cures, sun-baths, and the other equipments of a sanatorium for tuberculous invalids.

Tenements and Tuberculosis.

Another important work toward the solution of the tuberculosis problem which might be accomplished by a combination of public and private philanthropy, in addition to legislative measures, is the multiple creation of model tenement houses, particularly in large centres of population. There should everywhere be legislation to make the erection of any but model tenement houses impossible, and the law should at the same time empower the sanitary authorities to inspect all existing tenements, and if there are any which are unfit or unsafe for human habitation owing to lack of air, light, or ventilation, they should be condemned. As has been said before, if a thorough renovation will not make them sanitary, to tear them down will be the only remedy.

Overcrowding in tenement houses should be considered a crime, and the owner should be held responsible for it. A family of from six to ten living in three rooms, of which perhaps only one receives direct light and air, cannot possibly remain in a good state of health for any length of time. It is the dreary and cheerless room of the tenement dwelling which often drives the wage-earner to the saloon. He finds light and life in the saloon, and becomes indifferent to home conditions. Give the working-man a pleasant, clean, healthy, and comfortable home, and the rum-shop will have less attraction for him. He will be a better husband, father, and citizen. The money formerly spent for liquor will go to the butcher and baker for the better nutrition of his family, and underfeeding (another important agent in preparing the field for tuberculous diseases) will be materially lessened.

Overcrowding of Prisons, Asylums, Lodging-houses, etc.

Overcrowded prisons, asylums, almshouses, schools, barracks, public homes, lodging-houses, etc., must also receive the attention of the sanitary authorities. The often crowded and unclean sailors' boarding-houses must not be overlooked. Enough cubic space per individual, more systematic ventilation, and the isolation of tuberculous invalids, are the remedies which must be applied.

Ship-builders, ship-owners, and captains should bear in mind that the intensely crowded quarters to which the average sailor is confined during his hours of rest and sleep are absolutely

detrimental, and even the outdoor life during the hours of work cannot counteract the deleterious influence which the vitiated air of the forecastle exerts on the health of the seaman. Of course, we are aware that the space given to each individual on board ship must be of necessity limited; still, there can be some improvement, and the ventilation can be made more perfect. For the very reason that sailors have to live in crowded quarters the danger of infection on board ship is very great. A tuberculous sailor still at work is almost certain to infect his comrades. But shipboard is not the only place where sailors are exposed to the disease. When on shore they mostly frequent and sleep in houses where the accommodations consist of bunks and straw, and where sanitation is so neglected that they are in still greater danger of contracting disease. To prevent the spread of infection among sailors there is but one remedy, and that is the regular periodic examination of every sailor on board ship, and the exclusion from service of individuals suffering from pulmonary tuberculosis.

Lastly, the physicians, statesmen, and philanthropists interested in the solution of the tuberculosis problem have, besides working for the better housing of the poor and the creation of special institutions for the treatment of consumptives, an additional mission to perform. The tide of emigration from village to city should be reversed. If tuberculosis has made its appearance in a family living in a large city, the physician should exert all his influence to induce especially the younger members to migrate to the country and seek outdoor occupations. Statesmen should protect the interests of the farmer, so that farming will have more attraction to the rising generation than it has had in the last few decades; and philanthropists should aid the statesmen by endowing institutions for instruction in scientific and profitable agriculture, and also by providing healthful amusements, good libraries, and other educational institutions in country districts, thus making living outside of large cities more interesting and attractive to young people; in short, the love of Nature and life in the open air should be more cultivated. In the proportion in which this is done tuberculosis will decrease.

Emigration from City to Country.

Life in the Open Air.

CHAPTER XXIX

CONCLUSION

The author of this essay is aware that much that has been asked in the preceding pages may appear at first too difficult to be realized; nevertheless, he is convinced that by the earnest co-operation of all interested in the solution of the various problems, the task will prove far easier than might be anticipated. In view of the great mortality and fearful ravages of the disease in question, his hopes for a more rigorous crusade against this common foe of all mankind are justified. He is optimistic enough to believe even in an ultimate eradication of the disease.

If any community is visited by an acute contagious disease—small-pox, for example—of which a few people may die, everybody is up in arms, while consumption, a far more prevalent disease, demanding thousands of lives every year, is treated well-nigh with indifference. Yet all who have made the disease a study have for years come to the conclusion that tuberculosis, especially in its pulmonary form, is not only a preventable disease, but one which can in the majority of cases be completely and lastingly cured. It is certainly within the power of man, living in a civilized country, to combat tuberculosis as a disease of the masses most successfully.

All that is required to attain this goal is the combined action of a wise Government, well-trained physicians, and an intelligent people.

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THE END

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