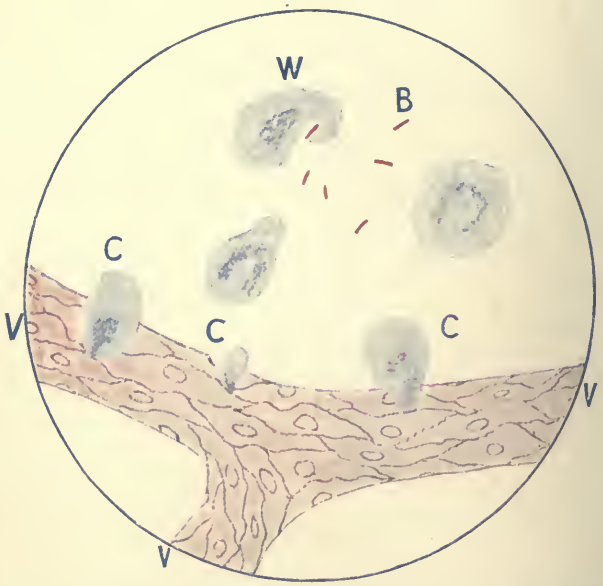
THE BATTLE WITH TUBERCULOSIS AND HOW TO WIN IT

A BOOK FOR THE PATIENT AND HIS FRIENDS

D. MACDOUGALL KING, M.B.

Dr John O. Hunt



Tubercle Bacilli and White Cells (diagrammatic representation by the author. See page 21). *V*, blood-vessel showing individual cells of which its wall is composed; *C*, white cells making their way out of blood-vessel; *B*, tubercle bacilli; *W*, white cell engulfing tubercle bacillus.

THE BATTLE WITH TUBERCULOSIS AND HOW TO WIN IT

A BOOK FOR THE PATIENT AND HIS FRIENDS

BY
D. MACDOUGALL KING, M.B

PHILADELPHIA AND LONDON
J. B. LIPPINCOTT COMPANY

Electrotyped and Printed by J. B. Lippincott Company
At the Washington Square Press, Philadelphia, U. S. A.

GRATEFULLY AND AFFECTIONATELY DEDICATED

TO MY WIFE

AND

TO MY BROTHER

"Hasten then to the end which thou hast before thee, and, throwing away idle hopes, come to thy own aid, if thou carest at all for thyself, while it is in thy power."

—Marcus Aurelius.

INTRODUCTION

DURING a sojourn of eighteen months as a patient at sanatoria in Canada and the United States, and a residence of two years in a health resort, the writer has had opportunity to meet many sufferers from tuberculosis and to come much nearer their secret thoughts, hopes and misgivings than was ever possible during ten years of medical practice previous to his illness. As a result of many conversations, not a few confidences, and witnessing the little comedies and tragedies that ordinarily are enacted behind the scenes of sanatorium life, he is no longer in doubt as to why tuberculosis, which the scientist knows tends kindly towards arrest, is such a fatal disease. He has become increasingly convinced that the great number of deaths occur, not because the disease is terribly virulent, for in most cases it is not, but simply because the majority of patients do not understand, or even begin to comprehend, the significance of the reasons underlying the only treatment that will bring success. And so this little book is written in the hope of setting forth in a simple and interesting, but none the less comprehensive and convincing manner, the fundamental scientific facts which help to answer the patient's constant inquiry—Why must I do this? Here and there similes and metaphors may seem extravagant, but the writer has sought by figure of speech to appeal to the patient, whilst being essentially true to the scientific understanding of the day.

It may not be without interest and encouragement to some readers of this little book to know the writer's personal experience with tuberculosis. The disease in his case has been of the acute variety and manifested itself after an attack of influenza complicated by double pneumonia. It spread rapidly to every lobe of the lungs, on both the right and the left side of the chest, and later attacked the larynx or throat. It enforced a complete confinement to bed for over two years, and at times made thought of recovery seem impossible. But now, just four years since the disease made its appearance, it has become so quiescent as to permit of a limited amount of work, and life would seem to hold for the writer the prospect of years of personal happiness and also of service to his fellow-sufferers.

The author wishes, in conclusion, to express his heartfelt thanks to Dr. G. Walter Holden, Medical Superintendent of the Agnes (Phipps') Memorial Sanatorium, Denver, and to Dr. Henry Sewall, Professor of Medicine of Colorado University, Denver, not only for their criticisms and suggestions, but for the professional guidance and advice which have made possible the writing of this little book. Also, he will ever remember, with grateful appreciation, the kindness, encouragement and advice received during the dark first months of illness from Dr. Roderick Byers, Medical Superintendent of the Laurentian Sanatorium, Ste. Agathe, Canada

D. M. K.

DENVER, COLORADO,
July, 1917.

CONTENTS

PART ONE

PART TWO

ILLUSTRATIONS

THE BATTLE WITH TUBERCULOSIS

PART ONE

CHAPTER I

The Enemy

Of the world's conflicts there is none comparable in magnitude or fatality to the war between the human being and the germ. This conflict has lasted for thousands of years; every man has been a party to it, and every hour of every day the battle is still being waged. On the one side in this conflict is the germ, a powerful enemy whose name is legion, whose battalions are manifold, and whose methods, while entirely offensive, are complicated, deceitful, and cruel. On the other side is man, living, until recent years, in blissful ignorance of the dangers that lurk by the way. Fortunately within the citadel of his being are forces of defence as varied and complicated as those of the invader; forces which, if treated fairly, if shown anything like proper consideration with respect to rest and food, will resist, with ingenious tactics, the hourly invasion of the enemy's hosts. How many persons there are who realize too late that through ignorance they have fatally neglected their forces of resistance and defence!

Perhaps the enemy's greatest advantage is that he is an invisible foe. Lying in the dust, lurking in food, smudged on fingers or sailing through the air, he is ever ready for the attack and man is none the wiser. The great scientist Pasteur has shown by a very simple experiment that it is difficult to find any spot on the earth's surface where germs do not abound. He demonstrated that broth or bouillon turns sour simply because it becomes contaminated by the germs in the air, and that it would keep for years just as pure as the day it was made, provided, immediately after boiling, it were sealed in germ-free vessels. In order to prove that germs existed in varying numbers in practically every locality, Pasteur prepared many little sealed vessels of germless bouillon and, taking them with him, travelled through city and town, into the fields of their suburbs and out to the meadows of the country. Where he wished to ascertain the presence of germs in the air, he opened for a few moments twenty of the sealed vessels containing the bouillon and then quite rapidly resealed them. He went on into the foot-hills and mountains, in each locality opening and sealing other twenty flasks of bouillon, and did not rest until he finally ascended Mont Blanc, and opened to the mountain air twenty more of his bouillon flasks. Of the twenty flasks opened in the city of Paris, practically all went bad; of twenty-three opened on a country road, eight went bad; of another twenty opened in the foot-hills of the mountains, only five went bad; while out of the twenty flasks opened on the summit of Mont Blanc but one showed contamination by germs. It must

not be imagined, however, that all of the germs thus demonstrated by Pasteur are enemies of the human body; indeed, some are friendly; some live only on dead things and thereby produce excellent food for all vegetable life, while the dangerous ones prey upon living beings. Nevertheless, the old proverb, "Birds of a feather flock together," holds as true here as elsewhere, and you may be sure that localities which show the greatest number of germs which make bouillon turn sour are also contaminated by the greatest number of human enemies or disease-producing germs.

Like enemies the world over, germs become much braver, much more vicious or virulent in their attacks, when congregated together in large numbers. When few and scattered, they become weak and comparatively harmless; but allow weakened members of the force once to join with their friends, as, for example, around a decayed tooth, in a very short time they regain their strength and activity to a surprising degree. Also, in regions where they can obtain the proper food, so rapid is their growth, by a simple process of dividing their bodies into halves, each of which becomes a distinct organism, that even in a very few hours they multiply to many times their former numbers.

While in general possessing many features alike, each battalion of germs, so to speak, or group of battalions, has, nevertheless, distinctive characteristics in appearance and effect. Each has its own variety of ammunition, which is poison or toxin, and the appearance of the man who has fought and lost the battle tells the story of the nature of the

conflict and makes possible a classification of the enemy.

One might well compare the virulent streptococcus, or blood-poisoning germ, to cavalry that charges with sudden shock and startling effect; or one may see in the violence, the conflagration and the destruction of the brief five-to-nine-day attack of pneumonia the work of heavy artillery. The steady approach of infantry finds a parallel in the three or more weeks' relentless advance of the typhoid germ, advancing and fighting step by step, weakening his victim; devastating all behind him and often returning to the attack when apparently beaten. But if there exists an army whose chief purpose it is to besiege, every member of the tubercle bacillus host must hold in such a force a decoration for distinguished service. Endowed with ability to not only hold his position for years at a time, but on every possible occasion to make telling and dangerous sorties, the tubercle bacillus, unrelenting, uncompromising and indestructible, must rank in the first line of adversaries, with a toll of death as constant as it is unsurpassed. What irony that men should struggle to slay each other while in their midst there stalks an enemy, common alike to man and beast, ever working misery and sorrow and dealing destruction and death!

It very often happens that one division of germs, seeming to realize that it is going to have difficulty in winning the battle on its own resources, calls to its aid reinforcements from another division. For example, the blood-poisoning streptococcus, having failed to bring about complete ruin in its

attack, is very often assisted to ultimate victory by the pneumonia division; or, again, the influenza, pneumonia and tubercle germs may all join forces. These combinations attacking the human body are called "mixed infections," and, while there may be occasion to refer to them later, it might at once be mentioned that the consideration of greatest importance must be the tubercle bacillus.

Like some of the warriors of old, this worst of enemies is clad in a coat of mail which is well nigh impenetrable, and it is with considerable difficulty that the bacteriologist is able to stain him for examination. It is quite impossible to kill him by freezing; indeed, he has been found quite lively after being kept continuously frozen for four months. Twenty-four hours in a 5 per cent. solution of carbolic acid does not end his activity; even boiling him for five minutes, if he be in a fair-sized lump of sputum, fails to annihilate him. When his body is dyed a deep red and placed under a powerful microscope which magnifies a thousand times, he looks like a tiny clipping of red silk, about one-sixteenth of an inch in length. It is because he has this rod-like shape that he is called a *bacillus;* if he were round-shaped like a period or a dot, he would be called a *coccus.* His legions are divided into four divisions, and it is fortunate indeed that all of the divisions do not attack man.

One division or type of tubercle bacillus attacks fish and snakes and cold-blooded creatures only; another type is death on birds, and particularly on chickens; fortunately neither of these types attacks human beings, nor do the tubercle

germs that attack man appear to molest the hot-blooded chicken or the cold-blooded snake. It is not so, however, with the "bovine type" or the tubercle germ that attacks cattle. Beef and milk from tuberculous cows may cause tuberculosis in human beings, and particularly in little children. Similarly, the type or division which attacks the human being may invade the bodies of animals. Some animals are more susceptible of attack than others. Thus, the pig falls an easy prey to the bovine enemy; but it is very resistant to the "human type," while it is with difficulty that the cat or dog is infected with either type. But even these latter are sometimes attacked by the human germ, as was demonstrated by a young lady tuberculous patient who, upon finding a piece of meat difficult of mastication, took it from her mouth and gave it to a pet dog to eat, with the result that the dog soon developed tuberculosis.

Like all good fighters, the tubercle bacillus is well nourished; he is enveloped with from 10 to 40 per cent. of fat, and just as the very fat soldier is slow and inclined to be lazy, so also the very fat tubercle bacillus is less active, while the lean fellow is deadly or very virulent in the poison he produces. One can readily imagine what an asset his diminutive size is to him. He and thousands of his friends can rest with perfect safety in one of the little grooves of your finger without in any way changing its perceptible cleanliness. They can ride in hundreds on the tiny fragment of dust which one sees peacefully floating in the single sunbeam that steals through a hole in the blind. An entire

regiment of tubercle bacilli can readily obtain transportation on the hairy foot of another foe, the house-fly. But you must not imagine that every fragment of dust you see is laden with tubercle bacilli; in fact, you have no right to assume the presence of these germs in any place except where there has been a *careless* or *ignorant* consumptive. Wherever people congregate, however, there is uncertainty, for while the number of deliberately careless consumptives is relatively small, the number of ignorant tuberculous individuals and people who do not even know that they are suffering from tuberculosis is very large. Thus it happens that we are surrounded by enemies looking for an entrance to our bodies, and were it not for opposing forces, every living being would rapidly succumb to the attack.

CHAPTER II

The Defence Forces

Sunlight is of more importance than all else in preserving our lives against the attack of the tubercle bacillus. Day by day, it is actively engaged in slaying millions of the enemy; indeed, could the rays of the sun but gain access to the germs in the interior of every dwelling, in the depths of every cellar, in every nook and cranny of the world, all regiments of tubercle bacilli would speedily be annihilated. Unfortunately, there are many populated places never reached by the direct rays of the sun, and there, particularly, we are liable to find the enemy lurking.

Next in importance to sunlight in saving us from destruction is the splendid army of defence, or "resistance," with which every individual is equipped. This army consists of enormous divisions of blood-corpuscles, antitoxins, agglutinins, opsonins, lysins, and many other units. A volume could be filled with a description of these forces and their tactics, but it will suffice to become familiar with but one, and that the most important of all, at the same time remembering that practically the whole army of resistance is mobile and travels in the blood and lymph streams, thus being capable of reaching any and every part of the entire body and of concentrating at any point of attack.

In the division of blood-corpuscles, or little cells

which float in the blood, is an immense regiment of what will be spoken of in future as white cells. These have many other names, such as leucocytes, phagocytes, etc., and the regiment is divided into many divisions of varying size and appearance. In general the white cell appears under the microscope shaped like a little disc about one-quarter of an inch in its widest diameter; actually, he is only one twenty-five-hundredth of an inch in diameter. He is usually more or less lop-sided and is constantly changing shape. He is like a diminutive jelly-fish in movement and transparency.

Like his enemy, the germ, the white cell possesses the remarkable faculty of increasing his numerical strength many times by dividing himself in two should an invasion threaten; in fact, physicians are often able to tell that germs have entered the blood, and that a battle is in progress, by actually counting the white cells, and finding that there is a very largely increased number in a given unit of blood.

The white cell's method of giving battle is to stretch one end of himself out in an arm-like process, and with this arm to encircle or embrace his adversary, who is thus engulfed or swallowed, and later, provided he is able, digested by the white cell. Apparently he is very courageous in the attack, for it sometimes happens that he swallows alive such a large number of germs that the latter succeed in poisoning him. Should the white cell be tired and poorly nourished, you can readily understand that he is more likely to be overcome by the poison than if he is in good fighting form.

Under the whole surface of your body, whether external or internal, under your skin, under the membrane that lines your mouth, air tubes or food passages, are millions, nay countless billions, of minute trenches or lymph-spaces in which the white cell and his allies are on active service. It would be quite impossible for you to prick yourself with the point of a needle anywhere, outside or inside the body, without entering one of these minute trenches where the white cell is on the lookout for the enemy.

Every trench or lymph-space is provided with a communication trench, and this great network leads back through well-defined lines of communication or lymphatic vessels to many groups of little forts or blockhouses known as lymphatic glands. These glands protect every frontier of the body and guard every highway leading to its vital centres; moreover, they are not only the fortifications of the white cells, but they are for many of the latter the shelter that gives them birth.

Beyond the fortifications, and leading towards the body's more vital centres, are many well-defined roadways or vessels, and the white cell wanders from his blockhouse home in through these vessels to the great high-road or thoracic duct which opens into the blood-stream. Upon reaching the blood-stream, he is sent out again towards the surface of the body, and is mobilized at any point where trouble is brewing. Indeed, as he approaches a scene of disturbance, by insinuating himself between its component cells, he actually wiggles through the wall of the blood-

vessel in which he travels, and so gets out into the trenches or lymphatic spaces. Thus you must imagine him as continually doing outpost and sentry duty, marching up and down every avenue in the body where the enemy is likely to appear, and hurrying to assist his comrades wherever and whenever a germ may seek to make its entry.

Let us imagine that, through a pin prick, some blood-poisoning germs have managed to effect an entrance under the skin of your finger. You notice in a little while that the finger appears red or inflamed; this means that the white cells have discovered the invasion and have called for help, with the result that the blood-vessels in the vicinity have dilated in order to allow a much larger army of defence to reach the scene of hostilities. The white cells mass in and around the place of the conflict in such great numbers that the communication trenches are quite blocked, so that unless the germs happen to be of a particularly fine fighting division, or unusually virulent, they are absolutely blocked at the surface, and are finally thrown off in the pus from the little abscess that forms, the pus being the bodies of the white cells killed in the conflict. On the other hand, the germs by various tactics may manage to get through the communication trenches or lymph-vessels, and are then held up in the blockhouse glands, and you are made quite aware, by the pain and the swelling high up in your arm-pit, that a desperate struggle has ensued.

It is but another mark of the treachery of the tubercle bacillus that he manages either by stealth or deception to keep his identity masked until he

has reached at least as far as the blockhouse gland; and even when he is at this point, or deep in the lungs, and a struggle for mastery takes place, you are nearly always quite unaware that he has even effected an entrance, and hence you are apt to leave your army of defence without generalship and destitute even of ordinary care. But even suppose that the tubercle bacilli gain entrance to the blockhouses in such great numbers that they are able to overcome the plucky white cells, or suppose that the white cells are too exhausted to put up a strong resistance. Is the battle lost?

CHAPTER III

The Skirmish at the Outposts

For practical purposes only two avenues through which the enemy may gain access to the human body need be considered. It is possible, of course, that the tubercle bacillus, like the blood-poisoning germ, may get in through a cut in the skin, caused accidentally, or by such foolishness as tattooing, or scratching a pimple; but nearly always the first portal is the nose or the mouth. He may be breathed in with the dust, but the nose is so equipped that normally it arrests 95 per cent. of the dust and germs in the air that passes through it. You must see that you are not a mouth-breather, for your chances of breathing in germs are thereby twenty times greater than if you breathed through a healthy nose.

It is doubtful if as many germs get through the air-passages into the lungs as is popularly supposed. If you have ever opened the gullet of a frog that has been killed, and sprinkled on it a few particles of cork dust, you will have seen how all the particles slowly travelled down the membrane and finally dropped off. This, you will find upon careful examination, is owing to a perfect forest of little hair-like processes called cilia which wave together like a field of golden grain bowing before a gentle breeze. Softly but surely the little particles of dust are wafted along, all in

the one direction. In like manner, the larger tubes of your air-passages are lined by forests of these little cilia, and the greater part of the 5 per cent. of dust and germs which manage to escape through your nose are caught by the moisture on the walls of your air-passages and are slowly wafted back to the mouth by the waving action of the cilia. That germs and dust do, nevertheless, reach the lung tissue at times is proved by the small deposits of coal dust found after death in the lungs of many coal miners, or by the quantities of stone dust found in the lungs in a disease called anthricosis, common among stone-cutters. Experiments have been performed on animals which seem to prove that tuberculosis germs may enter the lungs direct and start up trouble in the lung tissue just where they alight.

What happens most frequently is that the germ enemy gets in through the wall of the air-passages, enters the trenches of the white cells, and makes his way under disguise to the blockhouse gland. This happens not only through the walls of the air tubes but through the lining of the back of the nose, the throat and the tonsil, and is very much more liable to occur when these structures are in an unhealthy condition and there are minute cracks or breaks in the membrane, as is the case in a chronically inflamed tonsil.

In the mouths of many individuals, the enemy that enters by chance is greeted by a sort of reception committee. In the single recess of a decayed tooth, in the minute gum-abscess under an old-time crown, or in the fissure near an unhealthy tonsil, are

millions of germs other than tubercle bacilli, creating in the mouth an environment of the most encouraging nature to the soldiers of fortune who come wandering in. The newcomers may chance to be a very small band of weakened warriors, but a little while in this hotbed of intrigue suffices to increase their numerical strength many fold, and to fill them with a deadly virulence.

It is an easy matter for tubercle germs to enter the mouth from the world without; food itself may be tuberculous, or it may be contaminated by dust, flies, or many other agencies; but it is the business of the food inspectors to control this source of danger. Your concern should be that the food is not contaminated after it reaches your home. Many people there are, especially those who come in contact with the sick, who contaminate food while conveying it to their mouths simply because they regard it as too much trouble to properly cleanse their hands before partaking of a meal.

Among people of ordinary refinement, it is a practice to place the hand in front of the mouth when coughing, and so the hand is sometimes sprayed with fine globules of sputum. Thus among people who are unaware that they are the victims of tuberculosis, and where as a consequence the proper precautions are not taken, food may be contaminated in the preparation. It is well to remember that the germ in the moist condition, as he is when coughed on the hand, is much more dangerous and more virulent than when dried out in the dust.

It is little children who particularly need care; their internal body walls, especially the stomach, are

more easily penetrated by the enemy and, like themselves, their forces of defence are immature. Creeping on the floor, constantly shoving their dirty fists and all manner of foul things into their mouths, they surely must have a special guardian angel who watches over their precious lives and preserves them from the enemies that hover around!

In children under fifteen, it is probable that the tuberculosis enemy effects his entrance to the battlefield by the stomach and intestines more frequently than by riding on the dust particle direct to the lungs. Hence the milk and the food supply of the little people must be carefully regulated, and all cattle should be tested to make sure that they are free of the dreaded disease. It must also be seen to that after food comes to the shop or the home it is not left where house-flies can convey to it the countless germs that roost on the hairs of their legs, and wallow in the excretions of their bodies.

But in spite of everything you may do, germs will gain entrance through the mouth and nose. This is no reason, however, why you should not endeavor, in so far as may be possible, to limit the number that gain access to what is really the high-road to the battlefield. Indeed, it is a very definite reason why, through avoiding excesses, and giving fair consideration to your general physique, you should back up your white cells in the battle they are continually called upon to wage against the incoming enemy.

You have now followed the enemy step by step, in through the nose or mouth, directly down to the lungs, or into some minute crack anywhere in the

membrane that lines the whole interior of the body. You have seen him in this way gain access to the white cells' trenches, pass by the outermost sentinels without causing suspicion, and finally gain entrance to the blockhouse gland. And now, in this little fortress, is fought a most important engagement with the outposts, an engagement upon which depends the prestige of the white cells and their allies, and one which determines whether or not they remain a first-rate power. The white cell pounces upon his enemy and engulfs him; if he is able to go further and kill him by digesting him, he comes forth from battle not only victor, but a more experienced and a stronger fighter than he has ever been before. Just as you are made stronger by vanquishing an enemy or overcoming a temptation, so the white cell, through his conquest, gains something that he did not have before, and the next time the tubercle bacillus invades the body he finds the white cell and his allies more resistant, or, to use the scientific phrase, the individual has "established increased immunity." Thus you see there is a lasting advantage gained if the battle at the outposts is won. Unfortunately it works the other way as well, and if the tubercle bacilli, after being engulfed by the white cells, are able to produce a poison so virulent that it kills the latter, the story is very different.

There are all degrees of victory for the tubercle enemy in the blockhouse gland. If complete, he takes entire possession of the fortification or a series of them, cuts off the various lines of communication by blocking them with the dead bodies

of the white cells, and proceeds to devastate the interior, and even to break down the walls of the gland. Such an unfortunate result is much more liable to occur if, previous to the attack of the tubercle bacillus, the gland has become enlarged through the action of the poison of other germs entrenched in such places as a decayed tooth, in adenoids at the back of the nose, or in the crypt of a diseased tonsil. The evidence of the devastation is often to be seen in the swellings and scars about the throat and neck of many people who have thus been attacked during childhood.

On the other hand, victory may not be fraught with so many advantages to the enemy. The attack may result simply in a drawn battle with the tubercle bacilli entrenched in the wall of the blockhouse gland, and apparently too frightened to make a disturbance. From the appearance of the gland in such cases one would never know the germs were present. It would almost seem as though the germs realized that every dog has his day, and that in years to come the day might dawn when, the candle burned at both ends just a little too long, the neglected white cells would become so weakened that opportunity to increase their own numerical strength would be afforded the germs, and so enable them to come forth to battle with greater chance of victory.

Once the tubercle enemy, not having been demolished by the white cell, gains entrance to the blockhouse gland, to the lung, to the kidney, to the bone, or to any organ of the body of an individual, that individual, to use the doctor's phrase, has become

"infected with the bacillus tuberculosis." This happens to at least nine out of every ten persons with whom we come in contact. In other words, 90 per cent. of people have tuberculosis at some time in their lives, and this is actually proved by the findings in many thousands of post-mortems performed on the bodies of people who die from any and every cause. But while nine out of ten persons have tuberculosis, only one out of every seven dies from it. It would seem that when 84 per cent. of the people infected make a successful recovery, tuberculosis is not such an incurable disease as is popularly supposed. But why, it will be asked, do not the remaining 16 per cent. also recover?

Unfortunately, some people are born into the world with forces of defence that are particularly poor fighters when it comes to a battle with tubercle bacilli. Their white cells and allied forces are able to resist with normal power other divisions of the enemy, such as germs of typhoid and blood-poisoning; but while they have inherited no tubercle germs themselves, they have inherited a weakness in defending themselves from tubercle bacilli. Again, to use a medical phrase, they have "a predisposition to tuberculosis." There are other people whose forces are terribly weakened by attacks from enemies other than the tubercle bacillus, consequently this besieger, following in the path of an army which has gone before, is enabled to gain a hold on his victim which is often fatal. However, the great majority of people who die from tuberculosis are vanquished only because their forces of

defence have been impoverished and ill-treated for a long period without interruption, or because the germ enemy has held sway for months or even years without their knowledge. The line of resistance may be badly down at times, and the enemy may carry the outposts and become firmly entrenched, but give the valiant white cell fighters half a chance and Nature has so endowed them that, with proper rest and food, they will arise stronger than before and defeat this adversary.

CHAPTER IV

The Promise of Victory

From the time the tubercle bacillus gains control over even a minute area in the blockhouse gland, or in any other part of the body, in other words, from the moment infection occurs, a change in the morale of the white cells and their allies seems to take place. An element of fear seems to enter their make-up, so that, for at least twenty years to follow, a great commotion takes place in the army of defence whenever another invasion of tubercle bacilli occurs in the body or even a minute drop of the poison of that enemy appears. Not only do the white cells become excited, but there occur as a result of the disturbance a slight fever, an increased frequency of the heart-beat, a flushed face, and the individual begins to feel just a little out of sorts. Doctors make use of this circumstance to find out whether tubercle germs have gained a successful entrance to your body. A minute drop of the poison of the tubercle bacillus, which is called "tuberculin," is injected under the skin, into the trenches of the white cells. If no tubercle germs have succeeded in establishing themselves in the gland, lung, or elsewhere, nothing happens. But if it recalls to the white cells and their allies a previous successful invasion by tubercle bacilli, a commotion follows as mentioned. This, however, quickly subsides. Such a commo-

tion is known as " a positive reaction to tuberculin," and is certain proof that the patient has been infected by the tubercle germ. Tuberculin is also used in the treatment of tuberculosis to stimulate the white cells to greater deeds of valor, but a description of its use in that connection must be left to a later page.

It will possibly surprise you to learn that not only did your first infection with tubercle germs probably occur in childhood, many years before you were conscious of having tuberculosis, but that you have in all probability been reinfected with the same germs many times before the final break which filled you with dismay, and made you feel that you were face to face with death. Of course, it is possible that the onslaught may be made by such a large number of the enemy, or by such fine fighting or virulent tubercle germs, that not only are the trenches carried and the forces of the blockhouse gland overwhelmed, but the enemy goes on to much more extensive invasion. In such a case you are very ill. It is the rule, however, for these besiegers to adopt a policy of attenuation, *i.e.,* to slowly wear you down, and watchfully to wait, knowing that, where they have effected an entrance, reinforcements of their own ilk will be able to follow even more easily and establish a foothold.

And so the years roll by, and you are all unconscious of the fact that the enemy is waiting patiently in the citadel of your being, and that new enemies are from time to time winning the skirmish at the blockhouse glands. You go gaily along the joyous path of youth, arriving home from the club or from the dance in the small hours of the morn-

ing, rising dog-tired to a hard day's work, coming home to meals at any and every hour, gobbling down your food in order that you may look after the hundred and one irons you have in the fire; exercising to utter fatigue on one day, and the next not exercising at all. Is it any wonder that slowly but surely the day arrives when the tubercle enemy feels it safe to venture from his trenches in the blockhouse gland, feels confident that he can poison the white cell who endeavors to demolish him, and that he increases his numerical strength and goes boldly sailing in through the lymphatic high-roads into the blood-stream? This is just what he does, and more.

Reaching the blood-stream, he travels along in the current, until, as the stream divides again and again into innumerable branches, he becomes conscious that it runs more slowly, that the river has become but a rivulet, and that finally its borders have so narrowed that they are easy of approach. Then he effects a landing, and behold, he is ashore on lung tissue! It is possible that he may be washed right through the fine capillaries in the lung and find himself landed in some other tissue like bone or kidney. But the lung is the tissue he likes best, and he generally leaves the others to a later sortie after he has conquered definite areas in the lungs.

The history of the adventurous bacillus now becomes practically identical with that of the tubercle germ who has reached the lung by floating in on the air current. In the same way as when he first reached the blockhouse gland, he proceeds to entrench himself among the cells of the tissue. The

white cells attack him in great columns, but they fall on the brink of his trenches, overcome by the terrible poison, and so the avenues of approach become blocked by the dead bodies of the little heroes, and the lines of communication are severed. Thus he is left free to destroy the tissue in his vicinity and to convert the cells which compose it into giant blocks for a fortification.

Could you now look at his camp, you would recognize it as a tiny white ball about as large as the head of a pin. This little ball is called " a tubercle," and from it the disease, tuberculosis, derives its name. All is quiet and dead in the interior of the tubercle, but not so at its periphery or outer edge. Here the battle rages in all its fury, the tubercle bacillus doing his best to enlarge his territory, and the quixotic white cell throwing himself at his enemy, engulfing him, and carrying him bodily out into the air spaces. Here also the allies crowd about, doing their best to neutralize the poison, and manufacture ammunition that will outclass that of the enemy.

So it is that, about this time, a very little tickling begins to occur in your throat. The grim procession of the dead, and the perilous procession of the living with the dead have commenced. The bodies of the valiant white cells, known as pus, and holding even in death the living and active enemy, have come from the air-spaces where they fell with their foe, and have been wafted along the larger air-passages by the waving action of the cilia. Later in the disease, when the dead bodies become very numerous, they may be recognized as pus in the sputum, which contains also much débris from the

ruins of the battle, as well as mucus from the air-passages, and saliva from the mouth.

Keep this weird procession of life and death ever vividly in your mind and, though it is difficult to comprehend, make yourself realize that your own sputum is no exception, that it is as deadly to your friends as is the sputum of the forlorn consumptive of whom you have been thinking.

Once the tubercle enemy leaves the scene of battle and travels through the different air-spaces, it is not surprising that the many currents of air distribute him to fresh fields, and that in a short time where formerly there were only one or two little tubercles there should appear quite a colony. Moreover, as the enemy beats back the white cells, he gradually extends his camp until it approaches and coalesces or joins with the camp of his fellows. Thus the lung territory is slowly but surely ceded to the enemy, and could you see it now, it would no longer show the isolated and scattered little white ball tubercles, but very definite tuberculous foci or areas, yellow in appearance, cheesy in consistency, and as large as a marble, an alley, or even an egg.

It is generally about this time, should fortune favor you with a symptom or two sufficient to cause anxiety, that you consult your doctor, and if fortune still further favors you with a careful doctor, he will make you expose your chest in its entirety, both front and back, and carefully examine it. By tapping with his fingers or "percussing," as it is called, he finds a little area which is dull, *i.e.*, a spot that doesn't sound hollow underneath, like the other parts of the chest, where there is good lung tissue. It sounds solid underneath because,

as we have seen, the enemy has established his fortifications down there and his fortifications are solid. Again, the doctor listens with the stethoscope and, all about where the fighting is going on, he hears tiny cracklings, called "râles." You see, the white cells and their allies are crowding around the tubercle, and this makes that area more wet or moist than it otherwise would be. As this moisture makes the air-spaces sticky, they crackle when the air comes into them and forces their sticky walls apart. The doctor now becomes suspicious and sends some of your sputum to be examined by a bacteriologist, and when the report comes back that tubercle germs have been found, you think you are the unluckiest being that ever lived. But that is where you make a mistake. Rather should you thank God that the discovery has been made in time for you to give to your white cells and their allies the backing, which is all they need, to get control of the situation.

If you follow the proper treatment, the little warriors organize for a fresh drive of a different character. They apparently realize that it is impossible to drive the enemy from his entrenchments and fortifications in the lung tissue, and so they proceed, day after day, week after week, and month after month, to build about him a strong cordon of fine fibres, until after months, or perhaps years, of labor, they finally imprison the encampment of the tubercle bacillus in strong walls of genuine gristle. Indeed, the white cells and their allies often go farther, and carry load upon load of minute blocks of calcium or stone, which they not only dump in upon the enemy, but with which they encase him

in a veritable vault of chalk cement. Although the enemy is so tough that he is not killed by the confinement, he is, nevertheless, as incapable of doing harm as is a prisoner in the Tombs.

Of course, just as circumstances may arise that make it possible for a prisoner to escape, so also the day may come when, through dissipation of your regained strength, or through the invasion of other enemies, such as the pneumonia or influenza germ, the prison wall may be broken down, and the enemy escape and again establish a footing on healthy soil. But this, in great measure, is a matter of your own control. Surely once having learned a lesson in the school of bitter experience, you are not likely to neglect your army of defence a second time!

As time rolls on, and the walls of the prison are made dense, and still more dense, they begin to contract, and if the location be favorable the enemy and his encampment are literally squeezed out into one of the air tubes and from there coughed up and expelled from the body. So it comes about that many years after you have effected a cure, when your life in this good old world comes to an end, and your body has been turned over to the cause of science, it is found, if your disease has been very extensive, that it is almost impossible to cut through your lung on account of the masses of scar-gristle which are scattered here and there in a bed of perfectly healthy lung tissue. Also that the edge of the knife is often turned as it strikes the chalk cement that years before was brought by your white cells and their allies to imprison their foe, the bacillus tuberculosis.

CHAPTER V

Reverses

Up to the present we have considered only that form of tuberculosis which steals into your life like a thief in the night—incipient tuberculosis, it is called, in its earliest stages. It makes its appearance so gradually, so insidiously, that you are inclined to regard its symptoms as related to laziness from which you must "buck up." There are other forms of the disease which are more startling in their onset and character.

You remember how the tubercle enemy first of all gained control of the blockhouse gland but was unable to get farther for the time being because the lines of communication leading into the body were blocked, and how he proceeded to devastate the interior of the gland, and even to break down its walls. Now it happens that these blockhouse glands are located not only in the neck, or under the arm, where possibly at some time you may have seen them inflamed and swollen, but they are situated deep in the chest, in the abdomen, and in many other places as well. It is therefore quite possible that while there may be no sign of trouble apparent to you, deep down in the chest, near the root of the lung, beside a big air tube, or even beside a vein, the tubercle enemy may be silently at work tearing down the wall of a greatly enlarged blockhouse gland, and indeed going further and tearing down the

wall of the air-tube or vein as well, because the latter presses very firmly on the gland, or is in fact stuck to it. Finally a day arrives and you are at work or play, just as usual, when the enemy completes his villainous task and the tuberculous contents of the invaded gland are emptied into the vein. Away goes the great army of germs scattered broadcast like autumn leaves on the four winds of heaven; not only into the lungs they go, but into practically every organ of the body. The result is "galloping consumption," and death. The victim has not an atom of a chance, so why discuss it!

But there is another condition which it is interesting and profitable to consider. It happens that in the lungs of very many people, a silent battle is fought between the white cell and his foe, the tubercle bacillus, in which, through good fortune, the white cell and his allies overcome the enemy and imprison him in a cordon of fine fibres, before his encampment becomes any larger than a marble or a bean. Throughout this struggle the individual is none the wiser. By lucky chance, or perhaps from design, he slackens down the pace he is travelling, and, happening to be blest with good fighting white cells or, as it is called, with good resistance, the slackening down process gives his army of defence just the opportunity it needs to imprison the enemy. But as life is one series of ups and downs, the day comes when once again the balance dips just a little too far in the wrong direction, or possibly some other enemy, such as the influenza or pneumonia germ, invades the lungs, and the prison walls are

rudely broken so that the tubercle enemy escapes *en masse* and scatters his army in several lobes, perhaps in every one of the five lobes of the lungs, where, with his friends of the other germ divisions, he rapidly entrenches himself and sets up a condition known as "acute tuberculosis." This occurs in about 10 per cent. of all tuberculous cases.

The difference between acute and incipient tuberculosis is a difference only in the degree of involvement and the rapidity of development. In time, if the patient survives the acute stage, both varieties of the disease, if not arrested, pass on into "chronic" or slowly developing tuberculosis with identical results. In the acute form the tubercle enemy gets important help from germs of other divisions almost from the very beginning. In the incipient form, it is only after the sputum begins to come that other enemy germs manage to get in to help the tubercle bacillus and to form what is called "a mixed infection." So it is that probably every one who is bringing up tubercular sputum is battling against a mixed infection. Naturally this alliance among the germs is much more destructive to the lungs, and more difficult for the army of defence to combat, than when the tubercle enemy is waging the war alone.

As time goes on and the disease progresses, the earliest encampments of the enemy, *i.e.*, the oldest tubercles, are liable to become softened in the centre, and the white cells so succeed in breaking down the moorings of the tubercle to the tissue round about, that bit by bit the cheesy material which comprises it is coughed up, and a hole or

"cavity" is left in the place formerly occupied by the forces of the enemy. Sometimes, instead of a cavity, a great number of very small holes are formed, and this is spoken of as "honeycombing." It is quite probable that later on the honeycombed area will develop into a definite cavitation.

What a sense of fear, and what dark forebodings filled your mind when you were first informed that a cavity had developed in your chest! and how very foolish you were to be so frightened! Is it not better to have an empty space in your lungs than that they should contain instead of it an encampment including millions and millions of the enemy ever pouring out a deadly poison? Is not an empty house better than a bad tenant? It is too late to grieve. The time for regret was when you were living contrary to the laws of Nature, and the enemy was building up his tubercle. The time has now come to rejoice that you have thrown out of your body some, at least, of the deadly invaders.

You can readily understand that while the softening process in the tubercle is going on, while the white cells are loosening the enemy's encampment from its moorings, there is very much more of the poison stirred up in the softened tubercle than would otherwise be the case. If, by chance, the white cells and their allies have had sufficient time or opportunity to build a strong wall around the tubercle before the softening started, the poison does not cause much trouble. If, on the other hand, the walling of the diseased area is not perfect, some of the poison will be sure to get into the blood, and, for the time being, increase the severity

of the symptoms and perhaps make you feel rather ill. Thus, you see, it is quite possible for a process to be going on which will hasten your recovery, but which at the same time may make you feel more ill than you have felt since you had the disease. You can now understand why very often you have to become a good deal worse before you can become any better, or why, after having gone along beautifully a certain length of time, you suddenly, without any apparent rhyme or reason, are put on your back with fever which lasts, in some instances, for months.

While softening is taking place, and the diseased areas are breaking away from the healthy tissue, it is not surprising that a little bleeding in the vicinity is likely to occur, especially if you are not keeping very quiet in bed. The bleeding or "hemorrhage" is most startling both to yourself and friends, and you are quite convinced that you are going to die. It is perhaps just as well that you are somewhat frightened, as you are more likely to do what you are told until the time of danger is over. Good friends will assure you that a hemorrhage is a fine thing, as they remember somebody who started to recover from the very time he lost some blood. There is, perhaps, more consolation than knowledge of fact in what your friends say. However, inasmuch as a hemorrhage very often marks the time of softening, and through the softening there is cleared out considerable of the trouble which has been keeping you ill, it will not do to be too sarcastic about the blessings conferred by hemorrhages.

A hemorrhage is practically always an accident, and may come at any time in the course of tuberculosis. It is frequently the first conflagration in the war that startles you into a realization that the enemy is upon you; it occurs in 60 per cent. of all cases. In 2 per cent. of all people with pulmonary tuberculosis, it is the final outburst that tragically brings eternal peace to the forces of defence.

After the enemy or enemies have made definite conquests in the lungs, it is not at all unusual for them to give their attention to other areas. Being so near to the pleura, or tissue which covers the lungs, it is natural that the germs should invade this structure early in the disease; indeed, they sometimes cause trouble there years before any tubercular disease can be discovered in the lungs. It is for this reason that the man who has had pleurisy generally finds he has difficulty in securing life insurance. The life insurance doctors have learned to suspect the presence of the tubercle enemy in all such cases.

Imagine the lung of one side of the body to be covered and held intact by an ordinary football. The rubber nozzle of the ball would represent the root of the lung, or the place where the large air-tube and blood-vessels come off. If the bladder of the ball were continuous with its cover around the nozzle or root, and the bladder and the cover were composed of the same material, you would have a fair representation of the pleura as it covers the lung. The inner coat of the pleura, or that part of it represented by the bladder of the football, is attached firmly to the lung, while the outer coat, or

that part of the pleura represented by the cover of the football, is attached to the ribs and body wall. So it is that when air goes in and out of the lung, the inner layer slides on the outer layer.

The pleura is normally very flexible and slippery and the two surfaces glide over each other with graceful freedom at each movement of the chest or lungs. But when the enemy invades their shiny surfaces, it is not long before the shininess and the slipperiness disappear and the surfaces become, at the affected spots, red and rough and sometimes stuck together. Is it any wonder that a pain like the stab of a knife shoots through your chest as these inflamed surfaces are pulled apart and rubbed the one against the other when you breathe or move your chest? It is interesting to note how, when the invasion is not a serious one, the application of the hot-water bag or mustard plaster dilates the blood-vessels in the vicinity so that a much greater army of defence is able to rush to the rescue and thus soon bring relief. Sometimes, however, the inflamed surfaces stick together " for keeps," and then we have what is known as an adhesion. But adhesions are sometimes a very good thing, as they keep the lung in the vicinity much quieter than it otherwise would be, and so give to the white cells and their allies a better opportunity to get in their good work of walling-off the enemy and of thus healing the lung.

Like warriors the world over, the tubercle enemy has two methods of making expeditions to new fields of action. He either sails or he marches, and, in fact, he often does both. He may leave his con-

quered territory in the lungs by taking to the blood or lymph-stream and sailing in it to any part of the entire body. Or, as he marches up the air-passages, if the opportunity presents itself he may decide to establish a new camp on the vocal chord or wall of the throat. Or, being swallowed in the sputum, he may travel through the intestine and dig his trenches at some favorable point in that structure. No matter where he lands, in bone, in kidney, in brain, or joint, he begins, just as he began in the blockhouse gland or in the lung, and slowly builds his little tubercle. He is the one enemy who is unhandicapped by vanity. He does no hurrahing or cheering; he resorts to no fireworks, but seemingly realizes the value of the strictest censorship. Without attracting any but the most casual attention and comment, he silently and stealthily advances day by day, week by week, and month by month, until whole lobes of the lung are excavated and gone, until structure after structure is taken as a prize, and until, after three to five years, the patient finally has become so very weak, or has so little lung left, that death presents the tubercle enemy with uncompromised victory.

It is very infrequent, however, that the course of the battle leads directly towards recovery, or is in favor of the enemy from beginning to end. To be sure, there are some cases that in spite of everything go from bad to worse, and from the beginning the doctor realizes the hopelessness of the struggle. But nearly always the battle seems to swing now one way, now another, and it is lost generally because the white cells and their allies

have not been given a fair chance. At practically no time in its course is the situation hopeless. Extensive involvement, hemorrhages, cavities, tuberculous throat, what you will—none of them mean utter defeat. Not infrequently, apparently hopeless cases progress to a cure. Many a doctor who has had extensive experience in treating tuberculosis knows what it is to be hailed on the street by a strapping young man who introduces himself as the tuberculous patient whom the doctor, a few years previously, had sent home to die.

CHAPTER VI

Days of Peace

To seek in days of peace means of averting the possibility of war is a principle as deserving of consideration in the humble home as in the halls of Parliament; it should occupy a place in the heart of the individual just as much as in the mind of the nation. As with respect to international war there are extremists of every kind, so as regards the war with the tubercle germ there are pacifists and alarmists of many degrees and varieties. There is the man who, metaphorically, buries his head in the sand and sees no danger anywhere; there is the man who believes in his own divine right to go through the world without regard or even respect for the ordinary laws of nature, and there is the man who, when the tuberculosis bomb actually explodes in his own home, pooh-poohs the fact, and virtually denies its existence. Regrettable as is the attitude of those peace-at-any-price individuals, it has at least the one redeeming feature, that their blind foolishness reacts chiefly on themselves. Not so, however, with the ultra-alarmist whom the doctors know as "the phthisiophobist."

Phthisiophobia is a sad condition, for, if there be one thing that is worse than tuberculosis, it is the everlasting dread of it. Do not imagine that the phthisiophobist is inspired by any concern for humanity. He cares less than nothing about the wel-

fare or feelings of other people, and so long as he himself is kept free of the dreaded germ, the rest of the world may infect itself if it wants to. He is utterly selfish, cowardly to a disgusting degree, and is responsible for much spread of the disease. If you would do business with him or get within ten feet of him, you must spit on the street like an ordinary person. Should you exhibit anything resembling a pocket sputum cup, he immediately classes you as a leper and, in the future, your reputation is sealed with him and his friends, who look at you with that peculiar blend of sadness and alarm which gives you a sense of unutterable resentment. It is largely on account of the demoralizing effect these selfish alarmists have upon many tuberculous individuals that there is urgent need of a general law forbidding anybody and everybody from spitting anywhere except in a public or private receptacle.

To-day, in nearly all towns and cities, you are politely requested, by notices that are often obscure, to refrain from spitting on the sidewalks, but in crossing the street you do well if you pilot your way without running amuck of a fresh and disgusting mass of sputum. Aside altogether from the infected dust which later occurs, think of what it means to be constantly tracking this source of ruin and death into your very home and to the children who play on your floor. No sputum, whether tubercular or not tubercular, is without its danger. If it be merely saliva, what reason for expectorating? If it be yellow, it contains pus and germs and is dangerous, disgusting, and filthy. A measure preventing its dissemination on the streets is

pro bono publico, if any measure ever was; and the liberty of the individual is interfered with just as little or as much as when he is prevented from expelling his other excretions on the public highways. Children, if properly rewarded, might be expected to render useful service in the enforcement of such a regulation. The child is most easily infected by germs, and would therefore profit most by such a law. A small reward offered for convictions on breach of the act would soon bring the sputum danger under control. It is, after all, only a matter of habit, and the habit, as it exists to-day, is responsible, in the United States alone, for one death from tuberculosis every three minutes. If it were controlled by law, it would soon become the fashion for people to carry their pocket sputum cup just as to-day they carry a match-box or purse. No longer would the finger of scorn be pointed at the man who tries to safeguard the public health by using a sputum cup, and no longer would there exist, against the intelligent and careful tuberculous individual, the discrimination which is as unfair as it is unfortunate.

It is not the honest and intelligent patient who is to be feared, but that great army of unfortunates who know not that they are diseased, or who, if knowing, fear the talk of the phthisiophobist more than they do the stigma on their immortal souls. By all means go out of your way to encourage the honest man who is fighting his desperate battle against the tubercle enemy. Welcome him into your home, and make him feel that you realize the absolute security in his understanding and care.

But shun as you would an assassin the man or woman who has the disease and is trying to "bluff" the world; he who, while pretending to wipe his nose, surreptitiously spits into his handkerchief, or he who, rather than that the world should know, brazenly expectorates on the thoroughfare. There are no words of condemnation sufficiently strong for the tuberculous man or woman who gains entrance to a home and heart which if knowing the truth would extend no welcome. Be not fearful of him who openly confesses he has tuberculosis, and who therefore probably takes the proper precautions; but close your home and your heart to him who is knowingly deceitful, or who exhibits the symptoms of tuberculosis, and has not taken advantage of the means at hand to ascertain the cause of his condition.

Nations prepare in anticipation of the coming of an enemy; but in the war with tuberculosis the enemy is already in our midst, unheralded and stalking unseen where often he is least suspected. Thus your first concern should be that he is not left free to attack you in your very home. What man has intended to be his castle of comfort and bulwark of defence often becomes the worst harbinger of this deadliest enemy, and the more man seeks to shut himself in from an inquisitive world, the more may his place of privacy become his palace of peril. To live at peace with germ and man, one's home and heart must be open as the day, and the sunshine of heaven must be allowed to fill both.

Societies for the prevention of tuberculosis

should know that there is a great field for their efforts in educating architects to a realization of the necessity of planning houses which will have their insides out, and you, also, should realize that the more you sojourn away from the house or enclosure, and the more you dwell under the blue canopy of heaven, the safer you are from the danger of the enemy's attack.

See to it that you do not establish your home in a house which has previously been inhabited without having it thoroughly disinfected.[1] It is not sufficient to ascertain that no one has suffered from tuberculosis while living in the house to which you are going to move; that is one subject upon which it is utterly impossible to get at the truth. Further, should you be going to board in a strange home for any considerable length of time, take measures beforehand to make absolutely certain that at least your own room is free of the enemy. It goes without saying that the room which is flooded with sunlight is a hundred times safer than a room which is not, for the direct rays of the sun will, in six hours, annihilate the tubercle enemy, provided he exists in a stratum no deeper than what is commonly called a smear.

It is not within the means of all to have homes with hardwood floors and polished surfaces, but much may be done toward placing limits on the abode of the enemy by doing away with carpets, and substituting in their stead painted, or stained and varnished floors, with removable rugs. By this means, sweeping may be rele-

[1] See Appendix, Disinfection of Houses.

gated to the out-of-doors, and the damp or oiled mop take the place of the broom inside the house. Experiment has proved that white enamel is the least accommodating abode for the tubercle bacillus; so in your home preference may well be given to white enamelled furniture and wainscoting.

If you are not in a position to afford what is most hygienic for the whole house, see to it, at any rate, that the nursery, the indoor playground of the children, receives consideration in this regard. It should be the sanctum from which the stranger is barred, and the holy ground upon which we should not tread without removing our shoes of contamination. The younger the child, the more easily it is infected, and to put the creeping baby down on the ancient carpet, or the ancestral rug, where at frequent intervals it is sure to sample the taste of the particular brand of dust the relic contains, is to court future sorrow and death. On account of the greater vulnerability of the child special care must be taken also to guard it against the ingestion of germs with food. The mother or nurse who cools her infant's pap by blowing on it, or who samples each spoonful before administering it, is making a sad mistake; and the mother who does not inquire carefully into the character of the dairy from which comes the children's milk supply is taking unnecessary chances unless, of course, she is careful to pasteurize [2] the milk before feeding. Likewise, it is well always to wash or peel raw fruit before it is eaten.

Finally, the food in your own home may be

[2] See Appendix, Pasteurization of Milk.

contaminated with germs by a servant or by anyone else who is ill with tuberculosis and who does not know it; by flies, which are notorious germ-carriers; and last, but not least, by your own dirty hands. See that it is a never-to-be-omitted procedure that you and your household properly cleanse your hands before in any way handling food.

It is doubtful if the dangers from infection outside your house compare for a moment with those inside. A great deal has been written about the danger of being infected with tuberculosis from telephone transmitters, library books, or while travelling in sleeping cars, but it is questionable if the menace is as great as has been supposed. It is well, however, that telephone transmitters should be covered by the little hygienic papers supplied for that purpose, or that they should be occasionally disinfected, especially if strangers are in the habit of using the phone. Also, one should be careful to avoid the practice of wetting the finger on the tongue while turning over the leaves of a book; and it would be well if the authorities in charge of sleeping cars and hotels were to see to it that the ends of the blankets which come in contact with one's face were covered each night before using with a few feet of freshly laundered cotton—this, of course, in addition to the periodical thorough disinfection that is at present supposed to be carried out.

The reports on the presence of tuberculosis discovered by means of school medical inspection are indeed appalling. Yet a careful investigation reveals the fact that the school environment is less

responsible for this than the home. To be sure, the cases are discovered in the school, but it is generally found that they come from homes where the enemy reigns supreme. Of course, Johnny is very likely to "swop" gum with Jimmie, and will give his apple core for a toot on the other fellow's tin whistle, or a tune on his mouth organ. Also, Mary will insist on putting pins and money into her mouth, and Jennie will spit on her slate and sneeze right in Mary's face. But all of these little people must be taught that, although man has made his mouth a medium for curious and unhygienic customs, that aperture, nevertheless, is intended by Nature as preëminently an opening into which food and drink should be put, and that, while the other fellow's pea-shooter or apple core is very tempting, the coöperative system with regard to anything that goes into the mouth is the wrong basis on which to do business. But if mothers are to worry about all the countless terrible things that may happen to Johnny or Mary, their hearts will be constantly filled with dismay. Teach your children wisely and carefully the dangers of life, and for the rest leave it to Him

> "who stills the raven's clamorous nest,
> And decks the lily fair in flowery pride."

CHAPTER VII

Strengthening the Home Forces

In national politics it is always a more or less perplexing matter to determine the degree of strength to which the army of defence should be raised, and the efficiency at which it should be maintained. The issue is constantly obscured by differing opinions as to the probability and source of attack, and by the tactics of petty politicians. Not so, however, as respects the distribution of power of the human body. Here the issue is clear: the invasion is not only a threatened one, but the enemy is already in our midst, and not only must our forces of defence be raised to the greatest possible degree of efficiency, but we must study carefully those demoralizing factors which tend to cause degeneration in fighting forces, both individual and national.

Just as some nations are weak from their birth, so also some races, and many individuals of every race, enter the battle of life poorly equipped for conflict. The North American Indian, the negro, and the aboriginal races fall easy preys to the tubercle bacillus because, throughout the ages, they have never known tuberculosis, and their armies of defence have never been trained in the hard school of experience to meet the attack of this deadly enemy.

Certain communities of people have descendants who are unequal to the conflict on account of con-

sanguineous marriages which have taken place for centuries. This factor is one which is chiefly responsible for the excess of tuberculosis on the Isle of Man.

Finally, many a child is born of parents who, not only because of tuberculosis, but because of many another weakness or disease, should have forfeited the privilege of bringing children into the world. The law that the sins and weaknesses of the fathers are visited upon the children is inexorable, and its recognition is not the least important part of obedience to the Ten Commandments. Yes, many a child comes into the world poorly equipped for his struggle against the tubercle bacillus, but this is only a reason for greater care in the development and maintenance of his army of defence.

It should be realized, at the outset, that not only the younger the child, the more easily is it infected, but that if a child can be brought through its years of frailty to adult life without infection by the tubercle germ, its army of defence gains so tremendously in strength of resistance that it becomes almost an impossibility for the germ to effect a successful entry into the blood. Nine out of every ten people are infected with the tubercle bacillus at least once during childhood, and although very few of them become aware of the infection, it should be realized that no other factor so throws the army of defence open to subsequent successful attack by the tubercle enemy. No factor so markedly predisposes to subsequent infections as the existence of a victorious tubercle detachment already on the ground. A first infection paves the way for a second, and the second

makes it easier for the third. With each infection, the army of defence is more and more demoralized. Every mother and father should strive to prevent the first infection in their children, and, failing that, to limit, as far as they are able, the number of subsequent infections.

There are times in the lives of all children when their armies of defence are more open to attack than at others. Naturally, when a disease of any kind occupies the resisting forces, opportunity for the tubercle enemy to effect his hold is more favorable. There are certain diseases of childhood which in themselves are apparently so insignificant that many mothers are not alive to the real danger they occasion. With measles or even whooping-cough, it is not uncommon to hear a mother say that as several of her children had been attacked, she thought she might as well let them all "get it over with at the one time." There are probably no diseases that open the door more widely to the tubercle germ than measles and whooping-cough, and it is little short of criminal to purposely allow any child to become infected. In many cases it would pay in dollars and cents to send the uninfected children away to board until all danger is passed. The only reason a child has either disease is because he is exposed to the infection. It is quite unnecessary for a child to have either disease, and every child would go through life without either, could he avoid exposure to its germ.

Any disease which inflames the lining membranes of the throat or air-passages, and any disease which enlarges and therefore inflames the blockhouse

glands makes it easier for the tubercle germ to effect an entrance. Hence, measles, whooping-cough, scarlatina, variola, diphtheria, and tonsillitis should all be carefully avoided, and once any one of them gains a foothold, the patient should be allowed to thoroughly convalesce, his white cells and their allies should be allowed to regain their equilibrium, before he is exposed to the combination of daily strain and germ attack of ordinary life.

In a previous chapter it was pointed out how in the normal healthy nose 95 per cent. of the dust is arrested, and you have seen how an unhealthy nose or mouth forms an ideal environment for the breeding of all kinds of germs. Further, you have seen that these germs produce poisons which are absorbed, and which keep the blockhouse glands continually enlarged. See to it then that your child has a nose unobstructed by adenoids or bony deformities, see to it that he does not breathe through his mouth, and, finally, see to it that his mouth is free of decaying teeth, gum abscesses, chronically inflamed tonsils, or disease at the back of the nose.

Aside from disease, there are critical periods during the life of every individual when the tubercle germ seems more disposed to manifest his presence. For a child, the period of puberty; for the woman, the period of menstruation, the period immediately following accouchement, and also the menopause, or change of life, are times when, if trouble is suspected, the individual must be guarded with more than the ordinary care. But what is meant by more than ordinary care? As manifested by people generally, ordinary care, it would seem, is something

of a negative quantity, and, on the whole, tends to weaken the army of defence, rather than to build it up. If you would live more carefully than the ordinary individual, if you would build up your army of resistance, you must examine into your life in three directions, namely, as to where you live, how you live, and why you live.

Important as climate is in helping to aid the favorable progress of tuberculous patients after the disease has once shown itself, it should be understood that, no matter how bad, climate in itself never causes tuberculosis. Indeed, a severe climate often develops in the individual a rugged resistance to the tubercle germ. An inclement climate is unfortunate just in so far as it drives people into the house. If one free of tuberculosis were properly protected, and would remain out of doors in bad weather just as in good weather, there would be no great advantage in the latter over the former. Of course, sunshine is an important factor in both the physical and psychological well-being of anybody. It annihilates the germ enemies which lie in wait, and it brings color to the pallid cheek, but in the individual who is free of disease, a minimum of sunshine may be compensated for by a maximum of fresh air. Dr. Baldwin, of Saranac Lake, says:[1] "There seems nevertheless to be a distinctly protective influence in the climates of arid regions, and especially in elevated invigorating climates, as Colorado, Mexico, and the Alps."

A fairly high altitude, whilst holding undoubted blessings for the tuberculous patient, is not neces-

[1] Osler's "Modern Medicine," vol. iii, page 144.

sary to good resistance in a healthy individual, although the man who lives and works in the mountains maintains a better degree of physical training and therefore a more efficient resistance to the tubercle enemy.

More important than climate or altitude is density of population. It is significant that wild animals and cattle which roam the plains are wonderfully free of tuberculosis, and the comparison in this particular is striking between them and the domestic cattle which are "protected" with sheds and barns. Some one has rightly said that the only impure air in the country districts is to be found in the farmers' houses. The out-of-doors in the country means more to your army of resistance than any other factor under the heading of where you live.

But everybody cannot live in the country, and everybody cannot live out-of-doors. There are degrees of purity of air, and if you cannot have the best, you must be content with as high a degree of purity as is possible. It is doubtful if the worst air of the city street is as bad as the air in your home. It perhaps contains more smoke and dust, but, after all, these are not the worst evils of impure air. The air of the city street has at least the redeeming feature of being constantly on the move, of constantly changing and of supplying fresh volumes of oxygen. Not so with the air in your home. Here, impurities are more constant and more concentrated, and increase in proportion to the number of people present and the infrequency with which the air is changed.

It is an easier, if not a more comfortable, matter

to ventilate in winter than in summer. Yet it is in winter that the greatest amount of impurity is found in the air of your home, because comfort is of more immediate concern to you than future health. There is also the economical side to it—you can't afford to heat all out-of-doors. One may sympathize with both points of view, but if you don't care about having the window open about one inch from the top and one inch from the bottom in the very cold weather, once in the evening at least, throw open wide the windows and doors just for a few moments, not long enough to chill the walls and furniture, and then seal the room up again to your heart's content. It will warm up very quickly, and you may sit in comfort in air which is perhaps not the best, but at any rate is not the worst. On the other hand, in your bedroom, the heat should be turned off when it is time to get into bed, and the windows should be opened from the top and bottom, and, if need be, a window-sill board used to break the draught. If it be cold in bed, it is an easy matter to put on a suit of underwear, and fortify yourself with a hot-water stone jar. It is better still to sleep out-of-doors.

If you are really in earnest about getting fresh air that will greatly help to build up your resistance, you cannot do better than invest a dollar in Dr. Carrington's book, "Fresh Air and How to Use It." Or write to the National Association for the Study and Prevention of Tuberculosis, New York City, and ask the Secretary to send you the excellent literature, relating to fresh air and the prevention of tuberculosis, which he is always happy to let you have free of charge.

CHAPTER VIII

Strengthening the Home Forces (*Continued*)

In reflecting upon how you live, and its bearing on the efficiency of your army of resistance, occupation very naturally should be a first consideration. Is your occupation one which keeps you indoors? Is it dusty? Does it expose you to gaseous fumes? Does it subject you to rapid changes of temperature? Is it in unsanitary quarters? Does it keep you in a cramped position? Does it force you to keep irregular hours? Does it submit you to overwhelming temptations? And does it supply money enough to keep the wolf from the door?

The farmer and the sailor have ideal occupations, for nothing is so conducive to fine resistance as good, strenuous work in the vast and open spaces; work that makes you eat well, sleep well, and keeps you happy-hearted. Any business which keeps you out-of-doors, and is comparatively free of dust and overstrain, is good. Lumbermen, raftsmen, gardeners, planters, policemen, detectives, watchmen, collectors and agents of all kinds should manage, so far as occupation is concerned, to keep free of the tubercle enemy. Stone and marble cutters, quartz-workers and quarry-men, on the other hand, although they work out-of-doors, are so perniciously affected by the fine dust of their trades that one in every two of them dies of tuberculosis.

Semi-indoor occupations are, naturally, better than ones which are wholly indoors. Of the professions, clergymen, doctors and lawyers, and of businesses, bankers, brokers, officials of companies, hotel and boarding-house keepers, auctioneers, merchants, school teachers and blacksmiths, show a comparatively low death rate from tuberculosis. The classes of semi-outdoor occupations, exceptions to the rule, which show a greater mortality to the ravages of the tubercle germ, are livery-stable keepers, hostlers, musicians and music teachers. It is interesting to note that musicians who play on wind instruments are less frequently attacked than others by the tubercle germ, probably because of the additional development brought about in the respiratory organs.

The workers who are continually indoors, and amongst whom it is not surprising to find many deaths from tuberculosis, are confectioners, barbers, compositors, printers, pressmen, servants, tinsmiths, and leather-makers. If, in addition to an indoor occupation, there are certain kinds of dusts and fumes, the outlook is bad. One-half of the deaths among cigarmakers and plasterers are due to the tubercle enemy, and not far behind in percentage come metal and glass grinders and polishers, woollen and cotton millers, weavers, factory operatives, men who work in smelters and in foundries, and chemists. Here, again, must be noted certain exceptions. Statistics show that the milling of flour and grist is a fairly healthy occupation, and certain fumes, such as coal gas, sulphurous acid fumes, and ammonia are really protective against the tubercle bacillus.

All occupations in which the worker is brought into intimate association with numbers of people, such as that of salesmen in shops, are naturally attended with greater risks of infection from the tubercle bacillus. Many undetected cases of tuberculosis become chronic, and masquerade in public under the name of grippe, catarrh, asthma, bronchitis, malaria, etc., and tuberculous people of this character are the most prolific scatterers of the dreaded disease. They spread it directly by coughing, spitting, or shaking out their handkerchiefs, and indirectly by contaminating the things they handle or touch with germ-infested clothing.

The unfortunate effect of incessant exposure to extremes of temperature is to be found in the frequency of tuberculosis among bakers, stokers, plumbers, iron and steel workers, gas and steam fitters. In some of these occupations, added to the extreme of temperature is the extreme of muscular strain. In the case of draymen, although the occupation is out-of-doors, and would therefore seem to be a healthy one, owing to the excessive muscular strain involved, the work is not propitious, so far as tuberculosis is concerned. The mortality from tuberculosis among book-keepers and clerks tells the story of the bad effects of impure air and cramped position. The high percentage of tuberculosis among hackmen bespeaks exposure and irregular hours. The death rate from tuberculosis among saloon and restaurant keepers is an indictment of foul air and intemperance, and the large number of consumptives to be found in such open air occupations as those of the teamster, the

huckster and the peddler discloses to a pitiable degree the ravages of poverty.

But you ask, what is to be done? You have been trained to your occupation and at this late date you cannot be expected to make a change. By no means make a change unless your health is failing. Nevertheless the strength to work at anything at all, it matters not what, is better than ill-health and inability to work at the finest occupation known. If you don't comprehend this now, it may safely be said that you will realize it with much bitterness when you are on your back, waging a life-and-death struggle with the tubercle enemy. If you are enjoying good health, continue in your occupation, but if it leads along a perilous path, be ever on the alert. If your working quarters are unhygienic, never cease to demand reform. There is one plank at least in the platform of trade unionists upon which the entire public is prepared to stand resolutely with labor, and that is the demand for the sanitary shop. Much, however, depends on the habits of the worker, and your agitation, if it is to be effective, must influence the laborer as well as the capitalist.

Indoor positions should be fortified by good ventilation and plenty of fresh air, but the danger of dusty occupations is greatly reduced by the worker wearing a properly fitting respirator. The evils of cramped positions may be reduced with proper exercise in the open air during hours of recreation. Absolute prohibition is the only cure for the ill effects of intemperance; and for occupations which demand severe muscular strain, and exposure to ex-

tremes of temperature, only the strongest should apply. But the dangers of occupation are generally insignificant in comparison with the dangers of the home, and the hours of recreation. You can, if you only will, make of your home-life and your hours of recreation not alone a bulwark of defence, but a source of strength that will enable you to throw off the enemy which assails you in your work.

It is a fact frequently remarked upon by people of foreign countries, and, indeed, avowed with pride by many Americans themselves, that the people of the United States are greater "hustlers" than the people of any other country. This is true, but it is doubtful whether anything more is accomplished by the so-called "hustling." Certainly this incessant rush is to be credited with many a death from tuberculosis, and is it not, after all, as Professor William James has pointed out, a bad habit resulting from a wrong ideal?[1] Has it not become "the thing" in the United States for men and women to be so terribly busy with work or with social engagements, which in the case of many women amounts to the same thing, that they have positively not the time to live healthily? If regularity, system, and hygienic living do not invariably bring a larger return in dollars and cents, they at least bring more joy into life and less sorrow and ruin from tuberculosis.

Regularity must be the watchword of the healthy home. There should be a regular hour for each meal; as regular an hour for rising as for retiring;

[1] "Talks to Teachers on Psychology and Life's Ideals," Professor William James, page 212.

a regular time, preferably one hour before meals, for drinking a glass of water; a regular hour, preferably immediately after breakfast, for a bowel evacuation; a regular time for cleansing the body, and especially the teeth; regular hours for work, even if that work is a matter of attending social functions; and last, but by no means least, regular hours for play and exercise. Every healthy man or woman should walk at least four miles a day.

System is carrying out the premeditated or unexpected programme of the day in such a way as to fit in with regular hours and habits. He who would be systematic is destined to many failures. We cannot become machines, and things will constantly arise to interfere with our most carefully arranged plans. But much can be accomplished and much weariness of indecision avoided if we would take ten minutes of every evening to systematically plan the activities of the day to follow. Emergencies will arise which will interfere with the programme, but if a definite time is prearranged during which the majority of emergencies may be met, one will accomplish a vast amount by giving to his body, and to his army of defence, the consideration that is their due.

If your occupation requires you to remain indoors most of the day, it is an easy matter to arrange that the one-third of the twenty-four hours which you spend in bed shall be lived in the open air. Don't wait until you get tuberculosis to sleep on a sleeping-porch. Do it now. Infants, children, adults and old people, if properly dressed, with night-caps, underclothes, and bed-socks, sleep out-

of-doors on zero nights with the greatest comfort and benefit. One to a bed should be the rule where health is a first consideration.

With nature, at nearly every turn, there is what may be called an equilibrium or balance, the finding and maintaining of which spells success. But it varies with the individual, and so each man must persistently experiment until he finds it for himself, and all fathers and mothers should endeavor to have their children attain it as nearly as possible. If you were to put your arm in a sling and keep it there, it would in time become wasted and useless. On the other hand, it is quite possible to exercise your arm so violently that the muscular action would break the bone. Somewhere between these extremes is a balance betwen rest and exercise which will develop the arm to an ideal strength for the accomplishment of work. You can readily understand that such a balance cannot be standardized for all people, and further you can realize that for any one person it must be more or less of a sliding scale. As you exercise and the arm develops, more exercise may be added, *i.e.*, the balance will attain a higher level than before, until finally the ideal is reached. Likewise, there are balances of work and play, sleep and activity, pleasure and pain, and many others. The balance of attack and resistance is most interesting in its relation to immunity. As pointed out, the North American Indian and aboriginal races succumb readily to tuberculosis because their white cells throughout the centuries have not gained the strength that comes with struggle against the tubercle foe. In the same way

if, after living in a secluded paradise free of all temptation, you were to be suddenly forced to encounter the vices of the world, there is little doubt that you would succumb to what, in the case of another, might be easily resisted. Thus there is for you, or your child, a sphere where, quite possibly, temptation of an extreme nature would be overwhelming, but where the overcoming of the lesser temptations and obstacles, which every man sooner or later is called upon to meet, steadily develops moral resistance.

There is, particularly in mothers, too great a tendency to protect their children from anything and everything that is disagreeable, or even remotely threatening to the child. We find mothers sending their children to school in automobiles because the child feels disinclined to walk, allowing them to play indoors because the weather is threatening or because the child is lonely, giving them delicacies because the child refuses to eat what is plain and nourishing, protecting them from the bad little boy next door because he might tempt them into mischief—in short, responding to the natural human impulse to give the child what he wants, but not having that impulse ruled by reason. And all of this is called carefulness!

If you would bring up your child to meet the dangers of life, do not let the precious days for developing in him moral resistance and physical strength slip by. By all means keep ever the watchful eye, but curb your desire to interfere when the little tragedies of childhood arise. Learn to regard the obstacles and rough spots on the road of life as

nature's tonic for developing in your child a rugged self-reliance, self-control, and resistance to the forces of evil which assail the moral, mental, and physical equipment of every individual.

This brings us to the final question—Why do you live? What is your life's objective? Is it one vain search for pleasure, or are you seeking something higher and nobler? Here is a young man who wonders what his chances are of contracting tuberculosis. Let him tell how he spends his evenings, and the answer will not be far distant. Love of liquor, love of excitement, love of what is sordid, and slavery to passion and pleasure—these are the loves that break down the finest army of resistance that ever held subdued a tubercle foe. The history of the tuberculous patient in the majority of cases points to the fact that he has not been able "to abstain from, and to enjoy, those things which many are too weak to abstain from and cannot enjoy without excess."

The prevalence of tuberculosis is less marked among married people than among those who are not married, and this is, as Mayo Smith says, "partly due to the fact that marriage in itself is more or less a process of natural selection, and partly to the greater regularity and soberness of life induced by marriage."

Be ever on the alert to make use of anything and everything in life which will create a greater degree of self-control and unselfishness. Something accomplished in this direction may some day save your life, when everything may depend on your ability to master your own desires and to follow the

advice of another. The training of the day tends too strongly towards achievement, and neglects renunciation, and so, as Professor William James puts it, "Keep the faculty of effort alive in you by a little gratuitous exercise every day. Be systematically heroic in little unnecessary points."

There exists with some people, particularly with some women, an unfortunate fallacy with respect to "unselfishness," but which, viewed in its true light, appears quite the reverse. The individual is obsessed with the idea that her life must be sacrificed for those around her. For who else is there to do what has to be done! The importance of her activities occupies in the mind of such an one a magnitude quite out of proportion to their actual value. Should anyone suggest that she should lie down during part of the afternoon for a rest, she resents it as unfair and unappreciative—as if she, of all people, could possibly take the time to rest! And the declaration is followed by a deeply-drawn sigh. The fact is that her long-standing habit of being busy would render it intolerable to her to indulge in any relaxing or reflective practices. She regards herself as a martyr to an irremediable cause. The idea is encouraged by the sympathy of others, and she never stops to really seriously consider whither her sacrifice leads. Occasionally the picture of herself as broken in health flashes before her, but she sees it as something meriting sympathy, rather than as a warning of expense and sorrow to others which will far outweigh the attainments of a life of blind sacrifice.

Every one should realize that one's first and

binding duty is obedience to the laws of Nature. If these be broken, a punishment inexorably follows, and the sad part of it is that the punishment is not confined to the offender, but extends also to relatives, friends and descendants. No wish or desire of the heart, no kindly impulse, should have the right of way over the laws of Nature. It matters not why you break the law, the punishment is the same. If the requirements of your home are such that to carry them out you must break the laws of Nature, those requirements should be changed. None of us are indispensable; the world and the home can manage without us, and so, whatever else forms our life's objective, the first tenet must be obedience to reason and not to impulse, obedience to God and not to man.

CHAPTER IX

War Clouds

It is a lamentable fact that the battle between the tubercle germ and your forces of defence may have assumed appalling proportions before you even become suspicious that the enemy is upon you. A great deal depends on your temperament, as to whether or not you become aware early that there is something going wrong somewhere in your make-up. If you are a man who works hard, and are not much given to thinking about yourself, you are likely to be conscious only of your inability to accomplish, in the same time, as much work as you formerly did. Your staying powers have become somewhat limited; you start off just as fine as ever in the morning, but, as the day develops, you find yourself putting off things until to-morrow that you used to do to-day; towards evening you are just a little bewildered, you don't think as quickly, as clearly, or as accurately as you did in the morning, and you come home from work disinclined to take up anything that requires concentration and effort, but wish simply to loll around until the hour for going to bed arrives. Perhaps also you wonder why little things irritate and worry you in a way quite out of proportion to the usual. You may rightly come to the conclusion that you need a holiday, and perhaps, being able to afford it, you take a brief vacation and you feel much more energetic for a short while after you return to work. But grad-

ually the old inertia returns and your friends say you are looking tired. Should you happen by chance, perhaps "just for fun," to stand on a pair of scales, you note that you are not quite as heavy as you were a year ago—oh, just a matter of five or ten pounds or so—but, of course, that is natural enough, because, when you come to think of it, you haven't been eating quite as much—you have rather turned against your food of late, and, in fact, food is often inclined to nauseate you a little, and you think perhaps you will pick up something in the way of a tonic at the drug store.

Haven't you a cough? Well, no, nothing more than the other fellow has, just a clearing of the throat, and that is, you are sure, owing to a little catarrh at the back of the nose. And then one morning, as you are walking to work, you suddenly feel something warm in your mouth, and when you spit, you are startled to find that about a tablespoonful of blood has come up from some place, but you don't know exactly from where. However, you have heard of a man who had somewhat the same sort of thing happen to him from a "varicose vein in the throat," so perhaps it is wiser not to frighten the people at home by saying anything about it. Your relatives have already been talking about your being "run down from overwork." Unfortunately, neither they nor you realize that a man is practically never run down from overwork alone; nearly always there is a very definite reason, other than overwork, and very often a diseased condition to account for it.

If anyone were to suggest tuberculosis to

you, you would like to hit him. The idea that anyone in your family *could* have tuberculosis is positively insulting. But as the weary weeks drag into months, and occasionally you feel a little feverish in the evenings, and the catarrh becomes a severe cough in the mornings, and you disseminate in the highways and byways, to say nothing of your own home, enough tubercle germs to infect the town, you begin to have a secret dread that even you may perhaps have just a little trouble—perhaps bronchitis, or "lung catarrh," but oh, no! not tuberculosis! And then you make the most inexcusable mistake you ever made in your life—you refuse to go and see a doctor, for fear of what he may tell you! The day comes finally when you literally fall in your tracks, a doctor is sent for, and you discover to your utter surprise that you haven't six months of life left, and that other members of the family are in a fair way to follow in your footsteps.

Some readers of this tragedy may feel that it is overdrawn, may feel that it is quite impossible for a man or woman to be so utterly ill with tuberculosis and not know it. Within a month of this writing, there died at a well-known sanatorium a young lady who, less than three months previously, had started on a journey to visit an exposition. She became ill on the way, and not only was it a great surprise to her to learn that she had tuberculosis, but it was found at that time that the enemy had made such desperate ravages in her chest, ears, throat, and bowels that recovery was out of the question.

It was the writer's experience several years ago to witness an Indian wedding in the wilds of Northern Canada. The young groom was a fine, big, strong, healthy looking fellow, but it was noticed that during the ceremony his voice was somewhat husky. In response to an inquiry he stated that the hoarseness had existed for several months; his temperature was taken, and it was found to be over 103°. The reason may be readily inferred, still it was quite impossible to convince him that he was ill; he *felt* well and there was an end to it. As you may possibly argue that there were extenuating circumstances to account for the high temperature, it is well that you should realize that no excitement, not even a wedding ceremony, is capable of producing a temperature of over 99° in a healthy person. Further, the temperature in tuberculosis is so unstable that very little in the way of excitement soon affects it. It is not at all uncommon for a tubercular temperature to be running over the hundred mark every afternoon and for the individual to be none the wiser. But a little temperature, say only 99°, repeated every afternoon or evening, should arouse your suspicions, and if, after resting for a few days, the temperature reappears on exercise, lose no time in seeking expert advice. If, with the temperature, there is an inclination to perspire, even a very little, after going to bed for the night, all the more reason for being on your guard.

In the Indian bridegroom a symptom which should early have aroused his anxiety was the persistent huskiness of his voice. You have doubtless

experienced a temporary hoarseness upon "catching cold" or perhaps from undue enthusiasm at a football match, but when weeks pass by and the hoarseness appears to have come to stay, you should lose no further time in ascertaining positively its cause, even if you are feeling quite fit in every other way.

There is much tuberculosis among the North American Indians, and it is wonderful how their resistance and outdoor life enable them to do hard work for years while suffering from the disease. It is no very exceptional thing to see a redskin, while tumping on his head and shoulders a load of two or three hundred pounds over a rocky portage, bring up, at every few hundred yards, sputum colored with blood, and it sometimes happens that an Indian will have a small hemorrhage at one end of a portage, and then go back for another load. Should it ever be your experience to cough up blood, or to continuously bring up blood-stained sputum, let no one soothe you into imagining that there is not, underlying it, a serious reason. Conclude positively that you have tuberculosis, and hold to this opinion until a competent doctor, or, if need be, a specialist, has proved to you definitely that there is another reason to account for it.

The great majority of people who develop tuberculosis before becoming aware that they have any trouble are under the standard of weight for persons of their age and height. It sometimes happens that marked loss of weight is the only cloud that appears on the horizon long before the storm of battle breaks. Look to the following table which

is based on the average weight of 77,178 healthy individuals, and if you find your weight is below the average, it is well that you should endeavor to increase it. If it be far below the average it would be well to search diligently for the cause.

TABLE SHOWING AVERAGE WEIGHT FOR HEIGHT AND AGE, BASED ON TABLES CONSTRUCTED BY OSCAR H. ROGERS, M.D., FROM THE RECORDED HEIGHTS AND WEIGHTS OF 74,162 INSURED MALES AND 3,016 FEMALES. THE HEIGHTS WERE TAKEN IN SHOES AND THE WEIGHTS IN ORDINARY CLOTHES WITHOUT COAT, OR WITHOUT COAT AND VEST.[1]

MALE

Age	5 ft.	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"	5'11"	6 ft.
20	114	117	121	125	128	132	136	140	144	149	153	158	163
22	116	119	123	126	130	134	138	142	146	151	155	160	165
24	117	120	124	128	131	136	139	144	148	153	157	162	167
26	118	122	126	129	133	137	141	145	150	154	159	164	169
28	120	123	127	130	134	138	142	147	151	156	161	166	170
30	121	124	128	132	136	140	144	148	152	157	162	167	172
32	122	125	129	133	137	141	145	150	154	159	164	169	173
34	123	126	130	134	138	142	147	151	155	160	165	170	175
36	124	127	131	135	139	143	148	152	156	161	166	172	176
38	124	128	132	136	140	144	149	153	158	162	167	173	177
40	125	129	133	136	141	145	149	154	158	163	168	173	178

FEMALE

Age	4'10"	4'11"	5 ft.	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"
20	103	106	109	113	117	120	123	127	130	134	138	142	147
22	105	107	110	114	118	121	124	128	132	136	140	144	149
24	106	108	111	115	119	122	126	129	133	137	141	145	150
26	107	110	113	117	120	124	127	131	134	139	143	147	151
28	108	111	114	118	121	125	128	132	136	140	144	149	153
30	109	112	115	119	123	126	129	133	137	141	146	150	154
32	110	113	116	120	124	127	131	135	138	143	147	151	156
34	110	114	117	121	125	128	132	136	140	144	149	153	157
36	112	115	119	122	126	130	133	137	141	146	150	154	159
38	113	116	120	123	127	131	135	139	142	147	152	156	161
40	114	117	121	124	128	132	135	140	144	148	153	157	162

Cough has not been mentioned earlier in this chapter because what the majority of people under-

[1] Taken from Osler's "Modern Medicine," vol. iii, page 328.

stand by cough is liable to be a late manifestation of the battle that is in progress. To be sure, there nearly always occurs fairly early in the disease a little tickling of the throat which causes you to occasionally clear it, or to give that insignificant variety of cough that sounds like "nervousness," affectation, or a desire to attract somebody's attention. Beware of the so-called "stomach cough." Stomach cough it may be, but a tendency towards indigestion or nervous dyspepsia is notoriously a war cloud. Likewise, be very suspicious of a cough that comes with "malaria." Malaria, as a matter of fact, is seldom complicated by bronchitis, and very often is a misnomer that permits tuberculosis to run on undetected for months. A summer "cold" in a person under forty, unless a definite cause be known for it, or a cold that clears up for a while, but keeps constantly coming back, should make you earnest in seeking the information that may save your life.

It sometimes happens that doctors, as well as many other people, make the mistake of imagining that pleurisy is a disease in itself. Pleurisy is, at best, only a war cloud; it is the smoke of a smoldering conflagration, and, once it appears, it should put you ever on the alert for trouble that may not break out until many years later. There are several conditions which cause pleurisy, but the pleurisy for which no cause can be found is generally a symptom of the silent battle with the tubercle bacillus. Likewise, continuous oppression in the chest, or constantly recurring fleeting pains in the same region should put you on your guard. Finally,

there is a form of abscess which occurs close to the rectum, and which is known as an "ischiorectal abscess"; this is frequently the first sign that somewhere in the body a battle against the tubercle enemy is going on. It often leaves a discharging opening which does not heal.

There are many people who discount symptoms of tuberculosis occurring in themselves, and who rest in an utterly false security through the thought that the disease has never occurred in their particular family, and is therefore unlikely to occur in them. As a rule there is far too much stress laid on hereditary tendencies, and that stress is laid too markedly on the one disease, tuberculosis. As a matter of fact, weakness of any and every kind in the parent is to some degree inherited by the child, and makes him just that much more open to attack from the tubercle enemy. The child of the syphilitic parent, of the drunkard, or the parent with defective mentality, is often predisposed to tuberculosis just as much as is the child of the tuberculous parent. Further, *two patients in every three* come from families where tuberculosis is unknown.

The fact that you have recently been successful in passing a medical examination for life insurance means practically nothing, so far as incipient tuberculosis is concerned. Such examinations are generally too casual to detect anything but a flagrant tuberculous condition in the chest. There is no disease in which the importance of early discovery is as great. In the case of tuberculosis, the old proverb should read: "A stitch in time saves nine

hundred." There is no disease the discovery of which occasions greater surprise, and for years after its contraction you never cease to wonder that it is actually you who are its victim. Therefore, put not your faith in heredity, nor in the invulnerability of your own strength, but when the clouds of war, be they ever so small, appear with shadowy uncertainty on the distant horizon, gird yourself for the conflict, and, with a heart prepared for the worst, and a mind manfully determined to learn the truth, do not rest content until the verdict has been scientifically secured.

CHAPTER X

The Intelligence Department

Every one who knows anything about war departments and military methods will realize how comparatively helpless a country or an army would be without an intelligence department to secure accurate information on matters pertaining to military necessities and the condition of the country, and to impart such information to the director general. In days of peace, the work of the intelligence department is, naturally, much reduced; it seeks, nevertheless, to keep in touch with the activities of any and every possible enemy. Should an enemy seek an invasion, the intelligence department, through its special information, is the first to discover the fact, and when invasion actually does take place, the intelligence department is indispensable in giving information regarding the size, the position, and the strength of the enemy. Imagine a general undertaking to lead his army to victory without being confident that a war was in progress; without having ascertained the location of the enemy, and without having the slightest idea of the course he should follow to gain an advantage! Such a man would be a fool, not a general.

You are the general of an army of billions of white cells, not to mention the other forces. Their destiny lies to a great extent in your keeping. Have you instituted an intelligence department that is

giving you accurate information and advice? Do you know whether or not your forces are at war? Do you know the character of the enemy? Do you know what course to follow to avoid ambush, surprise, annihilation?

An amusing and, at the same time, sad characteristic of many a man whose health is failing is that he derives pleasure through being deceived, or "bluffed," as the world terms it. It matters not that he knows he is being deceived. The assurances which he so cherishes are not open to criticism or analysis; they are accepted at face value. They are so soothing that even when he can no longer get his friends to deceive him, he continues to deceive himself. In his deepest consciousness he has a realization that it is all untrue, that it cannot last, but the fact is he is not made of the stuff that can look danger and trouble squarely in the face. Anything that may possibly help and which may serve to avoid an actual declaration of war is acceptable. One day, while reading the newspaper, he makes a discovery. On the third page there is advertised the very medicine for his case. It says that it cures tired feeling, cough, pain in the joints, skin rashes, falling hair, and many other conditions. He has no skin rashes, falling hair, or pain in the joints, but he always feels tired and has a cough, and as those are the first things mentioned, the medicine is sure to be just the thing he needs. He is so sure it will help him that he feels better for a while after taking it. He doesn't know that the first essential of every tonic patent medicine is a stimulant, and the stimulant gives him a temporary boost. But the effect

soon wears off. In the meantime, he has found another preparation that he is sure is better than the previous one, and so the poor fellow goes along trying many of the five hundred so-called cures for tuberculosis. In the United States alone these cures bring to their manufacturers an annual income of fifteen million dollars.

If you have failed to do so, lose no time in searching your mind. Try to rise above desire and fear, and look facts squarely in the face. Are you letting other people bluff you about your health? Are you bluffing yourself? Are you depending on some vague chance, such as a patent medicine, to pull you out of a condition which in your innermost soul you know is serious? Strength lies in truth, weakness in deception. Therefore, institute an intelligence department that will give you the truth. The medical profession is your intelligence department. Note the relationship. The doctor is not the general, he is not the leader of your forces. All he can do is to supply information, to point out the pitfalls, to tell you where lies safety and where lies danger. You are the general and chief commander. You alone are responsible for your actions, you alone must marshal your forces, and you it is who determines the personnel of your headquarters staff. Naturally, if your chief medical adviser gives bad advice, you are liable to make grave errors. Therefore, spare neither pains nor money in making certain that the doctor you choose is trustworthy.

From the accounts of one writer,[1] it would seem that many members of the medical profession are

[1] Thomas Crawford Galbreath in his book "T. B."

open to censure for apparent failure to recognize tuberculosis in its incipient stage. He mentions two prominent sanatoria which conducted investigations and declared that a mistake had been made in the diagnoses of the conditions of about 50 per cent. of the patients previous to their entry. Certainly the extraordinary statements of many patients in health resorts would confirm the opinion that some doctors are deficient in the necessary knowledge and skill pertaining to the diagnosis and treatment of tuberculosis. As is usually the case, however, there are two sides to the story.

What we don't understand, we fear, and although tuberculosis has been known and studied since before the time of Hippocrates (B. C. 460–376), it is only within the last few years that the public has begun to get a very imperfect idea of its cause and effect. As a consequence, the word tuberculosis, or consumption, has in the past filled the lay mind with dread, and even to-day the country is full of phthisiophobists.

No words could better picture the fate of a consumptive in the years gone by than extracts from a letter of George Sand written at Marseilles on her return from a trip to the Island of Majorca, whither she went in the winter of 1838–39 in a vain search for health for her friend and protégé, Chopin:[2] "The landlord of the little house which we had rented turned us brutally out-of-doors, and wanted to proceed against us legally in order to force us to give a fresh coat of plaster

[2] To M. François Rollinal, à Chateauroux, "Correspondence de George Sand," vol. ii.

to his house, infected by contagion. The native jurisprudence would have plucked us like chickens. . . . We had there the utmost difficulty in procuring the most common nourishment that the island produces in abundance, thanks to the ill will and thievish spirit of the natives, who made us pay for things almost ten times their value. So, indeed, we were at their mercy, and in danger of perishing of starvation. . . . Chopin grew steadily worse and in spite of all the so-called offers of services that were made us in truly Spanish fashion, we hadn't found one house which would offer us its hospitality, in the whole island. Finally, we resolved to depart at any price, even though Chopin had not the strength to drag himself along. We asked one single, one first, one last service: A carriage to carry us to Palma, whence we wished to embark. This service was refused us, although our friends had every sort of equipage. We have perforce to journey three leagues on execrable roads in a wheelbarrow or in a bath-chair. On arriving at Palma, Chopin had a terrible hemorrhage. We set off the next day on the only steamboat of the island, which is used to transport pigs to Barcelona. No other way of quitting this cursed country! We were in company of one hundred pigs, whose continual cries and foul odor left our patient no rest and no respirable air. The hemorrhage continued right to Barcelona, and he dragged himself along like a spectre." This was in 1838, but many people to-day are just as ignorant, just as unreasoning, and just as heartless in their attitude toward tuberculous patients,

but they dare not exhibit their feelings quite as callously as did the people under whose maledictions Chopin suffered.

Imagine, if you can, the effect of telling a person of this type that he or she has tuberculosis! A doctor soon learns from experience that in making such a statement he must expect to be maligned and slandered as an alarmist and a quack. Then, there are these three important facts: First, tuberculosis in its earliest stages is most difficult to distinguish from several minor ailments of little significance; second, in incipiency it is most difficult to convince the tuberculous patient that he has anything wrong with him. He generally looks well and feels pretty well, a condition which he imagines is quite incompatible with tuberculosis. Third, the majority of incipient cases clear up quickly with comparative rest. There are many people who have had incipient tuberculosis which has healed without knowledge on their part of their having had anything the matter with them. The doctor who tells his patient that he is suffering from incipient tuberculosis has to be positive of his diagnosis, and make his statement knowing that it may be taken as an insult, that the patient will doubtless alter his way of living because he has been frightened, that he will probably get well, and, if so, will most certainly hold the doctor up to unjust ridicule in the community. For this reason, many doctors will not diagnose tuberculosis until they find the tubercle bacilli in the patient's sputum, and as Lawrason Brown says, "He who always waits for tubercle bacilli to appear in the sputum before

making a positive diagnosis is apt to come to the conclusion that many cases of pulmonary tuberculosis have slight chances of recovery." There is no question as to what a doctor's duty is, ridicule or no ridicule; but doctors, like ministers and lawyers, are human.

Many a doctor suspects tuberculosis and hints his suspicion as strongly as he deems wise, but a patient is very slow to take a hint that, when acted upon, is going to change his whole life. As a rule it does not suffice to *tell* a patient he has tuberculosis. Speaking metaphorically, one has to hammer it in with a sledge hammer before many a patient will consent to follow the treatment, and it is open to question just how far a doctor is justified in exercising persuasion. Many a doctor who makes a perfectly correct diagnosis of tuberculosis is slandered and misrepresented in after-years because he did not force an unwilling patient to follow the proper treatment. Many a patient when he comes face to face with death is apt to blame anybody and everybody rather than himself. How often we have heard a patient say—"When the doctor told me that, he so discouraged me that I became perfectly reckless"; and how often we have heard another say—"If the doctor had only told me the whole truth I should have acted very differently!" Please note that in both instances it is the doctor who is to blame!

Any physician who has ever been a patient, and has received the confidences of other tuberculous patients, can tell you of the countless foolish misunderstandings which arise between doctor and

patient simply because their points of view are so far removed from each other. Take, for example, the word "cavity" which the doctor may have occasion to mention. To the dentist the word has one meaning, but to the excavator it may mean something very different. If a patient had had five years of hard study in a school of medicine, it might be reasonable for him to expect a perfectly straight answer to many of his questions, but it must not be forgotten that a doctor is employed not as a teacher, but as a reliever of suffering, and it is the doctor's business to decide what information will tend to relieve suffering, and what information will tend to add to suffering, and it is his duty to withhold the latter information. When three or four years have passed by and you are still "chasing" the elusive cure, do not be too harsh in your criticism of the old family doctor who, out of the kindness of his heart, let you down very easily by saying it was only a matter of a few months before you would be back at work. Perhaps he misjudged your case, and perhaps he judged it with accuracy and an insight which took into account your mind as well as your body.

CHAPTER XI

The Chief Medical Officer

In every business and profession there are men of widely varying intellects and character. A few are artists in their work, the majority are mediocre; some are dunderheads, and a scattered few are a disgrace to their calling. In a profession which has as its one purpose the alleviation of suffering and distress, it is difficult to realize that inefficiency and wickedness can find a place. But just as there are good carpenters and bad carpenters, good brokers and bad brokers, good ministers and bad ministers, so there are good doctors and bad doctors. In no other profession, possibly, is the opportunity for either goodness or badness so manifest, and in no other profession can badness prosper to such a degree.

In the medical profession, as, indeed, in all professions, there are two kinds of badness, active and passive. Active badness or wickedness in a doctor is disclosed in aggressive attempts to deceive, defraud, or to make money illegitimately, or on false pretences. Passive badness is revealed in ignorance, laziness, inefficiency, and carelessness. The former is often the outcome of the latter. It is very difficult for a layman to judge who is a good doctor, and who is a bad one. Many patients criticise a doctor adversely for following a line of treatment which is not only scientific but is in all

respects the treatment indicated for the particular case. On the other hand, an unprofessional and unscientific medical man is sometimes pointed out by some good lady as "the best doctor in town." Doctors themselves often have difficulty in determining the standing of one another, but they are in a much better position to ascertain accurately than anyone outside of the profession. While doctors are not prepared to pass judgment on the professional ability and integrity of each other, they nevertheless have examinations and a set of laws known as medical ethics, and a doctor who does not come up to the standard set by the profession is naturally looked down upon by his brother practitioners. You would be wise not to choose such a doctor as your chief medical adviser. A right-minded medical man cherishes, above everything else, the respect of his brother physicians, and will not openly go contrary to medical ethics, provided honor means more to him than money, and he has the ability to make a living as a regular practitioner.

A doctor who advertises himself and his cures in the newspapers, or on pamphlets for the public, has sacrificed the respect of the profession, and you would be wise to have nothing to do with him and his "cure." When a cure for tuberculosis, or any other cure worth the name, is discovered, the discoverer will not have to pay money out of his own pocket to advertise it in the local press. Even if he be a country doctor in some obscure hamlet, he knows the way is open to him to present his facts in a legitimate manner to the nearest medical

society, and if his facts stand the light of investigation, he will be heralded far and wide, not in one country only, but throughout the world, as a benefactor of mankind. No better advertisement for a doctor is needed than work well done. If he does good work, he will get all the patients he can take care of without having to resort to the newspapers.

Beware, also, of the doctor who tries to make capital out of criticising the members of his own profession and their work. Nothing is gained for a patient by sowing seeds of discontent over matters that are passed and gone. The work of a doctor is to deal with the present and the future, and he who tries to rise on the faults of his brethren does so because he realizes his inability to rise on the honorable basis of work well done.

It is not always the most successful doctor or the doctor with the largest practice who is the cleverest. Many of the best qualified physicians get utterly out of patience with the ignorance, opposition and foolish questioning of some sick people, and in no way attempt to conceal the fact. This does not increase business. Generally the most successful doctor from the business standpoint is the one who possesses that rare persuasive force which compels patients to accept his advice, and act upon it, without his being obliged to enter into explanations.

In choosing your chief medical adviser, pass by Doctor Advertiser, Doctor Knocker, Doctor Boozer, Doctor Gambler, and Doctor Hipped, and look for a doctor you believe to be scientific, ear-

nest, thorough, high-minded, and one who does not stake everything on some special line of treatment. When you consult him, remember that he makes no pretence at being a clairvoyant—tell him frankly everything about yourself you feel he should know. If you have been the victim of your own folly, tell him that also—he is used to hearing such things, and you will find him sympathetic. If you hold anything back, please do not, at a later date, blame him for making a mistake. During his examination, should he make the slightest hint regarding tuberculosis, it is not sufficient that you should refrain from looking as though you were going to stampede, but, rather, you should realize that it has taken some courage on the doctor's part to even hint at tuberculosis, and you ought to follow up the hint with all the assiduity you can muster. Further, it can do no harm, and possibly it may do a great deal of good, for you to ask the doctor quite frankly whether there is anything about your condition which simulates tuberculosis. There is nothing inconsistent or ridiculous in the question, even if you are a big, fat and powerful-looking man.

During the last few years, startling conditions have been discovered through medical examinations of large numbers of individuals, irrespective of any known ailment or disability. In one instance, out of two thousand men and women examined, 70 per cent. had impairments of a serious nature. Out of thousands who had thus been found to be impaired, only 10 per cent. imagined, before the examination, that they had had anything wrong with them. For

this reason the National Association for the Study and Prevention of Tuberculosis has set apart a special day, December 8th of every year, on which it suggests that everybody, irrespective of his physical feelings, should go to his doctor and have a general overhauling with a view to the discovery of any possible pathological condition which may exist unknown to the patient. If such a system were universally adopted, tuberculosis would certainly no longer cause one-third of all deaths between the ages of fifteen and forty-four.

Where one member of the family is found to be suffering from tuberculosis, it becomes highly important that the remaining supposedly healthy members of the family should go to a doctor for an examination.

It has been found that in the families of from 40 to 60 per cent. of a large group of tuberculous patients examined to demonstrate this point, one or more members of the same household had, or, at an earlier date, had had, the same affliction.

If you go to a doctor for an examination for tuberculosis, or if such an examination is indicated by your symptoms, it is not sufficient for the doctor to listen to your chest through your clothing or even under it. He should insist that you should take off all garments above your waist, and he should examine the back as thoroughly as the front of your chest. If you are in the habit of coughing up sputum, he should have you bring him a specimen, or direct you how and where to send it for a microscopical examination. After the doctor has full details on all the points neces-

sary, he should be able to tell you definitely whether or not there is active trouble in your chest. If there should be the slightest note of indecision or question in what he has to say, your course is plain. You wish a consultation. No right-thinking doctor will take offence at such a proposal, and even if he should take offence, remember it is your life, not his, that is in the balance.

In choosing a doctor for a consultation, in order to determine the diagnosis of a condition which may change your whole life, you should go very carefully, and refuse to have anyone who is not to your knowledge highly skilled in his work. Generally speaking, you should go to a lung specialist, one who is a recognized authority on tuberculosis, or one who is connected with a sanatorium for the treatment of tuberculous patients. If such a doctor is not known to you, write to the National Association for the Study and Prevention of Tuberculosis, New York City, and ask its secretary what doctor in your district he can recommend. Allow the specialist to carry out what tests he deems necessary, such as the use of tuberculin, or the taking of an X-ray photograph. With these tests and others he will be able to tell you to a practical certainty whether or not you have tuberculosis. The money you spend, in making assurance doubly sure on this score, is worth its weight ten times over.

It is possible that a doctor may tell you that you have tuberculosis, and you may doubt the correctness of his diagnosis. You are not exactly to blame for your doubts, but do not rest content

until you are absolutely convinced of the truth. Further, do not start treatment for tuberculosis until your are quite convinced that you have the disease. Imagine, as already suggested, a general setting out to lead an army to battle and not being convinced that a condition of war exists! He would naturally regard the whole thing as somewhat of a joke. There are many patients who come to sanatoria in exactly this very frame of mind. They are carrying out the treatment, but they don't believe they have anything wrong with them. When a serious battle is treated as a joke, it requires little foresight to predict what the end will be.

Develop a high regard for the doctor who tells you the facts about your condition irrespective of your feelings. It may come as a shock to you to learn the truth, but in fact there are very few tuberculous patients who do not recover from the shock a little more rapidly than is desirable. To know the truth is to build your house on a rock, and to know it early is to avoid a weak foundation.

Once the diagnosis of tuberculosis has been accurately made, although you are greatly depressed by the disclosure, although you have the kindly assurance that it is all of little significance, that you will soon return to work, and that the treatment will be a happy rest, it is well that you should realize, and realize early, that you have come to the parting of the ways, and that two roads lie before you—one, the pleasant path of Self-indulgence; the other, the rough road of Renunciation. The one is smooth and inviting to travel. It is

filled with theatres and palm-gardens and card-parties, motor-cars and joy-rides. It resounds with laughter and gaiety, its evenings are long and joyous, but it is shorter than most thoroughfares, and there are no cross-roads, so that should you ever wish to take the other path, you will have to come back against the current of the great multitude travelling towards the strange figure called Death, which is disguised in radiant robes of pleasure, and which stands at the end of the road beckoning them ever onward. The road of Renunciation is steep and rocky and is anything but inviting. It is overgrown with taunts and jibes and sneers, and it is overhung with a darkness which resembles night. But just over the first sudden ascent the sky seems to lighten, the taunts become fewer and are replaced by flowers of respect. The jibes give way to encouragement, and the soil is not of the sort where sneers can grow. It is a long, lonely road, but the farther you travel, the more fascinating becomes its strange, new light, and finally, away in the distance, you discover the dawn of a new day—a day of greater significance and happiness than you have ever before known. Think carefully while yet there is time. Which road will you travel?

CHAPTER XII

Choosing the Battleground

A distinguishing characteristic of every great general is his ability so to direct his army that it will meet the enemy on ground which will give all possible advantage to the home forces and, conversely, put the enemy at the greatest possible disadvantage. It often happens, however, that conditions make it impossible to meet the foe in a place which offers advantages, and it sometimes becomes necessary to make a stand on a battlefield which has serious drawbacks. Naturally, the greater the handicap imposed on the home forces by the character of the battleground, the more seriously the ingenuity of the general is taxed. While the most unfavorable conditions are occasionally attended by success, it is inconceivable that a commander worthy the name would, through prejudice or self-gratification, turn his back on a battleground which offered distinct advantages.

In your battle with the tubercle bacillus, no sooner is it discovered that a struggle is imminent than you are faced with the problem of choosing a battleground. If you are able to put aside impulse and desire, and allow calm reason to weigh the various considerations, you have one of the first attributes of the successful general. Of course, you do not *wish* to go away and leave your home, your friends, and all the joys that have been yours,

but the doctor has suggested that a change of some sort is advisable and before you reject the doctor's advice weigh it carefully, and consider it from all points of view.

You have doubtless been told that you have very little trouble, that everything will be well in a few months or even weeks. It is possible that this may turn out as you have been told, but if you have tuberculosis that can be demonstrated as such, you ought to realize that your way of living must be altered for *the remainder of your life.* You have perhaps been informed in what way your living must be altered, but knowledge is one thing and the application of knowledge is quite another thing. You will be a very exceptional patient, and you will be the member of a very exceptional family, if, even in a reasonable time, you can apply the treatment for tuberculosis as it should be applied in your home.

You will do splendidly for the first two or three weeks, and the family will back you up, because both you and the family have been badly frightened, but in the course of a month or two, when you *look* like the healthiest member of the household, your friends will begin to question whether your doctor knows what he is talking about. They think it is rather a joke that you are not allowed to see them when they drop in during your rest hour in the afternoon, and they secretly come to the conclusion that you are just a " little bit hipped " about your health. Gradually your own family begins to question " all this business of

lying around," and you happen to hear some one express an opinion, not intended for your ears, to the effect that if you would get up and do a little work, perhaps you would forget your troubles. And all of this is quite in accord with your own feelings. You have long ago begun to chafe under the confinement of the treatment the doctor has laid down. Long ago you have come to the conclusion that it is all fiddlesticks, because you are feeling fine and just long to get out with the boys. In your opinion, you are quite the exception to other tuberculous patients. This rest treatment may be all right for the other fellow, but you are quite different. . . . Go question the poor consumptive who is on his deathbed. Did he consider himself an exception in the early days of his disease? He will tell you that that is the reason he lost all chance of recovery.

Take heed while yet there is time. If you are to win your battle, you must be saved from yourself. That is possible under right conditions, but it is much more serious if, at the same time, you have to be rescued from the harmful influences of your family and your friends. It is one thing for a doctor to treat a patient and enable him to see the wisdom of following the proper treatment. It is a vastly different and much more difficult thing for the doctor to have to treat the whole family, and educate the family's many friends. Until such time as you are a veteran in the struggle, it is well that you should free yourself of home handicaps, and give yourself every opportunity to acquire

habits which will have to be practised to a greater or less degree for the remainder of your life.

If you are the head of the family, or the one who is expected to solve the family's problems, the necessity for getting away is all the more urgent. In addition to this, there is the important reason that a change of surroundings will be a stimulus to your recreative forces. If the change can be made to purer air and more sanitary conditions all the better, but any change, provided it is not to more unsanitary conditions, is better than none. But where should you go? If you could find a hotel, or large-sized boarding-house, which does not aim at making a business profit out of its guests, which has been built where the air is pure and favorable to health seekers, which exercises enough authority over its guests to prevent them from making a noise when you wish to rest, and which in fact has all the conditions necessary for the successful treatment of tuberculosis—if you could find such a place, you will admit that it would be the wisest place to which to go. Such a hotel is to be found in the modern sanatorium. Oh! but you would die if you went among so many sick people! That is where you share a popular notion which is utterly wrong.

You will be surprised to find that the majority of patients at the sanatorium seem to think that your condition is much worse than theirs. Every tuberculous patient thinks he has less trouble than the other fellow. Further, the patients you will meet walking around the sanatorium are a much healthier looking lot of

individuals than the average street-car load of people you see in the city. Their faces are not tired and haggard and lined with care; their faces are fat and tanned and round and happy. To be sure, if you seek out the very sick patients you can find them in their rooms or in bed on their porches, but so far as associating with them is concerned, that depends entirely on yourself. Strange to say, although you think you will die from being among so many sick people, a week or a fortnight will not have been passed at the sanatorium before you find yourself not only seeking out the sick man in his sanctum, but you will be acquiring the most valuable lessons of your life at the feet of this probable victim of bull-headedness, this doubting Thomas who has had to learn by experience.

A sanatorium is more of a hotel or boarding-school than a hospital. A good library, a music-room, very often a billiard-room, and a lecture and concert hall, form a part of many sanatoria, and that a certain amount of the right sort of amusement and diversion is just as essential to the well-being of the patient as rest is a fact that is not overlooked. No special medicine is given. If medicine cured tuberculosis, there would not be, as already mentioned, one death every three minutes from tuberculosis in the United States alone. Should you have some acute trouble, such as a very bad pain in the stomach, of course, you would be given such medicine as would correct that disability, but the aim of the sanatorium is not to

A Group of Sanatorium Patients

give medicine, but to teach you how to overcome bad habits, and to acquire good ones.

Where one's whole life has been a constant training to be active, to do things, it is not easy to learn to lie quiet day after day, week after week, and month after month, especially when you are feeling as though you would like to get up and paint the town red. It is easier, however, to lie quiet when everybody about you is doing the same thing, and when everybody is impressing on you the great necessity of so doing, than when your friends are telling you about their numerous activities, and hinting that if you would get up and get out, you would probably make a recovery much sooner than by weakening yourself continually lying on the bed. Many a man is content to lie outside and rest day after day if only he has some one to accompany him, but it requires exceptional determination and an iron will for a man to leave the family happily conversing within doors and go outside by himself to a lonely couch in the cold, fresh air. At the sanatorium, when you go out to "chase the cure," the family goes with you, and you need not be alone unless you so desire.

At home, when Uncle Joe comes down from the country, you are naturally expected to be pleased to see him at any and every hour, and his sensitiveness to the cold will not permit of his sitting in a room with the windows open. At the sanatorium, you may enjoy a visit from Uncle Joe just the same, but somebody, other than yourself, has the unpleasant duty of making him understand that there are certain hours at which he may see you

and other hours at which he may not. In short, the line of least resistance in the home is away from a cure, and the line of least resistance at a sanatorium is towards a cure.

You have perhaps heard that the food at a sanatorium becomes monotonous. That depends much more on the patient than on the food. Certain it is that no one menu, no matter how elaborate, could please every one of fifty tuberculous patients. About 80 per cent. of all such patients suffer from indigestion at some time during the course of their disease, and, very naturally, their fancy for particular foods is constantly changing. You must realize that you are not going to a sanatorium for good things to eat, you are going to learn how to win your battle. If you keep that in mind as your all-important objective, you will be content with the variety of food which best helps you to accomplish your purpose.

It has been pointed out that a doctor's time for educational purposes is limited. He may spend a half hour with you on each visit, directing you as to what you ought to do and what you ought not to do, and if you are like the average patient, you will have forgotten an hour later the greater part of what you have been told. At the sanatorium you will find old veterans who have learned by experience, and they will continually educate you; you will have before your eyes the foolish man who is losing his battle, and you will see why he is losing it; you will learn to attach importance to important symptoms, and you will not be filled with terror by symptoms that are of little signifi-

cance. You will not exhaust yourself with indecision wondering what you should do and what you should not do, provided, of course, you do not come to the conclusion that you can institute a better program than the one set by the sanatorium. At home you may be able to work yourself up into a frenzy over nothing, and so play upon the sympathies of your relatives that they think you are in imminent danger of dying. At the sanatorium such dramatics would be laughed at by your fellow patients, and you would be ashamed to lose control of yourself before them. Strangers as teachers, and strangers as disciplinarians are very much more effective than are the members of one's own family.

At home, should anything serious, such as a hemorrhage, take place, there is always the risk of not being able to get the doctor. At a sanatorium, you rest in the quiet assurance that should anything suddenly go wrong, there is a doctor in the building ready to come to your aid, and, further, that the doctor will have at hand any special instruments which may be indicated for use in an emergency.

At home your friends, with every good intention, will disturb your peace of mind by regarding you as a menace to the health of the other members of your family. It matters little whether or not they know anything about sanitation, they will annoy you with foolish advice and see danger in many of your harmless actions. You will be deeply embarrassed when you happen to bring up sputum in their presence, and the glances they cast

at your sputum cup will sorely tempt you to resort to the dangerous practice of either spitting in your handkerchief or swallowing your sputum. There is nothing of this at a sanatorium. There, everybody coughs and uses a sputum cup when he feels like it, and no one has any comment to make.

This makes you think of another point. You have so little trouble that you would not like to be reinfected by the other patients in a sanatorium. The chances against infection or reinfection in a sanatorium are very much less than in your own home, for the simple reason that the dangers are much better understood by the doctors in charge of a sanatorium than by your friends and the members of your household. Moreover, that which tends to cure tuberculosis likewise tends to prevent it. Dr. Edward R. Baldwin, of Saranac Lake, writes:[1] "No case of tuberculosis has been known to develop among the employees of the Cottage Sanatorium since its foundation twenty-two years ago. These included waitresses, chambermaids, and laundresses, many of whom were badly nourished on entering the service. The same absence of infection among nurses and attendants was claimed by Dettweiler of the Falkenstein Sanatorium."

The late Dr. E. L. Trudeau, who was one of the greatest authorities in America on tuberculosis, says:[2] "There is much less chance for a susceptible individual to become infected in a well-

[1] Osler's "Modern Medicine," vol. iii, page 184.

[2] "A Directory of Institutions and Societies Dealing with Tuberculosis in the United States and Canada," page iv.

planned, well-directed sanitorium than anywhere in the ordinary walks of life."

It is a fact that a man suffering from tuberculosis and unaware of the presence of the disease is a much greater source of danger than is the recognized invalid. When a case of tuberculosis is discovered in the home, so frequently is it found that some second or third member of the household also has the disease without knowing it, that specialists make it a rule to examine all members of households in which one case of tuberculosis is discovered. Another serious consideration is the possibility of contracting secondary infections, such as common colds, tonsillitis, influenza, whooping-cough, and the like. In the home there is little protection against anyone who comes in, whether it be the delivery boy or the society "caller." Any one of them with whom you come in contact may chance to infect you with something other than tuberculosis. Also, at home there are the infected street dust, the infection of public conveyances, and the smoke of trains and factories, all of which dangers, if not entirely avoided, are greatly reduced at a suitably located sanatorium.

CHAPTER XIII

Campaigning

Considering the convincing arguments in favor of a sanatorium as the best ground on which at least to begin your battle against the tubercle enemy, it is disappointing to record that not over 10 per cent. of tuberculous patients enter sanatoria for education and treatment. What, however, is infinitely worse is that almost 80 per cent. of the men and women suffering with active tuberculosis are obliged to continue at work in spite of their disease. When you begin to chafe under restrictions of treatment, consider for a moment the thousands of fellow-sufferers who would give everything they possess for the opportunity about which you grumble.

Notwithstanding this terrible handicap to the stamping out of the disease, the anti-tuberculosis workers of England succeeded in bringing about in forty years a 50 per cent. reduction in the deaths from tuberculosis, and in New York a 40 per cent. decrease has been accomplished in sixteen years. The greatest factor in these reductions, according to Dr. Newsholme, is hospitals and sanatoria.

Probably the greatest problem with which the majority of tuberculous patients are confronted is the financial one. If you are the breadwinner of the family, you do not see how you can go away and leave the household to shift for itself.

It may be difficult to realize it, but it is just this course which is the right one. If to-day you had been killed in a street accident, what would happen to the members of your family if, as might also happen, you had no insurance on your life? Such a tragedy is occurring in some home nearly every day, and the family is much better able to adjust itself to the new conditions than if it had, added to its loss, the expense and misery of taking care of a dying man. Be perfectly honest with yourself and be sure that "What would the family do?" is not a cloak for your own impulse and desire, or an excuse for procrastinating in a consideration of the real issue. It is better that the members of your family should do without you for a year, or even longer, than that you should become, for an indefinite period, a millstone of infection and financial encumbrance around their necks. There are many sanatoria ready to take you for nothing, and remember that the pride or prejudice which would keep you from accepting such an opportunity when you are utterly unable to pay your way is, in your instance, a sin of selfishness which may be the means of sacrificing lives more precious and innocent than your own.

When all is said and done there remain a majority of tuberculous individuals who cannot or will not submit to sojourn in a sanatorium. For such there have been instituted tuberculosis dispensaries, advice and care stations, day and night camps, visiting nurses, etc. It is not within the scope of this book to describe these various schemes, but it may be pointed out that each has for its object,

not the giving of charity, but the education of the patient, so that he may secure the best possible results on his own resources. It is well that a patient at home who cannot afford a private doctor, or whose doctor cannot spare the time required to give information on all points pertaining to the disease, should seek education early from officials whose business it is to instruct tuberculous patients. Any member of a local anti-tuberculosis association can give directions as to the proper place at which to apply.

Suppose you have come to the conclusion that you wish to go to a sanatorium, and suppose you can afford to pick and choose. Which sanatorium should you select? There are sanatoria in the frosty North and sanatoria in the sunny South; there are sanatoria near home and others far away; some in high altitudes and some down by the seas; some in wet climates and some in the arid plains. Which one offers you the best prospect of recovery? That all depends on your condition, physically, psychologically, and socially. There is no one place which offers distinct advantages for *all* cases of tuberculosis, and very often the place which is desirable for one patient is absolutely contra-indicated for another. Your doctor should be the one to advise on this point. Unfortunately many doctors know little about localities other than the one in which they dwell, so you would be wise to seek supplementary advice about the advantages and disadvantages of any health resort in which you think of residing.

The majority of incipient tuberculous cases,

provided they follow the right treatment, do well in practically any climate. There is an occasional incipient case fated to die from the moment of attack by the tubercle germ, because the individual is lacking in the necessary resistance. But provided your resistance equals or is above the average, and provided you *can be sure* your trouble is in its *incipiency,* you need not worry about climate, but should enter the best local sanatorium. Should you become well enough to again take up your regular work, there is a small advantage in having made a cure in the locality in which you are going to work, especially if that work be manual labor, because a readjustment to the climate will not then be required, nor will the results secured be undone owing to a return to more unfavorable weather conditions.

Every one agrees that it is unwise for a patient who is very ill with tuberculosis to travel a long way from home. Of course, should he be able to afford the best of nursing in his travels and at his destination, the change may give him much relief from his suffering, and is occasionally accompanied by unexpectedly good results. But few tuberculous patients can afford such luxury. Generally speaking, the patient who is suffering from tuberculous diarrhœa, extensive tuberculous involvement of the throat, marked shortness of breath with blueness of the lips, extreme emaciation and weakness, or advanced complications, such as diabetes, Bright's disease, etc., should not go farther away from home than to a local hospital.

With the exception of the very far advanced

cases there are very few tuberculous individuals who would not gain some advantage from a change to certain climates. If you can afford to make a change, you would be foolish to turn your back on a climate which has distinct advantages over that in your immediate locality. Rest, good food, and fresh air all come before climate in importance, notwithstanding that some patients believe that certain climates in themselves are sufficient to cure tuberculosis; and that many people in all health resorts exaggerate the benefits conferred by the weather conditions of their particular resorts. Many cases recover in very poor weather conditions, and you will find some doctors who declare that there is no advantage whatever in climate.

Aside altogether from complex scientific considerations, ask yourself the following questions: "On which days am I more likely to follow the out-of-doors treatment—clear days or rainy days, dark days or bright days, calm days or stormy days?" "On which days are my spirits the more buoyant—happy, sunshiny days, or gloomy, cloudy and wet days?" "On which days do I have the better appetite—when the perspiration trickles down my face, or when I can appreciate a light wrap?" "When do I make the best progress—when humidity melts my collar into a rag, or when a slight tang in the air stimulates my every organ to activity?" "On which days do I most feel the joy of living—when the smoke turns a somersault over the side of the chimney, or when it rises like a fluffy pillar straight up into the blue of heaven?"

The climate which offers more sunshine and less

cloud and rain, more calm and less storm, greater dryness and less humidity, and the climate which offers a more equable barometric pressure than that of your home, obviously offers advantages which are not afforded there. No climate is perfect; it is only relatively better than another climate, and very often you will find, shortly after your arrival in any health resort which is noted for its wonderful climate, that there comes a quite unprecedented period of inclement weather.

There is one great group of health resorts, however, which is preëminent in the advantages it has to offer the tuberculous invalid. This is the group which is situated in high altitudes. High altitudes vary from 4000 to 7000 feet above sea level, and the most famous resorts are to be found in the Alps, the Rockies and the Andes. The Alps are the coldest and have the greatest precipitation of snow. The Rockies have more sunshine and the accommodation is less expensive, but at the same time there is more wind and dust. The opportunities for employment are better in the Rockies, but in nearly every health resort wages are discounted owing to the great number of transients and newcomers looking for positions. Some people are precluded from high altitude resorts, owing to heart or kidney trouble, or a physical condition which will not react to the marked stimulus of the rare atmosphere. Consequently it is always advisable to ascertain before leaving home that there is nothing in your physical condition incompatible with the new conditions.

High altitudes are characterized by rarity of

atmosphere, and this condition stands first among climatic factors in its helpfulness to tuberculous invalids. The rarity of air causes deepened breathing, so that areas in the lung, which in low altitudes remain unused and catarrhal, become, in high altitudes, ventilated and reinvigorated. Children born and brought up in high altitudes have on an average larger chests than other children, and the number of cases of tuberculosis developing in high altitudes is relatively small.

The second condition of great value to tuberculous individuals in high altitudes is the dryness. It is a fact that people in high altitudes drink more water because the water from the body is so readily taken up by the atmosphere. This means that there takes place a greater flushing of impurities from the body, and at the same time there is less perceptible perspiration. So quickly is moisture taken up that, at an altitude of six thousand feet, it is no unusual thing to see the snow disappear as if by magic without wetting the dust beside which it lies. A high degree of humidity is a great handicap to the majority of tuberculous people, and, as may be seen by a glance at a weather chart, the relative humidity of high altitudes is exceedingly low.

Illumination and atmospheric electricity is the third factor in the climate of high altitudes which renders it valuable to health seekers. People are generally inclined to consider sunshine the most important factor in estimating the advantages of a climate, but, important as sunshine is in tuberculosis, it takes a place second to rarity and dry-

ness of atmosphere. It is found that the blood of the great majority of patients going to high altitudes shows a remarkable improvement in richness shortly after the patient's arrival. The blood-pressure, contrary to popular belief, is at first lowered, and, as the patient becomes acclimated, is slightly raised, owing to the increased strength of the heart muscle. A patient is *not* more liable to lung hemorrhages in high altitudes, and in fact many hemorrhagic cases have fewer hemorrhages after going from a low to a high altitude.

Regarding psychological considerations, there are unfortunately too many patients who have never learned what it is to exercise self-control. They seem to be utterly unable to make themselves follow anything resembling a rest cure. Should any such go to a high altitude they will doubtless run themselves to death much more rapidly than if they had stayed at home. It is folly to make the expenditures necessary for a long trip on patients of this character, as there can be only one termination to their condition. There is also another group of cases—those who have been over-protected at home, and whose sensitiveness and tenderness are such that life anywhere, except in the bosom of their own families, would be intolerable. In such cases the advantages of climate or altitude would be more than offset by the great disadvantage of continual fretting.

The social considerations are chiefly those of financial support. It is foolish for a tuberculous patient to consider a long journey to a health resort, unless he intends to stay at least six months,

and has $250 outside of his travelling expenses with which to finance his visit. Plenty at home in a poor climate is much to be preferred to poverty away in a perfect climate. To lie week after week in a sanatorium, worrying for fear that the next month's check will not materialize, is to incur a handicap that has cost many a good man his life. The patient who has a small sum saved up, and who can follow the treatment only until his money is exhausted, should not invest his all in climate, but should conserve his savings for the maximum amount of rest, fresh air and good food at or near his home.

If you have the necessary funds to go to a health resort, choose one which is frankly recognized as good for tuberculosis, and go with the earnest purpose of fighting your disease. A fashionable pleasure resort in the season is worse than useless for the man or woman with tuberculosis, and to go to any resort where you are tempted to try and hide your condition is utter folly.

CHAPTER XIV

The Orders for the Day

Every invalid should make it an invariable rule not to leave a known location for an unknown one, without having ascertained as far as possible the conditions that will be encountered at the end of the journey. Much uncertainty will be overcome if a sanatorium is the destination, but sanatoria differ in kind, just as widely as their superintendents differ in ability. A well-equipped sanatorium should have one or more resident doctors who devote their entire time to the treatment of tuberculosis. As a part of the institution there should be an infirmary where patients may be given proper nursing in emergencies, or when complications arise. There should also be an X-ray equipment and modern apparatus for controlling hemorrhage.

When you enter a sanatorium as a patient, your history should be taken and your chest examined; examinations should also be made of your sputum, blood, urine, blood-pressure, and an X-ray picture taken of your chest. You should be taught to keep a chart of your own condition, and this chart should be inspected once a week by one of the doctors of the institution. Monthly examinations should be made of your chest.

By sending fifty cents to the Secretary of the National Association for the Study and Prevention

of Tuberculosis,[1] you may secure a "Directory to Sanatoriums in the United States and Canada," which will give you a complete choice and reliable information about each institution. You may secure further information by applying for circulars to the sanatorium or sanatoria in which you are interested.

Where your destination is not a sanatorium, the information to be ascertained before departure presents more difficulties. The first question is, Where are you going to stay? Perhaps you think you will register at a hotel until such time as you get an opportunity to look around for a suitable boarding-house. If it can possibly be avoided, you should not set out under any such an indefinite arrangement. It is essential that the first thing you do on arrival at your destination is rest. Especially is this indicated if you are going to a high altitude, as there the work imposed on your heart is very much greater than it is at home, until such time as you become acclimated, which may take from two weeks to a month. The stimulus to undertake much exercise and a feeling of greater endurance is very marked in a high altitude, and more than once it has happened that a weakened individual has undertaken so much exercise on the first few days after arrival that he has suddenly expired owing to acute dilatation of the heart. While such a disaster is infrequent, it is no uncommon thing for a patient to so overtax himself on arrival in a health resort that his period of illness is thereby lengthened by several months.

[1] 105 East 22nd Street, New York City.

If possible, get in touch by correspondence with somebody in the town to which you intend to travel. If the town has a sanatorium, you will probably be able to get information regarding a place at which to stay through this source, as every sanatorium has a list of boarding-houses to which it sends ex-patients or patients who are waiting for admission. The disadvantages of most boarding-houses are their uncertainties. It is uncertain what the character of your room will be and whether or not it has been properly disinfected. You cannot be certain whether or not the eating utensils are boiled after each meal, whether or not you will come in contact with careless consumptives, and whether or not the food will be of the right character and properly cooked. You cannot be certain as to who will look after your needs in case you should have to go to bed for some days or weeks. And there are many other uncertainties. For these reasons, and also on account of restlessness, some patients develop a wanderlust, and continual changing becomes a habit. An occasional change in the same locality is a very good thing for tuberculous patients, but when changes are made too frequently, one is continually unsettled in mind and body, and such a condition is incompatible with good progress. When the change involves a different climate or different altitude, it is much more serious, and too much care cannot be exercised in limiting as far as possible the frequency of such changes. They involve a complete physiological readjustment, and while the readjustment is in

progress the forces of defence are much more vulnerable to attack.

Who is going to be your medical adviser in the new location? Perhaps your home doctor has promised to send you by letter any advice you may require, or perhaps you consider that you will need no further advice on a subject about which you have become more or less a specialist. Not only should you have a doctor at your destination, but you should consult him immediately on your arrival. Neither you nor your home doctor can possibly take into account all the important considerations of altered conditions at your destination, and to get started right in new conditions is half the battle. Further, your physical condition in a month, or even a week hence, may be very different from what it is to-day, and if you are to make an accurate estimate of the advantages or disadvantages of the new location, it is necessary that your doctor should have a picture of your chest condition at the time of your arrival, in order to make comparisons at a later date. If possible, have your home doctor give you a letter of introduction to some doctor at your destination whom he can recommend. It is criminal for a doctor to send a patient away from home with the advice to live out-of-doors, to exercise freely, and to consult no physician.

Is the weather settled at your destination? Owing to the greater vulnerability of your forces of defence during the readjustment following the change to another climate, it is well that you should

choose for travel a season of the year that will ensure comparatively settled weather conditions in the new locality to which you journey. Even in the best of climates there is liable to be a rainy or stormy season, and it is well to avoid initiation into weather conditions at such a season. If by chance you have had a hemorrhage, travelling of any kind should be postponed for at least two weeks after the hemorrhage has taken place.

A question regarding your hand-baggage which may seem to you trivial is, "Do you intend to carry it yourself?" The question, however, involves and illustrates very well the principle of true as opposed to false economy. There are a great many things with respect to which you may conserve your money with benefit, but where your own precious strength is sacrificed in return, the economy is false and is in reality an extravagant investment. To carry your own dress-suit case or valise in order to save fifty cents on baggage transfer, through the extra time you will spend in recovering from the effects of the indiscretion, quite possibly may cost you fifty dollars in the long run. In the same category there are many false economies, such as sitting up all night while travelling in order to save the Pullman fare, economizing on meals at a time when increased exertion demands extra nourishment, or walking from the station in order to save carfare or the expense of a cab.

When you arrive at a sanatorium or boarding-house, do not immediately start in to unpack all

your belongings. Postpone that for a few days, and when you do undertake it, limit yourself to a definite time. You have many days before you to straighten up your room, and if you arrange to undertake this work definitely from 11 to 11.15 o'clock each morning, it will soon be accomplished without evil effects.

At a sanatorium you will find the orders for the day are somewhat as follows:

7.00 A.M.—Rise, wash and dress. Sometimes, if it be desired, a glass of milk or cup of coffee is served before rising. If a patient is not too weak, the back and chest should be sponged with cold water and the skin should be made to glow with a rough towel. The stronger patients sometimes take a cold shower or a cold plunge bath, but this involves a degree of exercise which it is not well to undertake without special permission. The habit some patients have of lying in bed until the last moment, and then dressing in a great hurry, is both foolish and risky.

8.00 A.M.—BREAKFAST. Eat slowly and chew your food thoroughly. If you have pleasant table companions and a cheerful conversation, so much the better for your digestion.

8.30 A.M.—Evacuation of the bowels. This important detail should be attended to just as regularly as any other item of the program.

8.45 A.M.—Lying down outside on the porch or completely out of doors.

10.00 A.M.—Exercise when it has been definitely ordered. Never take it on yourself to regulate your own exercise, as this is the most vital matter in the treatment of the disease. For at least the first two weeks at the sanatorium you will receive no permission to exercise, and do not allow anybody, even although he appears to know more about it than the doctor, to tempt you from your régime of complete rest.

10.30 A.M.—If it be desired, a small luncheon of a glass of milk and crackers, or beef-juice, or raw eggs, may be served, and, provided it in no way interferes with three good meals a day, such a luncheon is sometimes an advantage.

11.30 A.M.—Silent rest hour. This means lying down in the fresh air away from everybody else. There is to be no talking, reading, or activity of any kind. Probably no one factor in the treatment of tuberculosis is as helpful as the silent rest hours, provided they are carried out to the letter. You should make yourself comfortable by removing such portions of your clothing as you feel constricting.
12.30 P.M.—Wash and dress.
1.00 P.M.—Dinner.
2.00 P.M.—Lie down outside for one hour. If you are able to sleep in the day time, take full advantage of this rest hour. Many patients obtain great advantage by undressing and going to bed, and for this reason some sanatoria omit the morning silent rest hour and have two hours of silent rest directly after dinner. To the patient who cannot sleep, these two hours of silent rest are apt to become so monotonous that he makes the grave error of succumbing to a novel or the newspaper.
3.30 P.M.—Lunch of the same character as at 10.30 A.M. if desired.
4.00 P.M.—Exercise only when ordered.
4.45 P.M.—Silent rest hour corresponding to the one before dinner.
5.45 P.M.—Wash and dress.
6.00 P.M.—Supper.
6.30 P.M.—Outside until bedtime.
9.00 P.M.—To bed.
9.30 P.M.—Lights out.
Once or twice a week a warm, cleansing bath, followed by a cold sponge.

It will be noticed that from 10.00 to 11.30 A.M., from 3.00 to 4.45 P.M., and from 6.30 P.M. until bedtime, there is no standing order for all patients to rest. During these times many of the patients sit around talking outside or on each other's porches. The rest hours, as outlined, are the minimum that must be followed by all patients, but beyond this point there are periods of rest for different patients, varying in duration from the hours stated to absolute rest, which means staying in bed all of the time. Patients on absolute rest

are for the most part taken care of in the Infirmary. Their orders for the day are somewhat as follows:

7.00 A.M.—Wash hands and face or be washed by the nurse.
8.00 A.M.—Breakfast in bed.
10.00 A.M.—Nurse gives alcohol rub (equal parts of pure alcohol and water). Either the front or the back of the body or one limb only is exposed at one time until each area is rubbed with alcohol and dried with a brisk rub from a Turkish towel.
10.30 A.M.—Beef juice (two ounces with a biscuit) or other nourishment.
11.30 A.M.—Silent rest hour.
12.30 P.M.—Wash hands.
1.00 P.M.—Dinner in bed.
3.30 P.M.—Beef juice and cracker.
4.45 P.M.—Silent rest hour.
5.45 P.M.—Wash hands.
6.00 P.M.—Supper.
8.00 P.M.—Alcohol rub by nurse.
9.00 P.M.—Lights out.

The nurse gives a cleansing sponge bath once a week, provided the patient is too weak to take a warm plunge bath himself.

During your first week or two at the sanatorium you will find many little things which tend to interfere with your main objective, but much depends upon your making a proper beginning. Even if you are lonely, do not be too pressing in your invitations to other patients to visit you in your room or on your porch. The time will soon come when you will appreciate a place of privacy, and you may then find it difficult to have your room to yourself. The great out-of-doors is the best reception room, where, at the right hours, there will generally be found all the company you desire. You will find there is a decided tendency for conversation to become centred on the disease from which you suffer, and for every patient to give all the weary

Hallowe'en at "The San"

details of his "case." When you are tempted to tell your experiences with tuberculosis, remember how it bored you to listen to the other fellow, and

> "Talk health! The dreary, never-changing tale
> Of mortal maladies is worn and stale.
> You cannot charm or interest or please
> By harping on that minor chord, disease.
> Say you are well, or all is well with you,
> And God shall hear your words, and make them true."[1]

The great majority of patients soon become specialists in the treatment of tuberculosis, and not a few appear to come to the conclusion that they know much more about it than the doctor. These will tell you how it is that the orders for the day are based only on theory, and that it is not expected of you to follow them literally. Further, when you do follow the treatment as it should be followed, you will find that a few of these feeble-minded individuals, lacking the self-control to play the game themselves, wisely smile, and wink, and perhaps get off a little joke at your expense. Turn a deaf ear and a blind eye on all such folly, and remember that not only have the orders for the day been drafted by the wisest physicians in the world, but experience has proved that they have to be acted upon and faithfully followed if you would win your battle against the tubercle enemy. As Marcus Aurelius says," If thou workest at that which is before thee, following right reason seriously, vigorously, calmly, without allowing anything else to distract thee, but keeping thy divine

[1] By Ella Wheeler Wilcox.

part pure, as if thou shouldst be bound to give it back immediately; if thou holdest to this, expecting nothing, fearing nothing, but satisfied with thy present activity according to nature, and with heroic truth in every word and sound which thou utterest, thou wilt live happy. And there is no man who is able to prevent this."

PART TWO

CHAPTER XV

Commandeering the Home

There are one million tuberculous patients in the United States, and only six hundred sanatoria, with thirty-five thousand beds, in which to take care of them. Thus the vast majority of patients must fight their battle at home. While the home under ordinary conditions offers serious handicaps to the patient's favorable progress, provided the family can be induced to adjust conditions to the invalid's needs, it is quite possible to make the home offer to the tuberculous patient more advantages than a modern sanatorium.

If the tuberculosis battle is to be successfully waged at home, it is necessary that the home be modelled on a sanatorium plan, and that the orders for the day be carried out even more carefully than at a sanatorium. The greatest handicap to the patient at home arises from the interference and advice of friends and relatives. The majority of people cannot comprehend how it is that a man can *look* better than any member in his family, how it is that he can walk about and go on an occasional picnic or outing of some kind, and yet be fighting a life-and-death struggle. Tuberculosis is one disease in which the inexperienced must accept without question the statements of the doctor.

If a patient is to stay at home and fight his battle successfully, he may do so only on the clear understanding that no matter what he thinks, and no matter what his relatives think or say, the doctor's word is law and must be carried out to the letter. Further, no matter how alluring the arguments of kind, interfering relatives may be, the members of the patient's immediate family must, through thick and thin, protect the patient, and be loyal to the doctor. It must also be realized that this is not a battle of days or weeks or even months; it is probably a battle of years. The doctor cannot tell you how long it will be, and the unsettled frame of mind, which is continually questioning as to when a return to work will be possible, is most pernicious. When the disease is first discovered, settle down with the determination to give it a definite period, and then proceed to live one day at a time, and to make that day count for all it is worth. If the doctor should liberate you before the time you had fixed has arrived, so much the better, but hope continually deferred not only makes your own heart sick, but so upsets the members of the family that they are constantly coming to the conclusion that they "must do something," such as change the doctor, change the treatment, or make some other equally foolish alteration.

If it can be arranged, a move should be made to a more favorable location. A change to the country, or at least to the suburbs of the city, is wise. There the patient will be withdrawn from the environment under which he contracted the

disease, and the nearer the country the less there will be of dust, smoke and infection. If a locality can be chosen where there is not too much traffic, and too many people passing the house, the patient's natural sensitiveness about being stared at will be undisturbed. It is well to realize, however, that if one cares more about the staring and curiosity of people than about following the "cure," the chances of recovery will be considerably reduced. A little change in locality is often stimulating to the patient's appetite and digestion, and so important is it that some doctors claim that a change, even if it be from a good to a bad climate, is of advantage.

The great importance of environment, for the man in whom tuberculosis has disclosed itself, is well illustrated in the classical experiment of the late Dr. E. L. Trudeau. Taking fifteen healthy rabbits, he divided them into three divisions, A, B and C, each consisting of five rabbits. He inoculated each rabbit of divisions A and B with tubercle germs, and then put division A (inoculated rabbits) to live under the best of conditions. Division B (inoculated rabbits) and Division C (healthy rabbits) he put to live under conditions of privation and poor sanitation. Of the five tuberculous rabbits in Division A, four quite recovered their health. Of the five tuberculous rabbits in Division B, four died within three months, while none of the five healthy rabbits in Divison C died. All of this means that while healthy people, like healthy rabbits, may flourish under bad hygienic conditions, tuberculous people,

like the inoculated rabbits, die under such conditions. The four recoveries among the five tuberculous rabbits which lived under the best hygienic conditions should greatly encourage effort to perfect conditions in the home of tuberculous patients.

In choosing a house, remember that regard should be given to outside considerations, even more, perhaps, than to inside. The patient will probably spend four-fifths of his time out-of-doors, and if he carries out this part of his treatment properly, the inside of the house is a matter of secondary consideration. An ideal location for a house is to have it standing back from the street, on an elevation of three hundred to seven hundred feet, and with a sunny exposure. An old Indian proverb says, "He who plants a tree in front of his house begins to dig his own grave." Remember that there is no better disinfectant than sunlight. The house should have one or more porches, or, at least, a favorable position on its south side for the building of a porch. There are very few houses, even in the heart of a great city, which will not permit of the construction of a small veranda where a patient may sleep in the fresh air.[1]

A porch on the north as well as the south offers additional comfort to the patient in the heat of summer. If possible, the patient's dressing-room should be in connection with this porch. If the

[1] In the free literature sent out by the National Association for the Study and Prevention of Tuberculosis, there are some excellent cuts which illustrate ways and means, and for a more thorough consideration of the subject Dr. Thomas Spees Carrington's book, "Fresh Air and How to Use It," may be purchased for one dollar from the Association.

door between the two can be made sufficiently wide to permit of a bed being wheeled in and out as desired, this is a great advantage, especially in the case of a very sick patient.

An ideal room is one that measures at least 12 x 14 x 10 feet; the windows and balcony door should have an area of at least one-seventh of the floor space; it should be possible to flood the room with sunlight; the floors should be of polished hardwood or covered with linoleum; the walls should be covered with washable paper or paint; there should be no ledges and the corners should be rounded; a fireplace is a disadvantage in so far as it causes dust, but if kept properly clean, is valuable in the additional ventilation it affords; the heating should be by hot water or steam; a gas heater or oil stove should be absolutely prohibited; if a hot-air flue enters the room, it should be kept closed while the room is occupied by the patient.

Where funds are limited, they should be devoted chiefly to making the porch comfortable, and also the most attractive place to live. An ideal porch faces south in winter and north in summer; it should have a solid roof, and afford plenty of room for its furnishings; if occupied by more than one person it should permit of a space of four feet between each individual; it should never be deeper than its height; it should be fitted with glass storm screens, which should never be closed on more than two sides at one time; it need not be supplied with heat in any way, no matter what the weather, and should offer all the advantages of the out-of-doors and afford at the same time protection against

storm or wind; it should be lit with electricity, and be screened from insects in the hot weather.

The bed should be of iron and run easily on large-sized rollers. In the case of bed patients, there is great advantage to the nurse in having a high hospital bed. Good hair mattresses are best, and in the very cold weather two mattresses with a thick layer of paper between them add much to the warmth. The bed should not be shoved back into a corner, nor should it be placed in a strong draught. The current of air may always be modified by placing a frame covered with gauze inside of the window frame. A movable back-rest is much appreciated by many bed patients. Beside the bed should be placed a table or stand with drawers. On this, or in it, should be kept all the immediate necessities of the patient, such as the sputum cup, bell, reading lamp, books, urinal, etc. If an electric bell can be fitted up to ring indoors from the bedside, it will give a great sense of security to the patient on winter nights when the doors are closed.

The furniture in the patient's apartments should be solid, or, if cushioned, should be covered with washable covers. It should be well raised from the floor, so as to permit free access to a damp or oiled mop. If window curtains are used in the room, they should not reach to more than a half a foot from the ground, and should be so hung that they may readily be removed for washing. It is wise to have no curtains, but the room must be furnished in such a way that it will not pall on a patient's sensibilities.

An article of great importance to a patient's

comfort, and one which contributes much to a faithful following of the treatment, is a "chasing chair" or invalid recliner. Many a patient who will not stay on a bed is quite content to spend most of his time on a recliner, provided it is comfortable. There is an extensive variety of chasing chairs, and the important considerations in choosing one are that it should have a broad, flat back, which will in no way bow or restrict the shoulders or allow the spine to bulge backwards in a curve; that it should be sufficiently substantial to impart a feeling of perfect safety and thus permit relaxation; that it should not be too heavy, and should be movable on easily running castors. A metal chair perhaps lasts longer than any other, but it is too heavy. The chair selected should be one which may with ease be moved into the shade, out into the garden, or up on the veranda.[2] Swing chairs are not desirable, and a hammock is forbidden on account of the cramped position it enforces. A wheeled chair, while too much of a luxury for the great majority of patients, is of considerable help to convalescents from acute exacerbations or complications.

During winter time, in cold climates, the patient who is not properly equipped with clothing is unlikely to make a success of fresh-air treatment. The ideal covering is a fur coat and fur rugs, but many patients do well with steamer rugs, horse or ordi-

[2] A free catalogue of the W. C. Leonard Company, Saranac Lake, New York State, illustrates in very excellent cuts not only reclining chairs, but many articles of equipment especially manufactured for use by the tuberculous patient.

nary blankets or quilts. A sweater under the coat is good, a cardigan jacket is better. Chamois jackets or other clothing which prevents skin ventilation should not be worn. A sash about the waist outside of the overcoat adds much to the warmth.

The hands and feet require the best of coverings. Fur or pure wool mittens, extending over and embracing the cuff of the coat, are excellent for the hands, and for the feet there are specially constructed foot-muffs, loose fitting felt shoes, fur-lined moccasins, wool stockings, with or without lisle thread stockings under them. Equestrienne tights are advisable for women. A covering for the head as light as desired, such as a toque, may be used. The seasoned patient may go without any covering for the head except when in the sun. At night, in cold weather, the patient should wear a closely-fitting suit of underclothes with woollen or flannelette night garments. In addition to these, on the coldest nights, a sweater or bath-robe, a woollen hood covering the ears, and bed-socks are necessary.

The bed should be equipped with from three to five pairs of double blankets and with a sheet of mackintosh to cover these. There should be flannelette sheets as well and a few squares of flannelette to place on the pillow where the breath freezes; these may be removed one by one as they become uncomfortable. Three pillows, one across the top of the bed, and one down each side so as to make walls for the shoulders, complete what is desirable in cold weather.

The foregoing approaches the ideal home equip-

ment, but while patients should endeavor to approach the ideal in so far as is possible, there are many who have to be content to do their best under conditions less luxurious. Truly, in fighting the tuberculosis battle, " Necessity is the mother of invention," and it would be a tonic to many a man who thinks his lot is hard to see the obstacles overcome, and the principles of rest and fresh air carried out, by the very poor patients in the heart of every great metropolis. There one sees the window tent and the roof tent which take the place of the sleeping-porch; also the roof bungalow and the piano-box nailed to the wall just outside the window. The charm of them all is that they bring good results. Earnestness, not money; perseverance, not luxury; and grit, not ease, win the day: " To him that overcometh will I give to eat of the Tree of Life."

CHAPTER XVI

The Commissariat

We have seen that where the best equipment for the invalid's rest hours cannot be procured, the second best will very often bring results just as satisfactory. Unfortunately, in the next item of equipment, namely, food, substitution of a poorer for a better grade does not afford the same results. The old-time name, consumption, tells the story of wasting and diminished nutrition, and if the tuberculous patient is to get well, not only must he eat, but he must eat good food.

In the case of many invalids, the instinct for food becomes perverted and manifests itself in a craving for a variety of food which fails to satisfy the urgent physical need. Generally speaking, the patient should be given a generous variety of food, and attention should be paid to his special cravings, but his chief articles of diet should fulfil two demands—they should be highly nutritious, and they should not impose too much work on the organs of digestion. The foremost food in this class is milk.

A patient on a general diet should drink from three to four pints of milk daily, and many patients are able to consume daily as much as a gallon or even one gallon and a half. It is important that the milk should be fresh. If possible, it should be consumed within twelve hours, or, at most, twenty-

four hours after the milking, because changes occur in old milk which render it more difficult of digestion. If milk can be drunk when warm, just as it comes from the cow, it is most easily digested. It need hardly be pointed out that the milk should come from healthy, well-fed cattle, and that it should be kept scrupulously clean and well-chilled. Many patients who think they cannot take milk soon become fond of it by exercising a little patience and perseverance. Sometimes by adding a little table salt, one or two tablespoonfuls of lime-water, or some aerated water, milk may be more readily tolerated. Flavoring it with a little coffee or tea is often helpful; or it may be taken liberally in milk soups or with porridge, junket, puddings and the like. Whey and buttermilk are not as valuable a food as milk. When milk cannot be taken, there should be an increase in the amount of cream and butter consumed.

Eggs come next in importance. From two to thirty a day may be taken. Six a day is probably a safe limit. They are more easily digested when raw than when cooked, and when raw are readily swallowed with a sprinkling of salt or a squeeze of lemon juice. Whenever an extra egg may be incorporated in a pudding or sauce, it is well that it should be put in.

The third article of importance on the list is meat. Good red meat is best and should be prepared by broiling or roasting in such a way that the juices are retained. Fried meats are difficult of digestion and should be eliminated. In value to the tuberculous patient, meats stand thus: Beef,

mutton, poultry, game. Veal and pork may be eaten occasionally, but they take long to digest and are better avoided by those whose digestions are not of the best. Expressed beef-juice [1] is the quintessence of food, and its value to the tuberculous patient is only equalled by its cost. A wine-glassful between meals, twice daily, represents from one to two pounds of round steak. The so-called beef-tea and broths contain but little more nourishment than hot water. Their chief value lies in the stimulation they afford.

The more fat a tuberculous patient can assimilate, the better the outlook for his recovery. Generally speaking, the lower the temperature at which a fat remains fluid, the more easily is it absorbed. Thus, oils and cream come first, then butter, and, finally, meat fats. Cod liver oil has for many years been an outstanding food for the tuberculous, and, provided it does not upset the stomach or interfere with the appetite, there is none better. The pure oil is best, but it is wise to make a start with an emulsion in half teaspoonful doses, one to two hours after meals, and gradually increase it to one or two tablespoonfuls a dose. If this be well borne, the pure oil may then be tried. It is well to defer making a start in the use of either the emulsion or pure oil until the cold weather. One or two tablespoonfuls of cream after each meal is an excellent substitute. It should become a habit to include plenty of cream and butter in every variety of food that will permit of it. Large quan-

[1] See Appendix for preparation of expressed beef-juice.

tities of cream on fruit and an abundance of butter on bread and in vegetables are most helpful. Browned beef fat, the fat of lamb or mutton chops, bacon, oily fish like sardines and salmon, olive oil pure, or on salads, or in salad dressings, cheese and ice cream are all good. Second dishes, or meats cooked over the second time, should be avoided.

When choosing vegetables preference should be given to the green ones, such as stringed beans, peas, asparagus, spinach, lettuce and the others. Some vegetables, such as beans or peas, contain considerable proteid or the substance which makes meat valuable, while others, such as potatoes, are nearly entirely carbohydrate or starchy. Green vegetables like spinach contain considerable iron, which is of much value to the blood. While bread and potatoes may be freely consumed, they should not be eaten to the exclusion of meats and fats, which are more necessary in tuberculosis. Vegetables such as cabbage, turnips, and the like may be eaten freely, but they have a comparatively small food value for their bulk, and would be a poor substitute as a chief article of diet. Vegetable purées of all kinds are much more valuable than beef-tea, and should be substituted for or combined with the clear soups.

Among breadstuffs (carbohydrates) cereals are probably of the greatest value. Bread, of course, must always form an important article of diet. By way of a treat, a few candies may be permitted once in a long while, but they should be eaten immediately after a meal and never between or

before meals. For a patient to eat candies whenever he feels like it is to impose a serious obstacle in the way of recovery. Nuts, however, may be substituted for candies, and, if eaten immediately after meals, may be indulged in fairly freely. Among desserts, the variously flavored gelatines are valuable and should find a place, particularly in the hot weather.

Water, while not a food, is, nevertheless, a necessity to well-being. It should be drunk freely anywhere from two hours to one-half hour before meals, and must be taken systematically. Generally the minimum amount should consist of a glassful on rising in the morning, one at the beginning of each rest hour before meals, and one at bedtime. Considerably more than this is permissible, but water with meals should be limited, as there is always the possibility of so diluting the digestive juices that they will be unable to properly carry out their functions. Pure grape juice is of value as a beverage, but pop, ginger ale, lemon sour and such concoctions should be ruled out. Tea, coffee, and cocoa in moderation are quite permissible, and often afford valuable stimulation to the appetite. A cup of coffee for breakfast is also stimulating to the bowels, and to many people ensures the proper evacuation fifteen to thirty minutes later.

Alcoholic beverages such as beer, wines, etc., are advisable only to those who would suffer as the result of their discontinuance, and in such instances the doctor is the one to determine whether or not they are required. The man or woman who has never used alcohol in any form has something

to the credit side of his resistance not possessed by the individual who has long relied on artificial stimulation. There may arise emergencies during the course of tuberculosis when alcohol is indicated, and it is well if the system is unhampered by habit and can respond quickly to the stimulation; but such emergencies are infrequent and are the occasion for special advice from a doctor. The patient, whether he has previously used alcohol or not, should never institute on his own account a course of beer, wine, or other stimulants.

In general, alcohol does much more harm than good, and very often figures largely as a causative factor in allowing the tubercle enemy to invade and overcome his victim. Many a good man who could easily win his battle has gone to his death as the result of inability to control his desire for alcoholic stimulants. Where he confines the habit to himself, such an individual is to be pitied, but there are no words of condemnation sufficiently strong for the man who insists on dragging with him others more innocent or feeble-minded than himself. Let him who persists in drinking, drink if he must, and the more he drinks, the sooner it will all be over, but at least let him have the decency to stay away from places where other men are doing their best to get well.

The housekeeper for tuberculous patients should realize that "a patient who eats and digests well is a patient half cured." The first great essential to a good appetite and good assimilation is regularity. The meals should be on the table at the regular hour each day, and that hour may very

well be patterned on what has been the previous habit of the patient, provided it leaves an interval of five hours between meals. The table should be made to look attractive and inviting, and the food should be served quickly without long intervals between courses. It is much wiser to encourage the patient to come back for a second helping than to heap up his plate with food. As extensive a variety of food as is compatible with the right things to eat is wise, and the catering of certain dishes on regular days should be religiously avoided. When the patient is in bed, the tray should be daintily arranged, and care should be taken to avoid the slopping over of soup, milk, or other liquids. Slopped-over food plus a few flies is enough to spoil the appetite of even a healthy man.

The patient should make it an invariable rule never to partake of a meal when tired. Rather than do so, it is better to lie down and let the meal wait half an hour. But the man who is regular with rest hours will not have to resort to such an expedient. One should eat and drink slowly, and chew the food well, and while it is wise to eat plenty, it should be remembered that too much is worse than not enough. A happy conversation at meals is an aid to digestion and a stimulus to the appetite, but irritability or a heated discussion is an inhibitor both to appetite and digestion. It is often an advantage for the bed patient to have a nurse to encourage, coax, or even command him to eat, although to have to carry on a conversation with a stranger while eating is worse for the bed patient than being alone.

There is no better tonic to the appetite of the tuberculous patient than rest in the fresh air. Many a patient whose appetite has completely gone, through exercising too freely, will eat a surprisingly large meal after a few weeks of rest in the fresh air. In fact, without the rest, digestion is often impossible, and fresh air is a great stimulation to the powers of assimilation. Rest after eating is equally important. The tuberculous patient should never go so long without food that he is very hungry. This is why a lunch between meals is often valuable. At the same time a desire to eat when sitting down to a meal is most important, and if a luncheon robs one of this desire, it is just as well to omit it unless for special reasons the doctor thinks it is advisable.

Hunger during the night should be satisfied with a glass of warm milk or something even more substantial. Very often sleeplessness is overcome by taking a warm drink or something to eat. In the case of many bed patients, the appetite is improved by sitting up to a table for meals instead of having a tray in bed. Thus, when any exercise at all is permissible it should be taken at mealtime, even if the patient is only allowed to sit up to a little table beside the bed. When a patient's weight rises above normal, it is just as well to discontinue all extra feeding such as luncheons, and where a patient appears to ingest an abnormal amount of food, he will be safer to have the excess food consist of fats rather than meats.

No patient can eat abundantly or digest properly if he does not attend carefully to the elimina-

tion of waste products from the bowels. Regularity in this regard is just as important as eating or sleeping. In fact, the daily evacuation of the bowels depends on regularity for its successful action. Once allow the regular time for evacuation to be broken into for any reason and there is always trouble for a few days until the habit becomes reëstablished. The secret for overcoming constipation is regularity. A regular hour, preferably a few minutes after breakfast, should be fixed, and no matter what happens, one should never fail to secure a movement at that hour. If the action does not come naturally after ten minutes' earnest attempt, a glycerine suppository may be used. This will probably be effective inside of five minutes. If not, a soap-and-water enema should follow, and this will be effective. It is not advisable that the enema should be repeated indefinitely, but generally one week or a fortnight of determined effort in securing a movement at the one regular hour establishes a habit which will persist without artificial aid. If such does not prove to be the case, the doctor should be consulted, because constipation is too pernicious in its effects, and too readily corrected, to be allowed to continue.

CHAPTER XVII

The Beginning of the Battle

When first the tubercle enemy gains the balance of power in the body, and begins to make sorties into the lung tissue or other areas, the white cells and their allies in the blood are but raw recruits, and have neither the ingenuity nor agility in meeting emergencies or adverse conditions that later on they acquire through experience in the disease. It is for this reason that your generalship in the beginning of the battle should be based on a policy of extreme caution, a line of action that takes no chances. It is quite possible that after your white cells have become experienced veterans you may impose upon them many new responsibilities, but while they are recruits you must show them great consideration and watch carefully every movement of the enemy.

Two cardinal principles should be applied to any fighting force: the army should be well fed, and there should be a limitation of the amount of work it is expected to perform in a given time. In other words, adequate food and rest are necessary to the performance of good work. The white cells and their allies do not take their rest by stopping work and going to sleep; their rest is only relative and means simply that they do not work as hard as usual. As will be explained in the next chapter, the white cells have many more

difficulties to overcome when you are exercising than when your body is at rest. Generally speaking, while you sleep, there are fewer handicaps encountered, and at that time the white cells are most effective in their battle against the tubercle enemy. Keep constantly in your mind the picture of the conflict as described in Chapter IV, and, particularly during the beginning of the battle, support your inexperienced recruits all you possibly can by keeping your body at rest.

The word " rest " has a vastly different meaning to different people. To one it may recall a sojourn in bed with only one pillow under his head and all meals administered through a tube. To another it may mean a trip to the country with hunting, mountain climbing, and perhaps a little broncho busting by way of diversion. To you, during silent rest hours, it should mean a condition approaching as nearly as possible to sleep. It is not sufficient that you should merely lie on the bed, or even in it. Many patients accomplish this as a fish might, by touching the bed only at the extremities, the body remaining rigid. You must endeavor to lie through the bed, to make yourself as heavy as possible, to give way in every muscle, so that if the bed were suddenly to break, your collapse would be complete. This may be accomplished in different positions. but it is most easily attained by lying supine on the back with but one pillow under the head, with the arms thrown wide and the palms up, with the feet about half a yard apart, with the jaw relaxed but the mouth closed, and the body in very much the

attitude in which you would expect to find a dead soldier lying on the battlefield.[1]

Your mind should be as your body—not riveted to any one point, but so dreamily relaxed that if any one were to ask you, "What are you thinking about?" you would be unable to tell him. This cannot all be accomplished at once. Practice and perseverance will be required, but even if, for months, it seems impossible to properly relax in rest, there is no excuse for your becoming *actively* restless as you are when reading, talking, or carrying on some work or play with your hands. The nearer you come to complete relaxation at any one time, the more readily will you accomplish it on subsequent occasions, and you are well repaid for the effort, because such rest is one of the greatest possible aids to your white cells in their struggle.

Although there are many methods by which the doctor may determine the activity of the enemy, you must rely on your temperature, pulse, and general feelings to indicate how the battle is going. You should have your own thermometer, and keep it in a wide-necked bottle containing a solution of 5 per cent. carbolic acid, and a padding of absorbent cotton in the bottom. Temperature and pulse should be taken just after waking in the morning, before you begin to stir around; at twelve noon; at four, and at eight P.M. Have somebody instruct you in the reading of the thermometer and the counting of your pulse-beats per minute, and in a week or two you will become quite expert.

[1] For a further consideration of this subject read "Power through Repose," by Anna Payson Call.

Do not mind the remarks of friends to the effect that you should " forget it." So long as the doctor sees no objection to your doing this for yourself, it cannot but do good that you should be aware of the activity of the enemy.

A further control and systematizing of your activities is to be gained through the careful keeping of a chart. If your doctor does not supply them you may readily rule one for yourself each week. By filling it out carefully, there will be no time during the day for which account is not given, and this is an important part of the business of getting well. Institute a regular time and fill out your chart at that time every day. In addition to aiding you to a control of yourself, it will give to the doctor very necessary information for the regulation of your treatment.

As a guide to the course of the struggle, your feelings are apt to be deceptive, and, in the beginning of the battle, the negative feelings are more significant than the positive ones. Feelings of tiredness, or not feeling well, are the equivalent of fever, and should impose identically the same restrictions as does an elevated temperature. Many scientists hold that the pulse is a better criterion of the violence of the fighting within the chest than is the temperature, so that, in the absence of fever, a pulse continually faster than the normal should call forth the same caution that elevated temperature does. The pulse varies considerably in frequency in different individuals, and your normal pulse-rate should be ascertained from your doctor.

PATIENT'S REPORT

NAME

For DR D. MACDOUDALL KING

MONTH	DATE	TEMPERATURE AND PULSE								TIME	EXERCISE IN TIME AND DISTANCE	HOURS RESTING OUT OF DOORS	HOURS LYING DOWN	TIME OF RISING - RETIRING	EXTRA DIET		APPETITE 1 Good 2 Fair 3 Poor	TIMES OF EVACUATION	NOTES
		8 A M		NOON		4 P M		8 P M						Hours Sleep	Milk	Eggs			
		T	P	T	P	T	P	T	P										
SUNDAY										A M									
										P M									
MONDAY										A M									
										P M									
TUESDAY										A M									
										P M									
WEDNESDAY										A M									
										P M									
THURSDAY										A M									
										P M									
FRIDAY										A M									
										P M									
SATURDAY										A M									
										P M									
SUMMARY																			

ORDERS :

The Patient's Record

There are few wars in which neutrals and non-combatants do not suffer to a greater or less extent, and the war against the tubercle bacillus is no exception in this respect. The tuberculosis battle will scarcely have started before the question arises—Is there much danger for the non-combatant members of the family? One thing is certain, if the enemy can make his escape, he will exercise no discrimination in the persons he attacks, be they neutral, combatant or non-combatant. Safety lies only in the proper care of the sputum.[2]

More than seven billion tubercle bacilli may be expectorated in twenty-four hours by one patient. If the sputum is as carefully controlled as is the fire in the furnace, the fear of attack should be no greater than the fear of the house taking fire from the furnace. Accidents are just as liable to occur with the one as the other. As a rule the intelligent and careful patient, with a moderate amount of trouble, is of very little danger to the adults with whom he lives. Not so, however, the far-advanced consumptive who is not strong enough to look after his needs. In such a case, not only the sputum, but the other body excretions as well, are fraught with danger if not properly handled. Consequently a strong, competent nurse must take over the responsibility which the poor fellow is incapable of holding for himself.

A beard or moustache adds considerably to danger. It must also be remembered that there is always the possibility of unfortunate results to

[2] See Appendix, Disposal of Sputum.

the child who associates with the tuberculous patient, be he an early or advanced case, just as there is danger for the child who plays with the furnace. The little ones are very easily infected, and their ignorance and beautiful affection render them quite indifferent to the danger of being handled and fondled to say nothing of being kissed. The road of the tuberculous is the road of renunciation, and we fathers and mothers who have the disease must withhold our demonstrations of love and affection until a happier and more healthful season.

The tuberculous mother, if she would value the life of her new-born infant, must give its nursing and care over entirely to hands of strength, if not of sympathy. The relative, should he be one in whom the enemy has also gained a hold, would confer on little children a true kindness would he not only bar them from his bedchamber, but confine his associations with them to the out-of-doors.

Apparently there are many adults, as well as children, who have to learn that the tuberculous patient, like the furnace, may be enjoyed, but that there are limits to the intimacy of the enjoyment. It is, for example, quite unnecessary to be constantly within the four-foot limit. There is no need to make the patient feel that an imaginary barrier holds him at a distance, but for close proximity, such as exists in sharing the same bed, there is no excuse. The fine spray that is emitted when the patient coughs or breathes is probably quite harmless, but not so the fine globules of sputum that at such a time, on some occasions, gain

liberty. As a consequence, the patient should make it a rule, in so far as possible, to cough into his sputum cup and not into his hand or handkerchief.

The square tin cup with spring lid and cardboard fillers is the best for ordinary use. The practice of expectorating into pieces of paper, or of cotton, and of putting these into the pocket, even although the latter is rubber lined, is a dangerous practice. For street use one should have a pocket cup which must never be filled beyond the point of safety. A cardboard pocket cup, which may be burned after using a limited number of times, is best.

When coughing in the presence of others, it is safe to place a clean handkerchief in front of the mouth, but one must be careful to apply to the mouth a part of the handkerchief, which may afterwards be folded within the unused parts. A handkerchief should never be shaken out with a flourish; it is most important also that it should be boiled and laundered after being used a very few times. One should never expectorate into a handkerchief. Such a procedure is most dangerous and deserves the severest censure. It should be a rule that the pocket which holds the handkerchief or sputum cup should be turned inside out and exposed to the sunlight at least once a week.[3] When a patient is bedridden, and is too weak to properly manage a sputum cup, squares of gauze, old cotton or toilet paper, are just the thing for him to expectorate into; after being used once they should be dropped into a paper bag pinned to the side of the bed.

[3] See Appendix, Disinfection of Clothes.

Every twelve or twenty-four hours the bag with its contents should be dropped into the fire.

The patient, and, indeed, every one in the same house, must be careful to frequently disinfect his hands with a good brand of carbolic soap. The man who would shake hands, just after spraying his own hand with sputum which may have been expelled while coughing, is surely unworthy of association with his fellowmen. Remember also the possibility of contaminating door-knobs, children's toys, or the hands of the little people when unsuspectingly they walk with you hand in hand. While there is no need of giving to the sick man an individual set of dishes, it should be seen that his dishes, and especially such utensils as come into direct contact with his mouth, are properly disinfected by boiling before washing.[4] As drinking glasses are readily cracked on boiling, it is an easy matter to supply the patient with tumblers of an odd pattern which may be readily distinguished from those used by the family. The patient should, of course, have his own towel, and it is just as wise for him to keep his tooth-brush in a case. Laundry should be handled as little as possible, and where it is not going to be submitted to the regular steam-laundry process, handkerchiefs, or any articles which may possibly be contaminated with sputum, should be disinfected by boiling before washing.

The danger of infecting pets with tuberculosis

[4] See Appendix, Disinfection of Dishes.

is not nearly so great as is the danger of pets infecting patients with some secondary infection. A patient must exercise care not to reinfect himself by swallowing his sputum. Tuberculosis of the bowels is always a stubborn and often a distressing condition, and is frequently brought about by swallowing sputum.

All through the tuberculosis battle, but particularly at its beginning, the presence of a nurse companion is most desirable. Possibly at no time in the life of a mother, a wife, a sister, or a friend is the opportunity for service and devotion so great as during the long, weary hours of the conflict, and in none of life's crises is devotion of the practical kind so helpful to the patient and so much appreciated by him. During the balmy summer months it requires but little fortitude to be a companion to the patient in his "chasing"; but when in the winter the thermometer drops with twenty degrees of frost, devotion finds its test and the spirit declares itself. If the mother or the sister can give up everything in the home and devote entire time to the patient, much that makes tuberculosis such a fatal disease will be overcome.

Where a patient is very ill in bed, a *trained* nurse is desirable. She should be possessed of great tact and cheerfulness; should understand to the full the value of mental suggestion, and should be able to exercise much ingenuity in making the patient eat. When she begins to flag, it is a relief to her as well as to the patient to make a change. It is the nurse's business to see to it that no unnecessary dust is allowed to rise in the patient's

room. The rugs must be taken out-of-doors for cleaning, and instead of sweeping, the floors should be gone over daily with an oil or damp mop. "Dusting" should be carried out with an oil or damp cloth which collects, not scatters, the dust. When not in use the mop and duster should be soaked in a disinfectant.[5] If the patient is weak, he should not be allowed to put on his wraps unaided when going out to "chase" in the cold weather.

A nurse should also realize that tuberculous patients are chronic procrastinators. In the first place, they procrastinate about going to the doctor, then they procrastinate about starting treatment; they always want to delay going out-of-doors on the cold days; they put off going to bed until the last moment; their procrastination makes them irregular in many of their habits if a rigid régime is not enforced. Much valuable time is lost by a patient loitering round inside the house after meals. The nurse should bring the patient's wraps, make him put them on, if necessary shove him out-of-doors, and then tuck him in cosily on his chasing chair or bed. It need hardly be pointed out, however, that the patient who avoids following the treatment when he is not made to carry it out has a poor chance of recovery.

In cold weather, whenever possible, the bed should be allowed to remain indoors until just before it is to be used, and if this be impractical, it should be thoroughly warmed with hot-water

[5] See Appendix, Disinfection of Dusters, Mops, etc.

bottles, hot bricks, or an electric pad, before the patient gets into it. The secret of comfort in winter time lies in prevention from chilliness, not in waiting till the cold is felt before applying warmth. Much suffering from chilblains will be avoided if this rule is adhered to, as it is the application of warmth to the very cold skin surface which causes chilblains.

There is nothing harmful in night air to the tuberculous patient. Indeed, in cities, the night air is the purest. While it is well that a patient who is not very ill should be out-of-doors four-fifths of his time, or even more, it is wise to avoid senseless exposure, such as lying out in severe storms, or when the mercury drops to many degrees below zero. As a rule, however, cold air is more valuable than warm, and if the patient has fairly good vitality, and is properly clothed and wrapped up in bed, exposure to the biting frost does him no harm. If he sleeps within doors, the heat should be turned off, and the windows should be opened wide. In high altitudes, wraps should always be at hand, even on the warmest days, as the evening shadows always bring a cool wave, and the changes throughout the day are liable to be sudden.

The nurse must regulate the number of visitors and the length of their visits. Of course, much depends upon the character of the visitor, but one ten-minute visit a week from a stranger is quite sufficient for the bed patient. Few of us realize what a strain it is for the average patient to talk to a stranger. Much of a patient's life is spent alone, and, from forced inactivity, the mind be-

comes weak like the body. It need hardly be pointed out that no visitors, not even members of the family, should be admitted during silent rest hour. Generally speaking, there is no better company than a companion nurse of the right type, one who seems to realize as if by instinct when to read aloud, when to laugh and be merry, and when to be silent. Many a patient who has no desire to talk finds a wealth of comfort just in feeling the presence of some one who is sympathetic; some one who realizes the seriousness of the battle; some one who is hoping and praying for victory.

CHAPTER XVIII

The Fighting Machine

There are no days, or even hours, during which your army of defence is entirely at peace. Practically always, at some outpost of the body's frontier, a diminutive skirmish is taking place between the white cells and some one or more of the countless divisions of enemies which gain access to the human body. The vast majority of skirmishes are, however, one-sided, and it is very much the exception for the white cells to be overpowered, even temporarily, by the enemy. Hence, we may distinguish between days of peace and days of war by attributing to the former the great majority of the days of life when "work, play, love and worship" are the only things which occupy our thoughts, and when our army of defence carries out in a normal or physiological manner the many duties that make up its daily round and common task. The days of war begin when for any reason the white cells have been temporarily or permanently vanquished by the enemy germ, and when the latter has succeeded in entrenching himself anywhere in the body.

You must not imagine, to speak metaphorically, that in days of peace the army of defence sits around and plays cards. Indeed, when you realize the actual amount of work its units are called upon

to perform in days of peace, you will never cease to wonder how final success attends the fighting of such a tremendous and long-drawn-out battle as that which occurs with the tubercle bacillus.

You must learn to look upon your body as a wonderfully constructed engine that operates in much the same manner and requires just as careful attention as a steam locomotive. As a locomotive requires fuel to run it, and the fuel is useful only because it is converted into heat or energy, so also your body requires fuel, and if you are wise you will supply it with fuel in the form of plain nourishing food at regular intervals, three times a day. Likewise, food is useful only because it is converted into heat or energy, and in the normal human engine about 90 per cent. of the fuel or food is utilized. Before food can be made use of in the form of heat or energy, it must first of all be dissolved or digested in the stomach. Some foods naturally dissolve more readily and completely than others.

Just as coal has to be stoked into the fire-box of an engine, so also must food, after it is dissolved, be stoked or absorbed into the human engine. The cells which line the stomach wall, and which in many ways resemble stationary white cells, are the stokers, and they have the tremendous task of picking out the good food from the bad, or the useful from the useless, and of carrying it bit by bit, load after load, into the body. The white cells seem to assist in this work by devoting themselves to the little globules of fat in the food, and by unloading them from the stomach wall cells and

carrying them into the body. Supposing that, while the white cells are occupied in this way, they are called upon to fight a great and long-drawn-out battle with the tubercle enemy, it is not surprising that they have great difficulty in carrying out, at one and the same time, this work of picking up the little fat globules and stoking them into the body, and of holding back the enemy in the lungs or elsewhere. You can understand that the more you get up steam, in other words, the more you exercise, the greater will be the amount of fuel consumed, and consequently the greater will be the demand for stoking.

In tuberculosis much of the enemy's poison gets into the blood, so that both the white cells and the stomach wall cells are rendered toxic, or dopy, and cannot therefore be expected to carry out their work with the vigor and exactitude that they do in days of peace. Thus there is liable to be a failure somewhere—either the enemy will not be properly held back, or the carrying-in of the food will simply have to be left undone. Perhaps there will be a compromise, and the enemy will be allowed to gain just a little ground while the body is allowed to go just a little short of its food supply. Is it to be wondered at that, in days of war, the absorbing cells of the stomach wall become so utterly tired and toxic that they refuse to work? Yet when this happens, as it does at one time or another in the case of from 70 to 90 per cent. of all tuberculous patients, how many of the latter there are who think only of medicines and stomach tonics to cure their indigestion, while *rest*—the one

rational and most likely cure—is never thought of! Generally speaking, the slowing down of the human engine in order that the necessity for fuel may be limited, that the enemy's ammunition or poison may be restricted, and that the stokers may be given a comparative rest, is all that is necessary to restore the stomach to normal activity.

The steam locomotive gives the highest grade of efficiency as a working machine when it is supplied with fuel that will burn well, and which will produce a high standard of heat. In the same way, the body is unable to perform its best work when a poor grade of food, which produces but little heat and energy, is consumed. Certain foods might well be compared to coke, in that they afford but little heat and energy, while others are of the class of anthracite coal. The latter are the kinds of food that should be selected by the tuberculous patient so that a maximum of energy may be supplied at a time when it is much needed by the forces of defence.[1]

The tender of a locomotive carries the surplus supply of fuel to be drawn upon as necessary. In the human engine the excess supply of fuel or food is reduced to fat, and is stored under the skin and in many corners and crevices of the body. On all emergencies, or at times when the supply of fuel does not come up to the demand, this reserve of fat is called upon. You can thus readily understand that if you continually over-exercise, the reserves of fat will be so constantly required to

[1] The foods of greatest value in tuberculosis are outlined in Chapter XVI.

supply the energy expended, that there will be no possibility of storing up a reserve, or of "putting on weight."

The ordinary locomotive could not possibly consume and make use of the fuel that is supplied to it, were it not for the draught of air which reaches the fire-box and supplies the oxygen necessary for consumption. Moreover, if the smoke and gases which result from the combustion could not escape through the smokestack, the fire would soon become stifled and refuse to burn. Perhaps you are unaware that it is impossible for you to move your finger, for your heart to beat a single beat, or for you to even think a thought without there being an actual combustion or explosion, of course, a very diminutive one, in the particular tissue, muscle, or brain where the activity takes place. This, in part, accounts for the fact that you become warm when you exercise. Further, this combustion requires its draught of oxygen, and gives off its gas, just as does the combustion in the fire-box of the locomotive. You furnish the oxygen in the air which your bellows, or lungs, draw into your body; but just as it is one thing to put food into your stomach, and quite another for the stomach wall cells to have to stoke it load by load into the body, so it is one thing to draw the air into your lungs and quite another and much greater task to separate the oxygen out of that air and to carry it to every part of the body. This is the work of the *red* cells, the most important ally of the white cells, and day and night without ceasing they travel with load after load of oxygen to every

minute part of your body, from the crown of your head to the tips of your toes. More, they waste no time by returning empty-handed, but on their way back to the lungs come laden with gas—the carbonic acid gas—which is given off from the fire of life.

The lungs may very aptly be called the receiving and delivering station of the red cells, and could the surfaces where these little workers take on their load of oxygen and throw off their load of gas be spread out and carefully joined together, they would cover an area of over two thousand square feet. In days of peace, the fire of the human engine may keep up high pressure all day long, and the little red cells work with such precision that the fire-box will be well supplied with oxygen and there be no stagnation of the gas which is given off. And so one feels the joy of living. But when the tuberculosis germ invades the lung, many of the receiving and delivering stations of the red cells are destroyed, and, if the enemy has made extensive inroads, the oxygen-receiving station is so reduced in size that the human engine is unable to get up enough steam to work at high pressure. Further, as the poison of the enemy gets into the blood, it often destroys many of the red cells, as well as interferes with them in their work. Thus there are fewer workers to accomplish more than ordinary work, and the environment is no longer conducive to energy and enthusiasm.

The result of all this is that the reduced number of workers, working with a limited source of supply, have to travel faster, and whereas formerly they could meet the demand in a normal number of

trips per hour, they now have to greatly increase the number of their journeys in order to accomplish the work even in an imperfect manner. But the heart is the pump which sends them on their rounds, and if they are to travel faster, the heart has to pump faster. So it is that the heart or pulse of the tuberculous patient beats more quickly than normally, and requires very little in the way of over-exercise to make it run riot. It is not surprising that when the man with tuberculosis undertakes more exercise than he ought to, when he tries to get up overmuch steam, there follows a hunger for air, with fast breathing, and blueness of the finger-nails and lips.

Then there is the other side. If the red cells have difficulty in picking up sufficient oxygen, they have just as much difficulty in getting rid of their loads of carbonic acid gas. Thus the human engine becomes partially stifled, the fire burns less brightly, and the wheels drag. In view of all this, you must surely realize the folly of remaining in any place except where the air is as pure as crystal; you must surely see that to continually remain indoors, even if you have fair ventilation, is to impose a handicap on your red cells that may suffice to make them lose in their battle against the tubercle enemy. Finally, the locomotive has its ashes, which have to be kept cleared out of the fire-box, or they will interfere with the draught, stifle the fire, and greatly restrict the running capacity of the engine. Just in the same way the human engine has its ashes which have to be constantly gathered from every remote part of the body, and have to be

carried to the lungs, the kidneys, the bowels, and the skin, where they are sifted and the useless parts thrown out of the body. There is probably no factor more accountable for illness than the constant presence in the body of poisonous ashes which should be removed. In the case of the locomotive, the fire may be allowed to die and a thorough cleaning out of the ashes may be instituted. But in the human engine the fire, once out, is out forever, hence the sifting of the ashes must be accomplished while the fire burns on.

Most of the work of gathering up waste from all parts of the body is performed by the white cells. Besides being the warriors, they are often called "the phagocytes," or scavengers. When the human engine is invaded by the tubercle enemy, the vital fire of peaceful days is eclipsed by the conflagration of the battlefield, and the economy of peace becomes the enormous waste of war. You have seen that the pus in the sputum is composed of billions of bodies of dead white cells. When you consider that hour after hour you are bringing up, and casting from your body, such inconceivable numbers of these little warriors so badly needed to carry on the extra work, is it to be wondered at that some of the poisonous débris of battle is overlooked and produces in your body fever and "toxæmia" or poisoning? So you must assist all you can in keeping the ash-sifters of your body from becoming clogged. Plenty of pure water for the kidneys, careful regularity in evacuating the bowels, daily cleansing rubs for the skin, and, above all, the avoidance of over-tiring the

scavengers, are a few of the obvious indications.

When one considers the many serious handicaps which are imposed upon the white cells and their allies, through the invasion of the human engine by the tubercle enemy, it is not unnatural that many a patient should feel that the outlook is hopeless. This is not so, however, as an experiment, performed by the great physiologist, Starling, demonstrated. He selected a healthy, muscular man trained to heavy exercise, had him on one occasion rest quietly for fifteen minutes, on another do moderate work for fifteen minutes, and upon a third do severe work for fifteen minutes. During each period he ascertained exactly how much oxygen the man required, how much carbonic acid gas he breathed out, and how many times his heart beat per minute. The following table shows the results.[2]

	Oxygen absorbed per minute	Carbonic acid gas given off per minute	Heart-beats or pulse-rate per minute
1. Lying quietly at rest....	243	200	56
2. Doing moderate work..	1,834	1,720	156
3. Doing severe work.....	3,265	2,227	166

Without considering severe work, as you are unlikely to attempt that, you will note that the healthy man requires, roughly, seven and a half times as much oxygen while exercising as while lying quiet; that he has to get rid of just eight and a half times as much carbonic gas while exercising as while lying quiet; and finally that his heart has to beat nearly three times as fast while exercising as while lying quiet. Starling has also shown

[2] Starling's "Human Physiology," page 640.

in another experiment that practically twice as much food or fuel is consumed by a man when he is exercising as when he is resting. All of this holds good in the case of a healthy man with a perfectly running engine, but consider for a moment the case of the man with a crippled engine —an engine which is burning two fires, one in the fire-box and another in the ventilator. Two fires require more oxygen than one; two fires give off much more gas than one, and two fires require more fuel, more stoking, and more gathering of ashes, and the crippled engine is less able to supply any one of them. Also the faster the engine runs, the more furiously must both fires burn, and not only must the engine be tended in every department, but a fierce and long-drawn-out battle must be fought at the same time.

The path of victory is *rest.* Surely you can realize the foolishness of making the fire burn more furiously than is necessary, of trying to get up steam when the little workers in the human engine are distracted beyond measure by the desperate struggle they are waging against death. Even if indifferent to your chances of survival, surely your love of fair play and your sense of chivalry will make you give to your soldiers of defence the right to fight their battle unhampered by the folly of pleasure-seeking and the curse of indulgence!

CHAPTER XIX

Good Generalship

There are many men and women who have been fighting the battle against the tubercle enemy for months and even years, who ardently desire to follow the treatment as it should be followed but who realize that there is an indefinable something or lack of something in their make-up which causes them to fall short of their aim. They know the right treatment because they constantly see before them other patients who carry it out, and for the first part of the day they themselves succeed very well, but before the evening shadows lengthen into night, something unforeseen seems always to arise to interfere with a complete day, which is what really counts. If recovery depended only on doing some big task, these patients would work the flesh off their fingers in the effort at achievement, but because victory depends on renunciation, or doing practically nothing, one out of every two is vanquished in the conflict. Why is this?

Professor Carpenter answers the question very well when he says: "Our nervous systems have grown to the way in which they have been exercised just as a sheet of paper or a coat once creased or folded tends to fall forever afterwards into the same identical folds." Again, as Professor William James writes: "Ninety-nine one-hun-

dredths or nine hundred and ninety-nine one-thousandths of our activity is purely automatic and habitual." All your life, previous to your illness, your training has been positive, has been to act, and the more activity the better; it has not been to sit still with folded hands. You are quite in the habit of obeying your positive commands, but are you in the habit of exercising self-denial? Lifelong habit is not changed in a day, or a month, or even in a year, and if in our early days we have not had the habit of obedience ingrained, if we have not been made to obey our parents, it is doubtful if in the present we will be able to obey ourselves. But recovery from tuberculosis depends to a very great extent on implicit obedience to one's own commands, and if in the past you have not learned to obey your own highest dictates, it is wise that you should institute a course in self-training without further delay.

First of all, do not deceive yourself with the idea that you can follow your own commands in any great test, if you cannot be obedient to yourself in the little, apparently trivial things. For example, if you have not enough self-control to make yourself lie quiet for an hour without amusing or entertaining yourself in some way, it is not to be wondered at if you fall an easy prey to seductive enjoyments. Start training yourself on little things, even though they do not demand self-control; in other words, exercise self-control in little things simply for self-control's sake. For example, the porter leaves on your table a letter from home the contents of which you are most

anxious to enjoy. There is no reason why you should not read the letter, other than that it affords an opportunity for practising self-control. Command yourself to let it lie for half an hour or an hour. Such commands faithfully and frequently carried out provide that something in your make-up the absence of which is the cause of many a man losing his battle against tuberculosis.

Try and develop an analytical mind—the type of mind that is constantly dissecting with the purpose of arriving at the truth with respect to statements of others and particularly your own statements, thoughts, and actions. You have probably discovered that to ascertain or speak the truth, the whole truth, and nothing but the truth about anything is most difficult. The reason is that people constantly refrain from calling a spade a spade, and insist on calling it a garden implement or something else equally indefinite. When you succumb to a quiet game of poker, or slip off down town when you should be in bed and asleep, do not call it "just a little fun"; analyze it carefully and you will be sure to label it "damn folly." Likewise, do not allow rank dissipation to masquerade under a colloquialism such as that of "being a good sport." Do not excuse your over-indulgence in the pleasures of life with soothing words to the effect that once in a while one has to do something to break the monotony. Every one must learn to be rigidly honest with himself, and always be his own most exacting critic and taskmaster.

There are many actions which our inner con-

sciousness whispers to us are unwise, but we do not stop and listen, because many of us are so constituted that we prefer to ride rough-shod over anything which interferes with our pleasure, or is unpleasant to think about. You have probably noticed, as we all have, that it is in the stern, calm light of the "morning after" that your inmost conscience sometimes refuses to be obliterated. It is then that it is wise to thresh the matter out to the bitter end. If you procrastinate, there is something so alluring about the shadows of evening that, with their approach, the morning's whisperings become drowned in dreamy anticipation of pleasure. In the morning, we can, to some extent, put away impulse and desire, and realize that perhaps Death was lurking in the shadows of the evening before. In the morning, reason is liable to be uppermost, so it is then that we must analyze our actions and decide, in no indefinite manner, what our future course is to be.

We have all made resolutions and we have all broken them, but there are some steps we may take which will fortify us in our resolves. In the first place, a resolution, if it is to be adhered to, must in no way be conditional on something else. It must be intensely earnest—so earnest that we become willing to place ourselves in a position in which we shall feel decidedly ashamed if we do not carry out the resolve. This is accomplished by telling others about it, by writing home about it, by confiding it to the doctor, by committing ourselves to it in every possible manner. Professor William James illustrates this very beautifully in one of his

books.[1] He writes: "I remember long ago reading in an Austrian paper the advertisement of a certain Rudolph Somebody, who promised fifty gulden reward to anyone who after that date should find him at the wine shop of Ambrosius So-and-so. 'This I do,' the advertisement continued, 'in consequence of a promise which I have made my wife.' With such a wife and such an understanding of the way in which to start new habits, it would be safe to stake one's money on Rudolph's ultimate success."

Once a resolution is made, no time should be lost in carrying it into effect. For example, you may have come to the conclusion that the right thing for you to do is to go to bed immediately after supper, in order to prevent the over-exercising that is so liable to take place during the evening hours of recreation. Suppose this conclusion to be reached on Friday, it would be utter folly to put off carrying it out until Monday.

There are very few rules which do not have their exceptions, but your resolution, in addition to being earnest, must be absolute. There must be no special occasions upon which the resolve is suspended—no "just for to-nights." Once the resolution is broken, it undoes the good accomplished during at least five occasions on which the resolve has been successfully carried out, and, on the other hand, every time it is put into effect it greatly diminishes the resistance it is necessary to overcome to fulfil it on the next occasion. It gradually becomes a

[1] "Talks on Psychology and Life's Ideals," page 68.

habit, and then the temptation to omit carrying it out is practically *nil.*

Scarcely a day goes by in the tuberculosis battle that some little thing does not arise which requires thought, patience, and determination. Sometimes the temptation is very strong to shift the responsibility to other shoulders, and make some one else decide on a point which we realize should be decided in only one way. Some one, for example, has extended you an invitation to a theatre party, and immediately there follows a conflict between reason and desire. Reason tells you that you are not in fit condition for such excitement, but instead of having sufficient grit to make the decision for yourself, you put it up to the doctor with a vague hope that perhaps, out of the kindness of his heart, he will let you go. Once having gained his permission, your own good sense in the matter, and your knowledge that the doctor has been imprudent, are effaced by the thought that he is to blame if anything goes wrong. Such tactics indicate very poor generalship, because a battle lost is a battle lost, and it matters little who is to blame. Such conflicts between desire and reason must be decided immediately and not put off for consideration, otherwise reason will invariably be overcome by desire. Indeed, even after reason has won the battle, desire will often lurk around begging for further consideration and, unless summarily dismissed, may become threatening.

It is well that you should lay down rules for yourself on many of the everyday little things which in themselves seem insignificant, but which

taken together often determine the destiny of the battle. For example, you have noticed a tendency to interest yourself in something in your room just after meals, so that you always lose ten to fifteen minutes in getting down to business. No one would think of finding fault with you for this trifling delinquency, and unless you are very much in earnest in the business of getting well, you will probably never take yourself to task for it. But fifteen minutes after each meal amounts to twenty-two hours in a month, and it is possible to take a great deal of over-exercise in twenty-two hours. Clearly, here is an opportunity to legislate on your own behalf.

Another example may be helpful. In winter time the question constantly arises as to whether or not it is too cold to lie outside, and frequently the decision is based on your own feelings rather than on the actual reading of the thermometer. Here is an opportunity to lay down a definite law for yourself. You will go out when the temperature is not lower than, let us say, zero, or ten above or even fifteen above zero. The point is not what the temperature should be, because your doctor will determine that, but that you should have a clear understanding with yourself as to when you go out-of-doors, and when you stay inside.

Finally, good generalship consists not only in possessing a clear understanding and objective, in enforcing rigid discipline, in self-reliance, and acting in accord with reason, but the most successful general is the one possessed of enthusiasm and optimism, one who is going to win the battle, no

matter what the odds. Never allow a word of doubt to escape your lips, and as for pessimistic reminiscences, remember Browning's words:

> "But how carve way i' the life that lies before,
> If bent on groaning ever for the past?"

The secret of being enthusiastic is to practise instilling enthusiasm into others. Cheer and encourage the other fellow all you can, and tell the friends at home that if they cannot write cheerful and encouraging letters they would be wiser not to write at all. To continually assert that you are going to recover, is to come in time to feel that you are getting well, and to feel that you are getting well is a wonderful help in your fight. You must carry yourself along with your own enthusiasm. Nothing wins like success. Remember that though it seems very difficult at times to be enthusiastic and optimistic, everything is difficult that is not a habit. Single acts become easier with each repetition until finally they become habits, and habits in turn mould character. Those who follow the line of least resistance will develop habits in accord with pleasure, and their characters will remain mediocre or feeble, and those who go against the current of their own harmful tendencies, and thoughtfully develop habits which have a definite high objective, will gain for themselves the greatest of all rewards, the ability to be what one wills.

CHAPTER XX

Special Weapons

In the light of modern research it is difficult to believe that there still remain intelligent people who proclaim that they do not believe in the "germ theory." Science does not seek to force itself upon skeptical minds, but we must realize that, while a healthy individual can afford to scoff at germs to his heart's content, there is an element of considerable danger, not to mention a positive handicap, in such skepticism, on the part of a tuberculous patient. Disbelief in a great scientific fact is generally synonymous with ignorance of the proof. But disbelief in the germ causation of certain diseases can no longer survive a knowledge of facts such as the following.

After years of labor and painstaking investigation, scientists have succeeded in isolating disease germs from their home in the animal body, and in growing them in broth, gelatine, blood-serum, and in many other media. They have succeeded in separating them into pure cultures, *i.e.,* in growing one variety of germ alone by itself, and uncontaminated by any other type. Thus anthrax, diphtheria, tubercle, typhoid, and many another germ may be separated out in different individual receptacles, and labelled, and the scientist can predict with absolute certainty the symptoms and the dis-

ease that inevitably will follow the injection of any one of these pure cultures into an animal body.

Further, it is possible to separate the poison produced by a germ from the living germ itself, so that, for example, by injecting only the poison of the diphtheria germ into the body, all of the symptoms of diphtheria appear for a short time, but disappear just as soon as the poison is excreted from the body. There being no germs present, the poison does not continue to be manufactured. It is the poison of the germ, and not the germ itself, which is the direct cause of symptoms. The poison of a tubercle germ, separated from the bacillus itself, is capable of producing tubercles, fever, emaciation, etc. Of course, it is possible to give such a large dose of germ toxin that, in itself, it would cause death. The effect upon animals varies; some can stand large, others only small doses, at one time. The rabbit, for example, can stand, per body weight unit, two thousand times more tetanus toxin than the guinea-pig, and the hen can stand ten times more than the rabbit. But the very wonderful and useful fact has been discovered that the second dose of toxin is borne very much more easily than the first, and, in fact, that the second dose may be made considerably larger than the first. Further, the third injection may be made larger again, and so on until finally the animal can stand a dose large enough to kill ten such animals which have never received toxin. What does all this mean?

When the first dose of toxin circulates among the white cells and their allies, these little soldiers

are naturally led to believe that an invasion is imminent, so they proceed to manufacture a variety of ammunition that tends to neutralize and combat the poison of the enemy. The taste of the toxin to the white cells is something like the first taste of blood to a tiger. It not only makes them keen and watchful for the enemy, but it actually whets their appetites and improves their digestions, so that after they have been given many doses of the toxins, should the germs themselves be injected, the white cells and their allies would annihilate them with ease. But here the old adage that "Enough is as good as a feast" applies. To get the best results, just the right amount of toxin must be injected. Too much will lead to "toxæmia," or drunkenness. When the germs are not in the body, drunkenness on the part of the white cells and their allies may be recovered from, but, when the germs are present, it puts them in a very precarious position.

The enemy hosts of the germ kingdom may be divided into two classes, according to the manner in which their ammunition is prepared. The germ belonging to the first class may be compared to a snake or spider in that it manufactures its poison within its body, and spits it out, or excretes it, into the blood of its victim. As respects the germ of the second class, it is the body of the germ itself which contains in its consistency the dreaded toxin, and it is probably not until the germ is dead and disintegrated that his poisonous character is disclosed. The tubercle bacillus belongs to the second

type, while the diphtheria germ is a prominent member of the class which excretes its poison.

Sera are prepared from the blood of animals treated with the poisons excreted by certain germs, while vaccines are solutions containing the dead or very weak bodies of germs of the class which do not excrete toxin but which contain it in their body substance. Tuberculin is really a broth of tubercle bacilli standardized to a certain strength. For years it has been the hope of scientists that by giving tuberculin to little children, starting with minute doses and gradually increasing them, the armies of defence in the children thus treated would become so strong, so resistant, that they would speedily annihilate any tubercle bacilli that might attempt an invasion. The results, however, up to the present have not been encouraging. Though Koch, who discovered tuberculin in 1890, very much overrated its value in the treatment of tuberculosis, it has nevertheless been given to a selected group of tuberculous patients with gratifying results. It should be clearly understood that it is of advantage only in certain cases, and that a considerable amount of expertness is required on the part of the doctor in determining which patients should receive tuberculin treatment, and in administering the toxin. Certainly, as regards these points, a patient is in no position to judge for himself.

Generally speaking, cases which are progressing favorably, and cases which are already overwhelmed with the poison of the tubercle enemy should be left alone. On the other hand, patients who have progressed favorably up to a certain

point and have then become more or less stationary, neither improving nor retrogressing, need something to stir up their fighting forces to greater deeds of valor, and tuberculin carefully and scientifically administered oftentimes proves a wonderful help. But, as pointed out by Dr. Sahli, "the qualifications of the physician who administers it are certainly of more importance in most cases than the quality of the tuberculin."

In a few incipient cases, tuberculin may be properly called a specific, *i.e.*, a preparation which is really curative. It aims at so improving the fighting power of the white cells and their allies that they will be able to eradicate the disease from the body. It is probably more generally helpful in moderately advanced cases than in any others. You cannot possibly judge of the value of tuberculin treatment on such evidence as that "Billy Brown became worse," or "Mary Jones got fat" after taking it. To arrive at anything like a comprehensive idea of its results, you have to consider the reports of competent judges who have tested its efficiency on a great number of patients. Dr. Kreuser selected a hundred and ten cases who were bringing up tubercle bacilli in their sputum, and while all of the patients followed the regular rest cure, he treated one-half of their number with tuberculin. After a prearranged period had elapsed, it was found that twenty-two of the fifty-five treated with tuberculin had ceased to raise tubercle bacilli, while only sixteen of the other fifty-five had got rid of the tubercle germs from their sputum. This gives a fair idea of what may

be expected in the way of so-called cure by tuberculin, but, outside of cure, the proportion of patients helped by tuberculin is very much greater.

After an injection of tuberculin, there is considerable bustling and excitement among the white cells and their allies around the encampments of the tubercle enemy. The forces of defence become exceptionally busy, and you can well realize that at that particular time it is essential they should not be tired, or have their attention in any way distracted. It is most important that during these little crises, you should make it a point to assist your diminutive soldiers just as much as lies in your power. Rest of mind and body enables your forces to give closer attention to mobilization and attack, so rest should be the watchword. Should your temperature reach the hundred mark for more than two hours, it is wise to go to bed and remain there until the reaction has completely vanished. Headache or pain at the site of injection may be treated by application of the ice-bag to the painful area, and all such symptoms should be recorded for the doctor's consideration.

Perhaps it has never occurred to you that during the course of your disease, each time you exercise, you inoculate yourself with a small amount of your own tuberculin which exists in considerable quantities at the site of your trouble. Until such time as the enemy has been completely imprisoned, every little movement of your body liberates a greater or less amount of poison of the tubercle germ into your blood. Generally, the toxin gets in all too freely, and makes you feel tired and listless, spoils

your appetite, and makes you feverish. Needless to say, the greater the exertions of your body, the more freely does the toxin enter the blood, and to over-exercise at a time when the enemy is in the ascendency is to intoxicate your army of defence.

When the time comes that the tubercle bacilli are imprisoned, and your white cells and their allies have slackened in their efforts at routing the enemy, apparently having come prematurely to the conclusion that the battle is won, then is the time that just enough exercise to liberate a little of the enemy's poison will take the cock-sureness out of the home forces, and make them realize that the time has not yet arrived to stack arms. So we see that when the right time arrives, exercise is just as important as rest was at an earlier stage. The most exacting duty of your medical adviser is to determine when you should exercise, and when you should rest, and what the duration of each should be. You cannot determine this accurately for yourself, and it would not be well to try.

To the man who is at business all day, exercise, so-called, often consists in turning out for a game of tennis or football. To the man who has been on the flat of his back for a month or two, sitting out of bed in an easy chair is strenuous exercise. To you, it must never mean anything more than walking, walking soberly and sedately as a man of sixty-five. Many a man has put himself back three to six months, if indeed he has not sacrificed his life, through the single act of running for a street car. Cars may come and cars may go, trains may be missed, and the postman may go by without your

letter, but you must never let your ambulations exceed the hemorrhagic gait. Perhaps the day will come when you may indulge in a quiet game of golf, or even something much more strenuous, but for the present reflect on the building operations which are taking place in your chest, and do not risk breaking down the newly-constructed, delicate fibres which imprison the enemy and his poison.

While walking is the outside limit of exercise for the tuberculous patient, one may readily understand that were an individual, who has had a long sojourn in bed, to rise, dress and go for a walk, all at the one time, it would quite probably undo much of the good accomplished by the complete rest. Hence, we may determine several steps between complete rest and walking. First comes passive exercise, *i.e.*, some one else exercising on you, by giving you massage or an alcohol rub. Next, you should be able to sit up in bed for half an hour without being fagged before attempting to sit out of bed in a dressing-gown. Again, you should be able to sit out of bed during one-hour intervals for some days before you attempt to dress yourself. Washing and dressing involve very considerable exercise and the man who attempts it, after being confined to bed for some time, should always follow it with a lie-down before going forward to other exercise.

Walking should be regular as to distance and time and should be regulated by ordinary common sense. For example, to start off walking down hill would mean that you would have to climb the hill toward the end of your exercise when you

might be more or less weary. It is wiser to avoid hills until you are able to walk a mile. It need hardly be stated that all exercise should be taken out-of-doors. Increases in the distance should not be made oftener than once a week, and a little rain need not interfere with the walk being regularly carried out. If you are ever caught in a storm, a change of clothes and an alcohol rub immediately after ceasing to exercise will probably prevent ill consequences. You must try to develop a subconscious discipline over yourself which will always control such natural impulses as to crank an automobile, to boost Tommy into a tree, or to force a window which is tantalizingly stubborn. Never attempt any pulmonary gymnastics, such as blowing water from one bottle to another, without the advice of your doctor.

If rest be important after a dose of tuberculin, it is just as important after the self-inoculation with tuberculin which occurs during exercise. If it be important that an overdose of tuberculin should not be administered, it is just as imperative that you should not give yourself an overdose of your own tuberculin by exercising too freely. Further, if tuberculin should be given in uniformly gradually ascending doses, likewise exercise should be taken uniformly, regularly, and methodically. To be capricious or impulsive about your exercise is liable to be just as dangerous as if a doctor, just because he felt like it,were to give you many times as much tuberculin as was wise.

When you are taking a course in tuberculin, do not be too ready to blame the doctor if the inocu-

lation is followed by a marked reaction. You may be sure that the doctor's regulation of the dose has been more carefully considered than your own regulation of exercise. Search your memory and see if you do not find an indiscretion four or five days previous which, by coincidence, is giving a reaction, just at a time when you are especially wide awake to symptoms of any kind.

It very often happens that the greater part of your indisposition is due not so much to the activities of the tubercle bacillus as to a failure on the part of the white cells and their allies to hold in check certain other enemy germs which have come to the aid of the tubercle bacilli, and comprise what has already been referred to as "a mixed infection." To increase the fighting strength of the white cells and their allies against such mixed infections, a vaccine is often used. There are two groups of vaccines—stock and autogenous vaccines. The former are generally kept in stock by druggists and are valuable in combating certain acute infections which do not give time for the preparation of an autogenous vaccine. In mixed infections of the lungs, however, it is generally advantageous to have a vaccine prepared from the particular strain of germ which is attacking the patient. To prepare such, the germs are taken from the patient's sputum and such as it is desired to use are carefully separated out, grown in pure cultures and finally made into an autogenous vaccine. The bodies of the germs in an autogenous vaccine will more than likely whet the appetites of the white

cells for the particular brand of enemy that is causing the mischief.

About one patient in twelve, treated with vaccine for mixed lung infection, shows truly marvellous improvement, and for this reason there is perhaps a good excuse if vaccines are given just a little too frequently. It is a mistake to suppose that the selection of patients for vaccine treatment is not to be very carefully made, or that a vaccine is incapable of doing harm. Undoubtedly, at times, a vaccine so irritates the diseased area that without it the patient would have made better progress. Only an expert can advise you wisely as to whether or not you should submit to vaccine treatment. Do not attempt to decide this for yourself.

In addition to tuberculin and vaccine, a third special weapon, in the battle against the tubercle enemy, is what is known as "artificial pneumothorax." This has for its object the splinting of the lung on one side so that it will be at perfect rest until its diseased areas have had an opportunity to heal. Imagine the neck of a football bladder so arranged that the air could escape through it just as air can escape through the bronchial tube from the lung when pressure is brought to bear on it. Imagine also the operation of inserting a tubular needle through the leather cover of the football, but not into the rubber bladder, and of forcing gas in through the needle so as gradually to compress and collapse the bladder, and you have a mental picture of what actually takes place in artificial pneumothorax. The bladder represents the lung, the leather cover the chest wall, and the space between,

the pleural cavity. By inserting a tubular needle through the chest wall and carefully injecting gas into the pleural cavity, the lung of one side becomes pressed upon and collapsed, so that it is put out of commission and is at rest. The gas is gradually absorbed, so that treatments of gas injection must be kept up at longer or shorter intervals for months; and after healing has taken place the lung may gradually return to its old position.

Special weapons in tuberculosis are all two-edged, and are as capable of cutting in the wrong direction as in the right one. Only those who are experienced should attempt to wield them, and they should never be brought into play if good progress can be made without them. They are in no sense a substitute for rest, and must never be a balm for impatience. The longest way round, in a faithfully followed rest treatment, is often the shortest way to the desired goal.

CHAPTER XXI

The Course of the Battle

As the battle runs its course, three outstanding conditions occasion considerable attention: weight, cough, and temperature. To the uninformed individual, weight is of paramount importance. So long as a tuberculous patient is fat and looks well, there is, he thinks, not much to worry about. Undoubtedly it is a disadvantage to be very thin, but there is not always the advantage there appears to be in carrying good weight. The majority of patients who are not very ill will put on fat very quickly, even as much as thirty pounds in a month, when first they follow the rest treatment. Until the germ enemy is imprisoned, however, should they return to work, they will lose the fat just as quickly as they gained it. Sustained good weight in combination with the ability to continually carry out strenuous exercise is a physical asset of great value, but, while it is always an advantage to be fairly fat, the tuberculous invalid must not indulge a false optimism concerning the soft obesity of invalid days.

Until such time as the toxin of the tubercle bacillus is prevented from entering the blood, you cannot expect to hold your weight when exercising, because the poison lessens the ability of the body cells to take in nutrition. Also, without exercise, your legs are sure to become lament-

ably small and flabby, but this is a lesser evil than losing everything through endeavoring to keep in training. After all, it takes but a month or two for the legs to regain their original proportions after the lung is healed and the poison in consequence shut off. As a rule, tuberculous patients gain a little in weight from August to December, remain more or less stationary from December to March and fall off slightly from March to August. A gain in weight generally shows itself first in the face and chest.

If weight is a deceptive factor in tuberculosis, so also is cough. It is not the patient who coughs the most or the loudest who necessarily has the most trouble. Generally, the old-time tuberculous patient has learned how to control his cough and manages to bring up his sputum with very little effort. Every patient should from the beginning practise controlling his cough. Not until he has had an attack of pleurisy, however, will he find out how completely it is possible to control it. Coughing is strenuous exercise for the lungs, and unless it is productive, *i.e.,* unless it brings up sputum, is worse than useless.

You will remember that the air-passages are lined with forests of cilia (described in Chapter III) and that the function of the cilia is to propel, out of the air-passage up to the throat, dust, mucus, pus, etc., which comprise sputum. When the sputum reaches a certain sensitive spot in the air-passages it begins to tickle and irritate, and, if the passage is inflamed, *i.e.,* if bronchitis exists, cough inevitably takes place sooner and more forcibly

than is necessary. When sputum and irritating particles are in the air-passages, they should be expelled, and cough is a most valuable means for accomplishing this, but the point is that the cilia must be allowed to do their work to the full, and cough be employed, not to pump up sputum when it is deep down in the chest, but only after the cilia have propelled it well up towards the throat. To lock up sputum by preventing cough with medicines is, except under exceptional circumstances, such as during a hemorrhage, the height of folly. When cough is persistent, it is an indication to avoid exertion, even talking and laughing, to say nothing of singing.

One must also be careful to avoid smoke, dust, sudden changes in temperature, exposure of the surface of the body, and the suggestion to cough which naturally comes from hearing other people do the same thing. A sip of cold water, a small piece of ice, a little orange juice, or even a licorice lozenge is sometimes helpful, but the lozenges must be limited in number. The morning cough is often helped with a glass of hot water or milk containing a pinch of salt, and the night cough, *i.e.*, the cough which occurs on lying down, may be moderated by similar treatment one-half hour before going to bed. It is most important also that the bed should be warm before getting into it. Cough is very liable to occur on change of position, and it is important to make a point of assuming at regular intervals during the day the position that brings up the sputum so as to keep the chest cleaned out. Exercise also, when it is indicated, is most helpful in

eliminating sputum. Where coughing causes gagging or vomiting, as it often does in a bed patient when he sits up in bed for breakfast, it is just as well for him to sit up half an hour before meals and have a clean-out so that the meals will in no way be interfered with.

Temperature, while affording a more reliable indication of the course of the battle than weight or cough, is nevertheless quite frequently deceptive in a negative way. You may rely on it being a sure indication of adverse conditions when it is elevated, but it is possible, on the other hand, for the battle to swing the wrong way without the temperature showing the naturally expected fluctuations. Very often the quickening of the pulse affords an earlier indication of trouble than temperature does, as the pulse is more liable to quicken than the temperature is to rise. Generally, however, the temperature is a safe guide. Should it remain above normal, even a fraction of a degree, throughout the whole day, it is an imperative command to remain in bed. Should it reach the 100° mark, it is an indication to go to bed and refuse to see visitors until the doctor has advised on the matter. 101° demands continuous stay in bed. Where a patient has gone some time without temperature, even a slight rise above normal should mean rest in bed until the movement the enemy intends to make is ascertained. A temperature of 99.5° or over forbids exercise, except dressing and going to meals, and if temperature is over 99°, exercise must not be taken without the doctor's permission. Subnormal temperature need cause no worry, although if under

97° it is a contra-indication to the taking of a cold bath.

The patient with tuberculosis is constantly on the verge of excitement, so that the visit of the doctor may increase the pulse 20 beats a minute. If at any time, while at rest during the day, the pulse reaches 110 or over, exercise, even dressing, is prohibited. The transaction of business, discussions, card games, and letter-writing will, in the case of many patients, cause a considerable rise in temperature. Likewise constipation or diarrhœa, cold in the head, or sore throat, is an occasional exciting cause. But the most frequent promoter of elevated temperature is over-exercise. Exercise on the day it is taken often lowers the mouth temperature, and the real effects do not appear for one, two, or even four or more days afterwards. If you remember nothing else, at least remember the possibility of *delayed reaction.* Delayed reaction is the submerged rock upon which many a patient has wrecked his chances of success. Do not imagine that because you appear to escape without bad effects after over-exercise you will not pay up for it in the long run. The tubercle bacillus is slow in reproducing himself, and while he may only start his developing operations on the day the white cells and their allies have been too fatigued to closely watch him, the start he gains is sure to be followed by definite results some time later.

In a well-known sanatorium, a certain young man who enjoyed the sobriquet of "Duffy" was supposed to be "chasing the cure." Duffy was a pink-cheeked boy with beautiful, large, blue eyes

that looked out from under long, dark lashes. The ladies thought him perfectly lovely, and it need hardly be said that he reciprocated cordially any demonstrations of appreciation. So long as Duffy remained strictly in his own quarters, his good progress continued without interruption, but the time came, as it is liable to come to us all, when he had gained sufficient strength to go forth into a world that for some of us is awfully full of temptation. The first occasion was a little Hallowe'en entertainment, and, the morning after, Duffy confided to a friend with some gusto (Duffy's greatest ambition was to be "a good sport") that he had found the entertainment too slow to suit him, and so had wandered forth into the moonlight with a certain very lovely young lady for a distance of half a mile or so. Up to this time, dressing himself had been Duffy's limit of exercise, but as he said he felt fine the next day he guessed it had not done him any harm. Four days later Duffy went to bed with a hemorrhage.

By the time the next sanatorium concert came along, Duffy was once more up and around, and secured permission to go to the concert. But, as he jubilantly related the following morning, on his way home some of the girls corralled him and something like a wrestling match took place. However, he guessed it hadn't done him any harm, because he was feeling fine. Four days later, when he had forgotten all about the folly, Duffy had another hemorrhage.

A month or two elapsed before a further indiscretion took place; as usual it was related with

gusto, and, as usual, was followed four days later by a hemorrhage. The third hemorrhage had not been recovered from very long when one day Duffy was discovered in the diet kitchen indulging in a little horse-play with one of the nurses. Four days later he went to bed with a hemorrhage, and for over a month he continued day after day to cough up blood, and several months elapsed before he was again able to be out of bed.

Four days was apparently Duffy's period of delayed reaction, but many patients have gone as long as a month before paying the inevitable price of bygone and forgotten indiscretions.

Elevated temperature is often accompanied or followed by sweats, which usually occur during sleep. They vary in severity from a scarcely perceptible perspiration to a drenching sweat that soaks not only night robes but bedclothes as well. When a patient shows an inclination to perspire during sleep, cotton bedclothes should give place to flannelette or outing-flannel sheets, and the night robes should be woollen. Too heavy a covering should be avoided, especially over the feet. If the sweat appears to be due to weakness, it is well to give some nourishment during the night. An alcohol rub or vinegar sponge at bedtime is often helpful as a preventive, as is also an ice-bag on the abdomen for several hours during the evening. If the sweat be considerable, *i.e.*, enough to wet the undergarments, a change of clothing is indicated, and care must be taken not to expose the body more than is necessary. When effecting the

change, a brisk rub with a Turkish towel is comforting.

Chills are better avoided than cured. Avoid exposure of the body, and do not drink cold fluids, or eat iced foods, on a cold day. In high altitudes it must be remembered that the change of temperature is liable to be sudden, and necessary wraps should always be at hand. Hot-water bottles, hot drinks, and plenty of blankets, are indicated should a chill supervene.

The course of the battle is seldom continuously favorable or continuously unfavorable. It may be compared to the waves of the ocean: first, long rollers, broken by small waves, and then the small waves lined with wavelets. The wavelets represent the individual days in the course of the battle, one day up a little and the next day down a little; the waves represent ten- to twenty-day periods, one period favorable or positive, and the next unfavorable or negative; but it is the long rollers that picture the real course of the battle, the course as you would see it could you stand afar off detached from yourself, and gain the perspective that the general gains as he views the course of a battle through his field glasses. Too many patients, like men in the trenches, judge the course of the battle by the exigencies of the moment, and lose sight of the fact that there are bound to be reverses and, what is equally dangerous, that there are bound to be deceptively calm days. And so patients often become the victims of symptoms, depressed and discouraged one week because temperature is elevated, elated into folly the next week because there is an

absence of unfavorable signs; they float along like a boat without a rudder, tossed by every wave, and they never arrive anywhere. The following is a familiar case:

A patient has been lying very quiet for a week or two, with a temperature that reaches 99.5° every day; the doctor has advised that this is the right course to follow, but the patient finds the temperature does not come down quite as quickly as he had anticipated. One day there happens in a friend who tells him that he suffered in just the same way until he got up and took exercise. Accordingly, patient No. 1 rises and walks forth, with the result that temperature vanishes. Naturally he is quite convinced that the doctor did not know what he was talking about. But four or five days later he discovers that without any rhyme or reason his temperature is 100°, and, of course, he is utterly discouraged and really is quite at a loss to know what to do. Do you wonder that the doctor sometimes nearly weeps or feels inclined to let a patient suffer the consequences of his own ignorance and folly!

You must realize that the symptoms of any one day are usually too insignificant an indication to effect any considerable change in your course of action. The battle must be viewed from a distance, and action for a definite period must be shaped upon an intelligent survey of collective conditions. If your temperature has been showing a tendency to rise above a certain point, a consultation with your doctor is indicated. He will map out a course to follow for the next month, and even if the tem-

perature seems to vanish the very next day, that course should be carried out definitely. If ever you are in doubt whether to rest or exercise, give to rest the benefit of the doubt.

If you would arrive at victory, you must not be a victim of symptoms, you must realize that you have a term of service to put in, just as much as the soldier in the trenches. That term of service will be punctuated with one series of reverses and gains, but the course must not be altered on account of either. It must be mapped out month by month in consultation with your medical adviser, and followed to the letter, one day at a time, and every hour of every day must be made to count.

CHAPTER XXII

The Tactics of the Enemy

Were the tubercle bacillus left entirely to his own resources in his attack on the white cells and their allies, in the majority of cases he would meet with ignoble defeat. However, he is endowed with untiring patience, and he seems to be willing to bide his time for years, if need be, until some germs of another division come to his aid; that is, until there occurs a secondary infection. The supporting columns of the tubercle bacillus most frequently gain admittance to the body at the time you "catch cold." What a multitude of sins are covered by that innocent expression! The man with tuberculosis may catch cold and recover from it just as other people do, but with him such a complication is liable to prove more than an episode. It quite possibly becomes an event in the history of his disease. So-called catching cold must therefore be guarded against with the greatest care.

We have seen that germs around a decayed tooth, or in the crypt of a diseased tonsil, comprise a sort of reception committee to other germs which enter the mouth by chance. The presence of one division of germs and of decaying matter, stimulates the growth of other divisions. Hence the tuberculous patient must see to it that his teeth are kept in a perfectly healthy condition, that his tonsils are free from disease, and that his nose does not afford a favorable environment for

catarrhal or other disease-producing germs. He should be able to breathe freely through his nose, because, as has been mentioned, the normal nose arrests 95 per cent. of the dust and germs in the air that enter it, while the mouth is not specially equipped for respiratory purposes.

It is important to avoid localities from which, and people from whom, secondary infections may be contracted. Street-cars, theatres, picture-shows, shops, and even the city streets, afford more or less chance of infection. Likewise people with colds, and children with running noses, should be avoided, and during epidemics of so-called "grippe" the tuberculous patient should stay strictly at home. Amusements which give rise to a dusty environment, as, for example, dancing, indoor-bowling, and the like, should not be attended, let alone participated in. Likewise, games which cause overheating are risky. If a musician, it is best not to indulge your talent without special permission.

Perhaps the greatest protection against taking cold is constant living out-of-doors. To the person who sleeps out-of-doors, and spends from eight to ten hours outside during the day, as nearly every tuberculous individual ought to do, even in the heart of winter, a cold occurs about as rarely as measles. The patient should avoid lying, sitting, or walking in a strong wind. Sensible perspiration or chilliness is equally dangerous, and an undershirt damp with perspiration should always be changed without delay. As the winter gives way to warmer weather, stick to your flannels until they

stick to you. They may be worn much further into the warm weather by the patient who is taking the rest cure than by others. When it can be afforded, underwear of intermediate weight is of advantage for use in spring and fall.

Careful attention to the skin is another important factor in the prevention of colds. The morning cold plunge or sponge, followed by a rub, sufficiently brisk to cause a skin reaction, *i.e.*, a rosy glow on the skin, is most valuable. Many patients in beginning this treatment do well to start with hot water, followed immediately by cold and exposing but a small portion of the body at one time. From day to day the temperature of the hot water should be lowered until it can be dispensed with, thereby avoiding the shock that usually attends one's initiation to cold-water baths. Where fatigue, chilliness, blueness of the skin or lips, or failure of the skin to react follows the taking of a bath, it should not be persisted in. On the other hand, a warm glow and a feeling of well-being is an indication that the cold bath is of advantage.

The most frequent result of so-called "catching cold" in the case of a tuberculous patient is a little localized congestion, either near the diseased area of the lung, or in the pleura. It is best treated in the good old-fashioned way of applying a mustard plaster. Simply a hot-water bag often effects a cure. Painting the area with tincture of iodine is most helpful to some. It is well to apply the iodine in little circles or squares like a checker-board, so that the second application may go on unpainted skin and thus, as far as possible, save the skin from

the soreness which follows several applications. Where the pain from pleurisy is very great, a binder pinned around the chest as tightly as possible limits the movement and thus alleviates the pain.

Tuberculous laryngitis, while it may be promoted by an ordinary cold, is not caused by it. Anything which inflames a throat and larynx, such as shouting, singing, smoking, sand or dust storms, and the like, is liable to cause minute cracks in the membrane which covers the vocal cords, and these cracks may afford to the tubercle bacillus a location in which to establish his camp. Once the enemy has formed his tubercle, the cords become inflamed and are liable more than ever to develop minute cracks in which the disease may advance. Consequently the patient with tuberculosis of the vocal cords should whisper instead of talk out loud, because the latter causes vibration of the cords, and when the inflamed cords vibrate they are more liable to develop cracks. When hoarseness exists in the throat from any cause, it is a sign that the cords are inflamed, and, then also, it is most important to refrain from talking out loud. Simple inflammation with accompanying hoarseness is often relieved by increasing the moisture in the room with steam.

When advised by your physician to whisper on account of trouble in your larynx, it is utter folly not to obey his advice on account of the comment that is liable to be made. What does it matter if people foolishly suppose you are too weak to talk out loud, or your fellow-patients learn that you have a tuberculous throat! Think of the years to come

when the foolish people will have forgotten that you ever had throat trouble, and the majority of your fellow patients will be in their graves. It will matter little then what people thought or said, but it will matter a great deal whether or not, when your throat was invaded, you whispered or talked out loud.

What is the truth about smoking? Does it really do any harm? That depends more on the patient than on the tobacco. Some men who have smoked for years are impervious to the effects of nicotine, others are kept under weight by it because nicotine generally prevents the body cells from properly absorbing nutrition. Men of nervous temperaments have their hearts made irritable, their pulse-beats quickened by from ten to twenty beats a minute, and their whole nervous mechanism depressed by the toxin. Every man who smokes absorbs a certain amount of toxin through the mucous membrane of the mouth, pharynx and stomach. Inhaling tobacco smoke is always fraught with evil consequences, and excessive spitting is liable to deprive the food of some of the necessary juices. Consequently, the man with tuberculosis who smokes is taking a chance. Should he have any inflammatory condition of the throat, smoking should be absolutely prohibited, and so long as his disease is active, his cough irritable, or his weight reduced, he would be much wiser to leave tobacco alone. In any event he should place a limit on the number of pipes, cigars, or cigarettes he allows himself in any one day, and that limit should be rigidly adhered to.

Probably the most alarming accident during the course of the battle is a hemorrhage. It often seems to come out of a clear sky, and may occur at practically any time during the course of the disease. Oftener it is the result of some indiscretion, and unfortunately it does not always show itself at the time, but is liable to occur some hours or days later. It may range in quantity from just a coloring of the sputum to one or two pints of blood. Very often a little coloring of the sputum precedes the hemorrhage, which may come some hours later, so that "color" must be treated seriously. The nervous patient is constantly finding color that alarms everybody until it is discovered that it made its appearance when he was cleaning his teeth, or after he had had a slight nose-bleed.

Color is most liable to appear early in the morning, when you are coughing just after awakening. It is generally intimately mixed in with the sputum. If it appears to be distinct and separate from clear sputum, as is a little clot or streak, quite possibly it comes from the back of the nose. To make sure, cleanse the mouth and throat carefully by gargling with one-half a teaspoonful of baking soda in one-third of a tumbler of warm water, and watch the next lot of sputum coughed up. If it be colored with blood, it is well to go quietly to bed, take a laxative, such as a dose of Epsom salts, and refrain from eating or drinking anything until the doctor has advised fully on the matter.

Although you will quite probably run the course of your disease without the accident of a hemorrhage, it is nevertheless important that you should

consider just what your actions would be in the event of such an emergency. The treatment for hemorrhage from the lung has two important objects in view: (1) To limit the loss of blood as much as possible, and (2) to prevent blood being aspirated or sucked into the air-spaces of the lung. Such a complication when extensive is liable to cause "post-hemorrhagic pneumonia," *i.e.*, pneumonia following the hemorrhage. Should you become excited when the hemorrhage occurs, and start to run, or struggle, or endeavor to hold back the blood, both of these objects, in all probability, will be defeated. It is obvious that such conduct will not only make the heart pump the blood more quickly out of the ruptured vessel in your lung, but it will also cause blood to be sucked into large areas of the lung.

Should a hemorrhage occur, your line of action should be to sit down and keep quiet. Should you be in a shop, sit down; should you be on the street, sit down—it is no time to look for a chair—sit down in the middle of the road if necessary. Of course, it will cause commotion and talk, but commotion and talk last only nine days, and life is worth more than that. Control the coughing as far as possible, do not try to talk, and do not try to hold back the blood. Some kindly disposed people will doubtless carry you home on a chair or in a conveyance, but if there be no one at hand, remain right where you are until the hemorrhage ceases, or help comes. Once at home, lie upon the bed until the doctor comes. In the meantime, your friends may remove any constrictions in your clothing, and it would be well for you to take a cathartic,

such as a dose of Epsom salts. Care should be taken not to expose the skin to cold night-robes or cold sheets.

While the hemorrhage is taking place, call to your mind the fact that, if it were going to be fatal, it would probably have been all over before you had had an opportunity to know what had happened, and that thousands of others have had hemorrhages and lived to laugh at the fear they felt. If you can exercise enough self-control to relax every muscle and lie limp on the bed, the trouble will clear up much more quickly. You will become very thirsty, but it is most important that you should not drink. You will think that your back is going to break, but time is filled with to-morrows, and to-morrow it will not be so bad. Other treatment which may be necessary differs for different patients, and therefore should be outlined by your doctor. When a patient is subject to hemorrhages, it is well for him to carry in his pocket an ampul containing five drops of amyl nitrite, and should the hemorrhage threaten to become excessive, the ampul may be broken into a handkerchief and the fumes of the medicine inhaled. Sometimes it is most effectual in lessening the flow of blood, but should be used only in severe cases.

Indigestion is generally caused by overeating, fatigue, irregular hours, constipation, or impure air. If you are spending all night and eight hours of the day out-of-doors, if you are resting as much as the doctor has advised, if you are arising from your meals feeling you could eat a little more, and if your bowels are regular and yet you are troubled

with indigestion, you are the one exception in a hundred, and a case for special consideration by the doctor. Think it over carefully, however, and be sure you are carrying out your part of the requirements before resorting to medicine.

Intestinal tuberculosis is not as frequent as an occasional pain in the belly would lead patients to suppose. Diarrhœa more frequently comes from swallowing sputum, or eating foods which disagree, than from intestinal tuberculosis. Swallowing sputum is an exceedingly dangerous practice, and, as mentioned, no feelings of delicacy should ever influence a patient to refrain from using the sputum cup. When diarrhœa and pain in the abdomen are frequent, it is well to wear a flannel or silk abdominal binder. Cold drinks should be omitted, as should also fruit, fruit juices, most vegetables, sugar, and other sweets. Fluids should also be restricted in quantity. Should the pains be excessive, the ice-bag, hot-water bag or turpentine stupes applied to the abdomen may be helpful.

Not infrequently a cold abscess makes its appearance near the rectum. This after being opened forms what is known as "a fistula," and may discharge for a long time. It should not cause anxiety, however, as if it be kept properly cleansed, it may exist for years without exerting any discernible influence upon the general health.

Some patients are the victims of insomnia. It is possible to sleep so much during the daytime or so late into the morning that one has difficulty in getting to sleep or remaining asleep at night. Although it is difficult to convince many patients of

the fact, it is just as important to wake up, or be wakened up, at a regular hour in the morning as it is to go to bed at a regular hour at night. Because a man does not sleep well at night is no excuse for allowing him to sleep in the morning. Such procedure is promoting the difficulty instead of alleviating it. The patient who is troubled with insomnia should have an early light supper. He should avoid all excitement, especially during the evening. He should sleep in the fresh air, and the bed should be thoroughly warmed before he gets into it. Sometimes massage of the back or an alcohol rub down the spine is helpful, as is also a glass of hot milk, one-half hour before retiring.

In Chapter V it was explained that many a patient with tuberculosis has in his chest, at the time he commences treatment, a condition which will have to become considerably worse, so far as symptoms are concerned, before a recovery can be effected. It was also pointed out that sometimes, as out of a clear sky, a patient, when least suspecting trouble, is thrown on his back apparently because his condition has suddenly become very serious. This is but one of the reverses, and is generally due to an old-time diseased area of the lung softening and breaking down to be thrown out of the chest. There are many patients who can never be well until after this happens, so that it should not prove as discouraging as it appears. When it comes, when any complication comes, it is no time to throw up your hands and say you want to die. Many a patient has, by sheer grit and perseverance, won his way through one long series of

the most trying conditions and complications, back to victory and health. If another patient can do it, so can you.

"You're sick of the game!" Well, now, that's a shame.
You're young and you're brave and you're bright.
"You've had a raw deal!" I know—but don't squeal,
Buck up, do your damnedest, and fight.
It's the plugging away that will win you the day,
So don't be a piker, old pard!
Just draw on your grit; it's so easy to quit:
It's the keeping-your-chin-up that's hard.
It's easy to cry that you're beaten—and die;
It's easy to crawfish and crawl;
But to fight and to fight when hope's out of sight—
Why, that's the best game of them all!
And though you come out of each gruelling bout
All broken and beaten and scarred,
Just have one more try—it's dead easy to die,
It's the keeping-on-living that's hard.[1]

It is when the complications and serious reverses come that the patient who has been bolstered up with false hopes is liable to search for short cuts to a cure, and to fall a victim to the ravages of charlatans and patent medicines. Philip P. Jacobs, of the National Association for the Study and Prevention of Tuberculosis, has investigated very thoroughly many so-called "consumption cures" which are grasped at towards the end of a losing battle, as straws are by a drowning man. The summation of Dr. Jacobs's report is that the medicines investigated consisted of stimulants, sedatives, or some absolutely worthless substance such as rye-flour or colored water. "Investigation of the claims of hundreds of testimonials for a large number of consumption cures has always proved one of three things: (1) Either the person

[1] "Rhymes of a Rolling Stone," by Robert W. Service, page 102.

who signed the testimonial had done so because he was paid for it; or (2) he never had tuberculosis at all and only imagined he had been cured; or, most frequently, (3) that he was very much worse, or dead, as a result of taking the nostrum at the time the investigation was made. . . . An investigation of the cases of more than one hundred consumptives in a Western city, who had been taking a certain widely advertised consumption cure, revealed the fact that almost every one had experienced a temporary relief, but that in every case the patient had either become worse, or died in a short time afterward."

If consumption cures always consisted of inert substances, such as rye-flour, the offence of the proprietor would be nothing worse than robbery, but unfortunately, no matter what the proprietor's opinion on the subject, many cures contain positively harmful drugs, such, for example, as potassium iodide, which to some patients means nothing short of death. When tempted to depart from the narrow road of ethical treatment, at least remember that, "The American Medical Association, 535 Dearborn Avenue, Chicago, will gladly tell you, if you will send them a sample, or write to them about any so-called 'cure,' what its real merits are. It should be worth a two-cent stamp to find out if you are taking poison or are doing yourself an injury in some other way." [2]

Apart altogether from patent medicines, there

[2] For further information on this subject, the National Association for the Study and Prevention of Tuberculosis will, on request, forward you a pamphlet entitled "Fake Consumption Cures," which is well worth reading.

are a few patients who, while following the directions of the doctor, make the grave mistake of carrying out some line of treatment on their own account that has been recommended to them by some pamphlet or patient. Some even go so far as to substitute Christian Science for the regular treatment of a sanatorium while professing to follow the latter. Obviously, such a course is ludicrous, and it is equal folly to take medicines recommended by friends who, of course, are desirous of being helpful, but whose understanding is limited.

The medical profession is quick, perhaps too quick, to try anything and everything that offers the least chance of being of value. Dr. Trudeau very truly writes, "As we look back thirty years, it is curious to see how the many widely heralded specific methods, aimed at the destruction of the germ in the tissues, have proved futile, and are now forgotten, and how the simple principles of treatment represented by the first little Sanitarium Cottage have survived, have saved and prolonged many lives, and are constantly being applied more and more extensively and intelligently all over the world." [3]

If you would be victorious in the fight, do not experiment with uncertain remedies, but through thick and thin follow the three cardinal principles of treatment: rest, fresh air, and good food. In the battle against tuberculosis, as in many another battle, the darkest day often comes just before the dawn, and, at such a time, to become diverted from the right course, because of a tedious line of treatment, is to throw away all that has been gained through years of patient endeavor.

[3] "An Autobiograph," by E. L. Trudeau. page 206.

CHAPTER XXIII

The Allies of the Enemy

In every walk of life men are realizing more and more that the influence of the mind over the body is a matter to which insufficient importance has been attached. They are learning that love and hope, fear and excitement, and every emotion which day by day stirs the human heart, not only stamp their imprint with indelible marks on every feature of the face, but finally engrave themselves upon the vital structures of the body.

You have seen in Chapter XVIII that it is impossible to think a thought without there taking place at the same moment in the brain tissue a minute explosion with the consumption of oxygen, the throwing off of carbonic gas, and the expenditure of energy. It is the explosion, in fact, which produces the thought, and it may be readily understood that prolonged and deep thinking requires a great series of explosions with the expenditure of a corresponding amount of energy. Thus, if you were to spend the day in reading a book which requires or causes deep concentration of the mind, you would expend quite as much energy as if you were to spend the day performing physical exercise.

The minute brain explosions which produce thought are seldom completely under your command, but some are more so than others, so that there may be recognized two classes of thoughts—

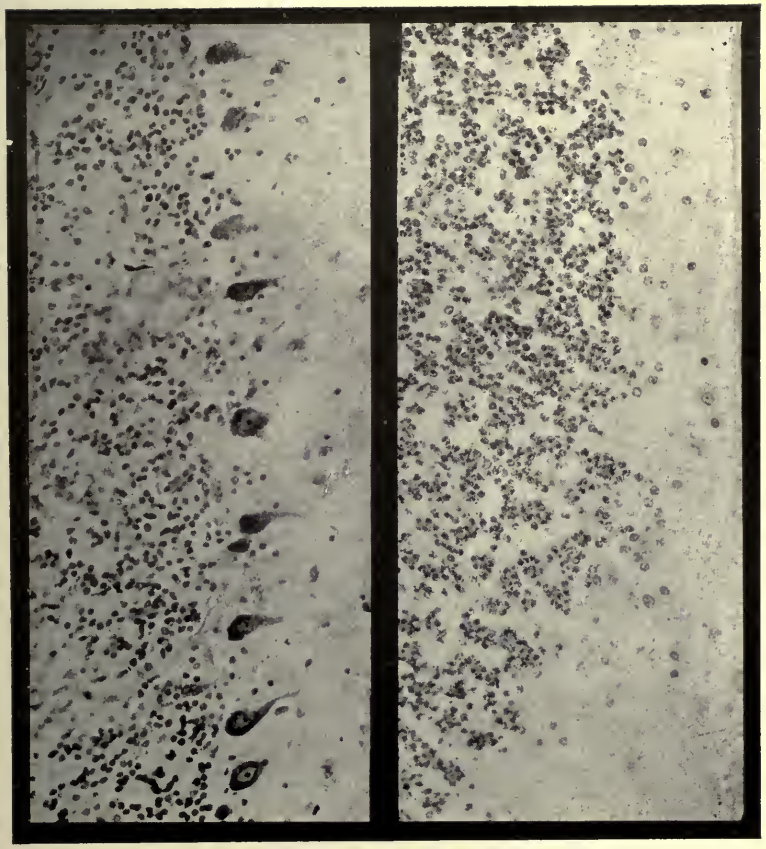
those which are volitional and come forth at your command or desire, and those which occur subconsciously and which take place without any direction, command, or sometimes even desire on your part. The subconscious thoughts look after many of the everyday actions of your body, such as the guiding of your hands when you convey food to your mouth, while, at the same time, your volitional thoughts are free to carry on a conversation with your dinner companion. It is well that the subconscious mind should look after the many little details of daily actions, as it would become very wearisome were you forced, before acting, to concentrate your mind on every little movement, such as putting a piece of bread in your mouth.

Added to one's everyday thoughts, and inseparably blended with them, is that child of feeling, emotion, which influences all thinking, but which affects, most profoundly, the subconscious mind. As soon as an emotion such as fear begins to blend itself with the ordinary thoughts, the mind is liable to become over-active and, without desire on your part, to produce a series of rapid, profound and often painful effects on your body. Different people are differently affected by the ordinary happenings of life. Thus one man will show great excitement where another will exhibit comparative indifference. But no matter what a man's temperament may be in health, he is very much more susceptible to emotional excitement when he becomes ill. In other words, the sick man is much more liable to have his body affected by his mind than the well man is. Moreover, certain diseases unnerve a man

much more markedly than others do, and amongst the former tuberculosis stands in the first rank. A person suffering from tuberculosis is on the verge of nervous excitement at all times, and the little things of life, which in health are passed over, have often a profound effect upon the invalid's mind, which, in turn, profoundly interferes with the normal working of bodily functions.

The emotions may be of an acute or intense character, such, for example, as fear, when you think you hear a burglar in the house, and the effect on your body is correspondingly intense—your face pales, you feel cold chills running up and down your spine, a great weakness seizes your limbs, and when the excitement is over you feel exhausted. If you are a woman quite possibly you fall in a faint.

Again, the emotion may be less intense in character, but may become chronic, and give rise to a series of depressing thoughts which seem to weave themselves into a circle, and revolve in the mind with wearying and never-ending monotony. Just how much the emotion will affect the body in either case depends, first, on the intensity of the emotion, and, second, on the length of time it continues to operate. When the emotion is of the acute or intense variety, a great deal of energy is expended in a short space of time, as is evidenced by the feeling of fatigue after the excitement has passed. On the other hand, if the emotion becomes chronic, and is continually alive in your subconscious mind, the effect on the body may not be so evident to an observer, perhaps, but you may lie quiet from morn-



A B

A, Section of Normal Cerebellum (×310). B. Section of Cerebellum Showing Effect of Extreme Emotion (Fright) (×310). (From Crile's "A Mechanistic View of War and Peace," courtesy The Macmillan Company)

ing until night thinking you are resting your body and the evening shadows will find you weary and tired.

Apart from the expenditure of energy connected with all kinds of thought, there follows in the train of depressing emotion not only an interference with the functions of the body, such as indigestion, but a series of profound changes in many of the body's vital organs. Dr. George W. Crile has shown in an interesting series of experiments a few of the changes wrought. One may see in the accompanying photographs, prepared by Dr. Crile, some of the effects upon the brain and the liver produced by extreme fear.[1] Dr. Crile also shows that certain emotions, such as fear or anger, act in the same way as overwork, pain, or infection, and give rise to a set of symptoms identical with many of those produced by tuberculosis. If depressing emotion is continually or repeatedly in operation, there follows in its train one of a group of diseases, among which tuberculosis is most prominent. Thus we find that certain emotions are promoters of tuberculosis. In other words, they are allies of the tubercle enemy, and if you would be victorious in your long-drawn-out battle, you must recognize which of your emotions are assisting the enemy, and endeavor in so far as possible to bring about a separate peace with them.

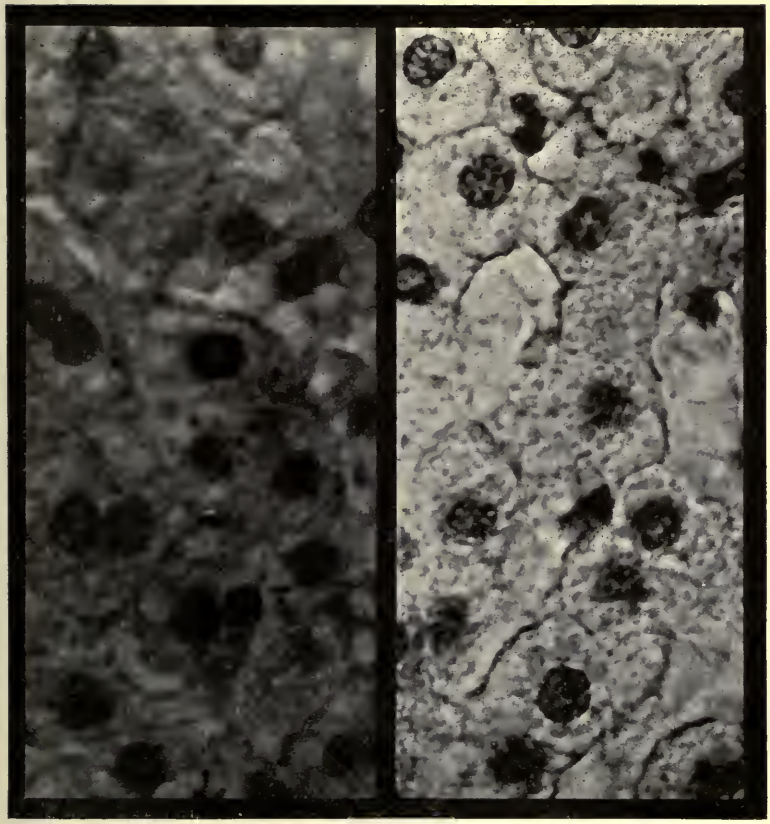
Concerning, first, the volitional thoughts or the thinking that you bring about by choice: it is quite impossible to draw any hard-and-fast line between

[1] Illustrations from "A Mechanistic View of War and Peace," by George W. Crile, pages 80 and 84. With the kind permission of the author.

the thoughts upon which you may with impunity allow your mind to dwell, and those which it is wiser that you should avoid. It is a matter more of degree or intensity of thought than of quality or kind of thought which determines the tiring effect upon your body. Thus you may read one book which is mildly entertaining and it does you good, provided you are well enough to read at all, but you may read another book which holds your attention so concentrated and which stirs your emotions so deeply that when you put it down your face is flushed, your eyes burn, your heart is galloping like a trip-hammer, and your temperature is elevated several tenths of a degree; obviously, the second book should be reserved for days of health.

Association with some friends may have a quieting and steadying effect, and the conversations seem to lead naturally through the most pleasant channels. Such associations are to be sought and cherished. On the other hand, association with an individual of aggressive, critical and perhaps cynical tendencies may seem to "rub you up the wrong way." Such associations form more of a handicap to the favorable progress of the tuberculous invalid than is generally realized.[2] Speaking generally, anything which deeply stirs the emotions, or which requires or causes deep concentration is equivalent to strenuous exercise and should be curtailed. Should the emotions stimulated be of a depressing nature, like anger, such as may arise in a discussion or argument, much harm may

[2] For a further consideration of nervous irritability and its treatment read "The Freedom of Life," by Anna Bayson Call.



A B

A. Section of Normal Liver (×1640). B. Section of Liver Showing Effect of Extreme Emotion (Fright) (×1640) (From Crile's "A Mechanistic View of War and Peace," courtesy The Macmillan Company)

result, and the things which give rise to such emotions must be carefully avoided. In a like class are all games or pastimes where money is at stake, or where the excitement is intense. As a result of such excitement in tuberculous people, the following significant set of symptoms may be observed: flushed face, tremors, quickened pulse, quickened breathing, raised temperature and disturbed digestion.

There are few tuberculous patients who do not early realize the immense amount of energy it is necessary to expend in order to write a letter that will satisfy the demands of a healthy correspondent. Unfortunately it is sometimes exceedingly difficult to convince one's friends, and even one's relatives, of the truth in this regard. There are probably few patients, living away from home, who are not subjected to a certain amount of unjust criticism for delinquencies on the score of letter writing. Let criticisms and misunderstandings correct themselves, as they will, with time; your business is to win your battle, and if writing letters interferes with your progress, the letters must give place to postal cards. To recognize such things as allies of the enemy is all that should be necessary to make you avoid them. They are entirely at your command, and it is simply a matter of exerting your will to keep free of them.

There is, however, another group of thoughts which, while they are under one's control, seem nevertheless to lie very near the borderland of volition. They sometimes spring into being un-

heralded, and quite contrary to one's wishes. They are the thoughts which have to do with the sexual life of the individual. If anything like an accurate estimate could be made of tuberculous patients who owe the development of their disease to sexual intemperance, it is safe to say the figures would be appalling. Could the veil be lifted sufficiently to reveal the battles lost as the result of the activities of this ally of the enemy, the absolute need of self-control in this regard would be realized as never before. In a disease like tuberculosis, which demands idleness and stimulating food, it is not to be wondered at that thoughts of the flesh should strive to enter the mind. But the patient who hopes to win his battle must constantly regulate his mind, and restrict the thoughts he allows to dwell there.

Marcus Aurelius says, "Those who do not observe the movements of their own minds must of necessity be unhappy"; also that, "Tranquility is nothing else than the good ordering of the mind." It does not require a philosopher to recognize that the mind feeds on that which is put before it, or on the things which are voluntarily chosen for it. If a man is going to search journals for articles that are sensual, if he persists in indulging in suggestive or lewd conversations and stories, and if he permits himself to resort to places where lust and impurity are stimulated, there is no need for him to read further, for he has not even the first essential to purity, viz., a *desire* to be pure.

Thoughts of desire, like a tree, are weak at birth, and may be crushed or rooted out. If nurtured

and allowed to grow, they gain in strength. In time they become difficult even to bend; in other words, the ideas become fixed. To nurture a thought is to allow it to dwell, to allow it to influence action, as putting the thought into words, writing about it, illustrating it, metaphorically or literally. Take, for example, a sad thought—in the beginning it has but little effect, but, pondered over on all sides in the mind, it causes pain. Put it into words, quoting an example as an illustration, and it becomes pictured in the mind so vividly that it causes enough pain to bring tears. If the emotion be given further sway, actual weeping results, and this action of the body greatly intensifies the grief.

The treatment is obvious. When the first delicate suggestion enters the mind, crush it out; don't nurture it, and ponder over it, until it is too strong to bend. But how crush it out? By calling up another thought, a thought that brings opposite emotions, and by crystallizing that thought through expression, as talking about it, writing about it, illustrating it, and, where possible, putting it into action. Take this example: A boy walks along a dark and lonely street where his mind is likely to call up the vision of a holdup, ready to spring upon him from every shadow. If he allowed the fear to remain it would grow, and he would probably break into a run, and, with the body action in running, abject terror would seize him. But he has learned through experience that whistling calls forth an emotion which combats fear, and so he walks along whistling as loudly as he can, and in a short time his mind is riveted on the comic opera

where he heard the tune, and all his fears vanish.

Steer your course clear of anything and everything that is suggestive, and when, for physiological reasons, the thoughts of animal passion come stealing into your mind with seductive mildness and arrogant repetition, become particularly busy with thoughts that are high and noble, and don't stop until you have put them into action in the form of a sympathetic word, or a kindly deed, which echoes in the heart throughout the day.

CHAPTER XXIV

The Allies of the Enemy (*Continued*)

We have seen that all thoughts may be divided into two classes—voluntary or volitional thoughts, and thoughts of the subconscious mind. All the subconscious thoughts were once upon a time voluntary thoughts which made a deep impression. Thus, in babyhood, the mind has to be voluntarily concentrated on the putting forward of a foot in walking, until the impression in the mind becomes so marked that the act is carried out subconsciously. Certain thoughts are so intense that they make a marked impression from the moment they come into being. When you were first told that you had tuberculosis, the thought made such a deep impression that it stamped itself immediately on the subconscious mind, and for some time afterwards, no matter whether you laughed or sang or slept, somewhere from the deep caverns of your thought there boomed persistently, "I have tuberculosis, *I* have tuberculosis, *I* have *tuberculosis, tuberculosis, tuberculosis.* . . ."

All thoughts which leave emotions in their train are more liable to make a deep impression than others, and this seems to be particularly so when fear is the dominant emotion. Fear is probably the oldest emotion in the world. It is seen right down the path of evolution. Every boy who ever went fishing has witnessed fear in the

wriggling fishworm. It is the emotion of self-preservation, and, without it, there would be no attempt to avoid danger.

Fear may be a very good thing, provided it is kept under control, and maintained at anything like an equal balance. The man who is able to control his actions, while his mind is filled with fear, is called a brave man. He is not brave because he knows no fear, but because when fear is present he controls it. On the other hand, the man who allows his actions to be controlled by fear is called a coward. Some men are born cowards, others have "lost their nerve" as the result of accident or illness. Among the latter, the ordinary happenings of life are too liable to call forth the emotion fear. Any happening which would naturally give rise to fear in a healthy person makes such a profound impression on a nerve-racked individual that it not only enters the subconscious mind, but it makes the mind run riot. Such a condition is commonly called "worry." Worry is chronic fear—fear that we are going to have a hemorrhage, fear that we are going to die, fear that the doctor doesn't know what he is talking about, fear that something, we don't know what, may happen, fear of nothing, and a vague fear of everything. The unfortunate part of it is that the fear does not come, be over with and go, as happens in perfect health; instead, strive as we may to avoid it, it repeats itself with never-ending persistency until our appearance is altered, our feelings are depressed, our body functions interfered with, and life itself becomes covered with a great shadow.

There is little need to recount the many evil

effects of worry; it is sufficient to state that in the tuberculosis battle worry is the strongest ally of the tubercle enemy. Many a patient who, did he have the unaided tubercle germ to fight, could easily come out of the struggle victorious, falls an easy victim to the allied enemies, tuberculosis and worry. Herein lies the secret of the occasional success in tuberculosis scored by Christian Science. This doctrine makes peace with fear or worry by convincing the patient that he has nothing wrong with him. In order to make him believe what, in this disease at least, is untrue, he is required to throw caution to the winds and act like a normal individual. The tremendous effect of the mind over the body is well illustrated in the fact that occasionally a man suffering from tuberculosis can discontinue all treatment and go to work, and at the same time defeat the disease, simply because he has got rid of fear or worry. But the experiment is a very dangerous one and, unfortunately, the failures are not as conspicuous as the successes.

Christian Science is capable of doing good when its application is confined to such cases as those of persons whose suffering is due largely to a psychological breakdown, but when the application is made to the field of organic disease, it is difficult to place limits to the harm it may do. When tempted by any form of faith or miracle cure, a tuberculous patient should think twice before he stakes his life on any course which ignores a change in the lungs as apparent as it is serious. It is well that the patient should get rid of fear, but if in so doing he at the same time gives up that good product of

fear called caution, his chances of recovery are, to say the least, greatly reduced. It would have been quite impossible for Christian Science to thrive as it has done had it not contained in its doctrine some important elements of truth. In its teaching that man must be in accord with God before he can hope to have peace of mind, it is heralding one of the "unwritten and unchanging laws of Heaven—laws that are not of to-day or yesterday, but abide forever, and of their creation knoweth no man."[1] Without accepting that which in the literal sense every man must feel to be untrue, we may take the gold and leave the dross, and gain for ourselves all that Christian Science can give, and more.

Worry is fear, but why are we afraid? Simply because we want our own way, and we have a depressing inward fear that we won't get it, and so we proceed to be unhappy and to make everybody around us unhappy. Suppose that one of your white cells should come to the conclusion that he was not content to travel in the same direction in which it was necessary that the blood-stream should carry him. Suppose that he thought he would be happier carrying oxygen instead of being a scavenger, and further made up his mind that he was going to carry oxygen. What would happen? He would continue to travel in the same direction in the blood-stream and he would continue to be a scavenger until he died of worry or fear that he was not going to get his own way. The relation of the white cell to your body is a feeble example of your relation to God. Perhaps you prefer to call God,

[1] Sophocles' "Antigone," line 450 ff.

Nature. The Mohammedan calls Him, Allah; the Buddhist calls Him, Buddha, and Christians find Him revealed in Christ. But God, by any other name, is just as powerful, and it matters little by what name you prefer to call Him, provided you begin to realize His almighty power, and the complete insignificance of yourself by comparison—how little you matter in "the scheme of things entire."

We come into a world where certain inflexible laws operated for millions of years before we were ever thought of. These same laws operate to-day. They are never suspended, and they always operate toward the one end of harmony and perfection. Anything and everything which attempts to thwart these laws is slowly but surely eliminated, is thrust out, dies. And so it comes about that every action which is out of accord with these laws, and every thought which is out of accord with these laws, is automatically followed by damage, and is a step towards death, whilst every action and thought which is in accord with these laws automatically brings about development and building up. You are not suffering from tuberculosis because a frowning Providence seeks to punish you, although such a thought contains, in metaphorical terms, the true philosophy. You are suffering from tuberculosis as a direct consequence of an attempt on the part of yourself or your forefathers to do what you yourselves wanted, irrespective of the requirements of Nature. Many of Nature's laws are unwittingly disobeyed because they are not understood, but whether understood or not, the results of the disobedience are equally unfortunate. Science

is God's highest servant in that it ever strives to throw light on the laws of Nature, and to bring man's actions and thoughts into harmony with the divine purpose. We must endeavor to arrive at a proper understanding of the laws of Nature, and to carry out these laws to the best of our ability. Without the knowledge that we are giving up everything that tends to operate against Nature, and without the knowledge that we are doing everything in our power to assist Nature, we are bound to worry, and it is well that we should, as worry is then the torture which tends to drive us back to what is right, and to what will prolong our lives. Once in our inmost consciences, we know that we have given up all pleasure, and renounced everything that is interfering with Nature, and that we are doing all in our power to assist Nature, we are able to shift the responsibility from our own shoulders and to say, "I am doing everything I can, the rest must be left to forces greater that I am." This is the first step in overcoming worry.

The second step is the cultivation within ourselves of a willingness to make the best of the road we travel, even though it leads down into the valley of the shadow. In his autobiography,[2] Dr. E. L. Trudeau says: "I had to give up work, however, and as sickness was a new experience to me at that time I rebelled and struggled against it, and was thoroughly unnerved by it. I have had ample opportunity in the past forty years to get used to illness and suffering, but it took me a long time to learn, imperfectly though it be, that acquiescence is the only way for the tuberculous in-

[2] Page 74.

valid to conquer fate. To cease to rebel and struggle, and to learn to be content with part of a loaf when one cannot have a whole loaf, though a hard lesson to learn, is good philosophy for the tuberculous invalid, and, to his astonishment, he often finds that what he considers the half loaf, when acquiesced in, proves most satisfying. It was many years, however, before I learned this great lesson, but when once learned it made life fuller and happier." Dr. Trudeau's experience is the experience of many a man. "Acquiescence in fate" does not come in a day or in a year, but requires humility, unselfishness and nobility of character, and such virtues are slow in the making.

We have seen that one thought is capable of combating and effacing another thought. When the worry thoughts fill our minds, while it is not possible to efface them and leave our minds a blank, it is quite possible to call into being other thoughts of a happy character which will supplant or combat the worry thoughts. This will prove more successful when the happy thoughts are put into action. Further, if the happy thoughts have to do with somebody other than ourselves, or are happy, unselfish thoughts, another irritating ingredient of the worry thought is neutralized. The everyday method of combating worry is to go in search of a good time, in the belief that the more excitement, the better. To be sure, worry is drowned for the time being; but there results that which promotes worry more than anything else, namely, fatigue, and just as soon as the excitement is over, worry returns with sharpened claws. On the other hand, if you combat

worry by a kindly action, your mind is diverted from yourself, there is not as much room for worry to find an entrance, and the reward of service to others, a happy heart, is yours for the remainder of the day.

As already pointed out, not only worry, but every depressing emotion, may be combated by an action which habitually accompanies an opposite emotion. For example, when you feel your temper particularly disturbed, or sadness thrusting itself upon you, or jealousy attempting to devour you, if you force yourself to laugh, whistle, or sing, the edge is taken off the anger, jealousy or sadness. Never allow a depressing emotion to find expression in word or action, because the word or action intensifies it. By constantly cultivating the happy emotions, you will soon realize that preventive treatment is more efficacious than waiting for trouble before applying the cure.

Many a man finds his true help and support in prayer. "More things are wrought by prayer than this world dreams of." Auto-suggestion has also helped many who have found it difficult to pray. In your every thought and action your mind responds to suggestion, either your own or another's. Why not intensify your highest thoughts and desires by putting them into words and by telling yourself what they are? It works successfully just in proportion to the earnestness and perseverance you expend on it. The suggestion should be positive, not negative; it should be made at a time when you are relaxed and peaceful, and preferably when the volitional thoughts are somewhat in abeyance, as during the moments when sleep begins to shadow

the mind, or wakefulness knocks softly at the door of consciousness. Perhaps some thoughts like these will take the form of words—"During this day, I will be watchful for every opportunity of service to those about me. I will forget myself in my thought for others. I will be sympathetic, kind, and cheerful. I will put the wishes of others before my own, and find my truest happiness and peace of mind in the happiness and peace of mind I can bring to others." Not once or twice, but every day, and several times a day, must these and other suggestions be made, and perhaps when a month has passed you will find the mind, like a humble child, ready to act on your bidding, and ready to follow the path of peace.

All of this you will say is nothing but religion. It *is* religion, devoid of dogma. It is the religion in which you must become most seriously interested if you would make peace with the allies of the enemy. Professor William James says:[3] "The sovereign cure for worry is religious faith. The turbulent billows of the fretful surface leave the deep parts of the ocean undisturbed, and to him who has a hold of vaster and more permanent realities the hourly vicissitudes of his personal destiny seem relatively insignificant things."

Many times failure will come, many times utter discouragement will come, but with a determination "to strive, to seek, to find, and not to yield," pride will be finally humbled, selfishness will be subdued, and "a peace which passes all understanding" will find expression in the words of submission, "Thy will, not mine, be done."

[3] "Talks with Teachers on Psychology and Life's Ideals."

CHAPTER XXV

The End of the Battle

To speak truly, the battle really never ends. Although, in time, the beacons of the enemy burn but dimly in the distance, once there has been a battle we must sleep forever after with our arms beside us and go through life ready, always ready, for the surprise attack. Tuberculosis is essentially a "relapsing disease," *i.e.*, the enemy comes back when given the least encouragement. On the other hand, of all chronic diseases, it is the most easily arrested, and in this fact lies its greatest danger. The average patient, provided he has signs of trouble constantly before him, will follow the necessary treatment faithfully, but, when the symptoms have disappeared, it is difficult to make him realize the necessity for keeping quiet. Thus it is that too often he gets about before the disease is sufficiently healed, with the result that there is a relapse and the same process of treatment has to be gone through with again. Eventually his life becomes one series of periods of arrest and relapse, until finally a time arrives when it is impossible for him to make an arrest, and there follow the closing scenes of a battle that has been won a dozen times, and lost as many simply because it was too easily won.

Sanatorium statistics show that only a few more than 50 per cent. of incipient cases are alive fifteen years after discharge, that 50 per cent. of those

with moderately advanced tuberculosis are dead in six years, and that one out of every two cases, discharged with the disease "arrested" (term as used previous to 1913), dies within six years' time. On the other hand, 40 per cent. of the patients who enter a sanatorium with tubercle bacilli in their sputum lose them during residence there. At the Adirondack Cottage Sanatorium, 34 per cent. of the patients got rid of their tubercle germs in six months, and 43 per cent. in one year. Why is it then, when patients improve so rapidly under sanatorium treatment, that they go to pieces so quickly on their own resources? Simply because they have not enough of two requisites: Self-control and money.

Tuberculosis, as a rule, takes years to heal; the best cures are made in from three to five years. You imagine, as every patient imagines, that you are quite an exception to this rule, because you have such a small amount of trouble, but although the truth may be distasteful to you, by all means accept and act upon it. Treatment should be carried out most carefully the first two years. After that, under favorable conditions, accompanying treatment, a small amount of work may be undertaken. It is a mistake to suppose that any one day will arrive when you will walk forth, and, metaphorically speaking, hoist the flag of victory. Many a man comes gaily out of the doctor's office with the information that his condition is apparently arrested, and goes out into the world with an absolutely fatal mental attitude. He supposes that

all his troubles are over, that he can start in and live as he did before his illness, and that, because the doctor has said his condition is apparently arrested, he is free from all further restrictions. Much of this mental attitude comes from a false understanding of words. An apparently arrested case is one in which all constitutional symptoms, that is fever, weakness, etc., have been absent for a period of three months. Likewise, cough, and tubercle bacilli in the expectoration, must have been continuously absent for a similar time. The signs of battle in the chest, as heard by the doctor, must indicate that the tubercle germ is quite imprisoned. But this result has been reached in all probability under invalid conditions, and what the results will be under working conditions is, as yet, quite unknown.

An arrest, according to the officially accepted meaning of the term, may be said to exist only when an apparent arrest has gone forward without interruption for six months.

There is no such thing as a cure in the official classification, but an apparent cure may be said to exist when no constitutional symptoms, no cough, no expectoration with tubercle bacilli has occurred for a period of two years. Also the physical signs must show that the enemy has been completely imprisoned for a similar time, and all this must have prevailed, not under an invalid régime, but under the ordinary conditions of life.

In view of these strict definitions, it is difficult to understand the statements of certain patients who, after a few months' sojourn at a sanatorium,

come from an examination by the doctor and with bland innocence announce that the doctor has pronounced them " a cure," or has said that they would be a cure in two or three months. Apparently it is possible for some patients to so desire a certain result that they can deceive themselves into believing it exists, and, by deceiving others, finally convince themselves. Such self-deception accounts for many deaths.

You must make a very clear distinction in your mind between immediate results and ultimate results. Suppose the immediate result of your treatment at a sanatorium to be an arrest. Very good, it is something of which to feel proud. But it is by no means a guarantee that a return to ordinary living will not bring about a relapse. Indeed, the chances are one in two that a return to normal living will result in a relapse. An arrest simply means that you have come to the place where you may begin to try and find out just how much work and play is compatible with ultimately good results. Life lies before you if you feel your way. Ultimate failure will be yours if you plunge.

It sometimes happens that, in spite of his condition, a patient who has not even secured immediate results recovers comparatively good health through taking up some line of service which at the outset does not tax him too severely. To every man of the right spirit there comes a time when he feels that merely to exist is no longer tolerable; there comes a time when death itself is to be preferred to life without some degree of usefulness, and when, in short, he is going to take the chance. Should such

a time arrive in your life, be sure to reflect carefully on what is due to those who have invested on your life, and remember that Dr. Trudeau did his greatest work after spending eight long, weary years staring death in the face. Some men, after many years of apparently fruitless endeavor to regain their health, have taken the chance and, partly through making a careful beginning, have found an unexpected reward in service to others. On the other hand, many have passed on to find their reward in another world. "Familiarity luckily removes many stings, and he who faces death constantly often comes to face it fearlessly." Should the end of the battle bring death, you who have played on the football field will know how to accept defeat like "a valiant man and true," and you who have learned the blessed teaching of renunciation will realize that in your very death you can teach one of the greatest lessons of life—an unselfish regard for the feelings of others.

When the time comes for branching out into new activities, if you would know how to proceed, watch the change of season, watch the summer giving way to winter. The hard frost does not come suddenly out of a summer night, but gradually, by what may be termed hesitating progression, the warm days and nights give place first to a few cool nights, which in turn are followed by days and nights that are warmer but not quite so warm as those which went before. And so the cooler season advances by steps which, as it were, are partially retracted as if to observe the results

of the advance. Thus all Nature is given an opportunity to adjust itself to the change.

Your term of hesitating progression starts not on the day you leave the sanatorium, but on the first day you take up exercise. At first very slowly indeed, you extend a little, drop back a little, but not as far as the first time, extend a little further than on the first occasion, drop back, and so on until finally you reach four to six hours of walking before you start to progress in some other direction, such as taking up office work. Always remember the new activity, such as office work, must *replace* and *not be added* to the old activity. At the beginning you cannot expect to both work and play. If you choose work, you must rest, not play, when work is over. More relapses occur from over-exertion in sport than from overwork. If the work in which you engage keeps you indoors during the day, it is highly important for you to sleep outside on a porch at night.

The more nearly the environment under which a patient takes up new activities approximates that under which he has been taking his treatment, the better the outlook for the future enjoyment of good health. Many a patient effects his undoing because he is not aware that, on returning from a high to a low altitude, there has to be a readjustment of his circulation, just as an adjustment in another way had to take place on going to a high altitude. Unfortunately, immediately following a change in altitude, there is generally a very great temptation to overdo, because the change usually involves a big celebration on arriving home after a

long and tiring journey. This is where many a patient makes a bad start from which he never recovers. Also herein lies the strongest argument of doctors who oppose change of climate for tuberculous patients. Change of climate generally does good. It is the foolish excesses to which patients go immediately after returning that works the havoc.

When you leave the sanatorium to go home, or to take up your residence in any different environment, remember that the change renders you more vulnerable to physical mishap for at least a month, and that, for that time at least, not only should you refrain from taking up new activities, but you should curtail to a certain extent the amount of activity to which you are already accustomed. If the change involves a different altitude, whether high or low, it is all the more important to be cautious. On arriving home, carry out the rest hours and all the sanatorium rules just the same as you have been doing, and when, after a month's time, you are thoroughly rested and acclimated, begin to feel your way into such new activities as the doctor has advised you are permissible. If you are still raising sputum, re-read Chapter XVII, "The Beginning of the Battle," and carry out carefully the details there outlined.

Is it necessary to go on taking your temperature? When temperature has been continuously normal for some months, the reading of the thermometer may be limited to Saturday afternoon and evening of each week. As you become more confident that there is no rise above normal, the interval may be

lengthened to a fortnight, and later it will be sufficient to take your temperature on the first two or three days of each month. Very often towards the end of the battle, it is highly important to develop a state of mind which is unconcerned about temperature or pulse. The long habit of watching closely your temperature's fluctuations is liable to lead to a harmful degree of introspection, and when the doctor considers it wise to "forget it," although a most difficult thing to accomplish, it is well once again to prove your self-control, or rather your ability to forget yourself, and carry out orders to the letter.

The doctor will inform you regarding what is advisable in the way of visiting him. Generally for the first few years after beginning graduated work, it is well, at least once a year, to go to a specialist and have a thorough examination, including an X-ray picture of your chest. The latter will give most valuable information regarding your progress.

At least once a year you should take a complete rest and change. If you have become an apparent cure, it is permissible for you to indulge moderately in golf and croquet, fishing and hunting, rowing and paddling, skating, skeeing, snow-shoeing, or bicycle riding, swimming, or horseback riding in careful moderation.

Finally comes the question of marriage, a question which each individual patient or ex-patient must decide in consultation with his doctor, and after weighing carefully all of the considerations. Normal marriage generally means propagation, and you must determine whether or not you consider

it right to become the father or mother of a child who, on account of your infirmity, will be predisposed to undergo a like suffering to that which has been yours. Then there is the more selfish aspect. Osler very truly says, "If a woman, threatened with phthisis, marries, she may bear one accouchement well, a second with difficulty, and a third never." [1] Also the intimate relations characteristic of early married life are undoubtedly a menace to either party not already tuberculous, unless, of course, the ex-patient is "an arrest," according to the official interpretation of the phrase. The danger of infection to husband or wife, however, is not nearly so great as it is to the children.

On the other hand, where reason is capable of outweighing emotion, where the head can control the heart, there is much in the good-fellowship and soberness of a sane married life which makes for uplift of mind and body. It is quite impossible to formulate any specific rules for a state the consummation of which should depend upon the personality, self-control, circumstances, and physical condition of each individual. Should marriage take place, the wife should know that conception ensuing before a term of two years of good health has expired will cause quite possibly renewed activity in the chest. If finances are such that a woman must work while pregnant, a like result may be expected. In any event, following confinement, all ex-patient mothers should have recourse to the rest cure for several months.

---

[1] Osler's "Modern Medicine," vol. iii, page 326.

There are many factors which determine whether the battle will end in provisional victory or defeat. Some factors are quite beyond the influence of human endeavor, but of the others which lie within your power to effect, self-control is the greatest. Whether the end of the battle bring victory or whether it bring defeat, "to travel hopefully," as Stevenson says, "is better than to arrive, and the true success is in labor."

CHAPTER XXVI

The Spoils of War

In the olden days, it was not unusual for warriors to come from far fields of conflict laden with the spoils of war. The seasoned veterans would exhibit their treasures and tell with pride of the subjugation of the enemy and of the glories of victory. But in the army's hosts there were always many who had failed to find treasure or glory, many who had found in the conflict nothing but privation and hardship, disappointed ambition, ruin and sorrow. And so it is in the battle against tuberculosis—one man finds in the conflict the richest of life's treasures, while another realizes only bitterness and disappointment.

In the first place, one must know that, although they are hidden, there *are* treasures to be found by searching, and that they are often hidden in what, to the unsophisticated recruit, would appear to be the most unexpected places. Again, one may know where the treasures are hidden, but may lack in the perseverance or even the desire to become possessed of them. It is a fact that in this world we often get what we most desire, and those things which we do not obtain, we are denied simply because we do not want them badly enough.

Time is a peculiar kind of treasure which is much sought after by the world. The lack of it is the excuse for the failure in carrying out many good

intentions. But when time comes, as it does in abundance to every fighter of the tuberculosis battle, how it is despised, how it is killed! You who are beginning your battle, are you going to kill time for the next two or more years, or are you going to find in it spoils of war which will bring you happiness and power unrealized before? Perhaps you are very ill, too ill you think to write or read or make use of time for things that count. Quite true, you must rest and not weary your mind with that which is tiring. But the mind, especially the mind of the tuberculous patient, refuses to be a blank. If it be not occupied with one thing, it will be occupied with another, and one of the finest opportunities of the battle is that of acquiring the ability to lead the mind into paths which are uplifting, and at the same time restful. No matter how weary you are, how much better to fill the mind with the silent wonders of Nature than to count the cracks in the ceiling, or worry about what " he said to her " or what " she said to him." Even if you are a prisoner, confined to bed on your porch, there may be hung on the wall little mottoes which will constantly recall the mind to thoughts that are high and noble. There may be pictures which are inspiring and rich in memories. In a mirror suitably hung there may also be reflected the living, ever-changing picture of the out-of-doors. In the summer time, you may watch with wonder the bursting bud of a fragrant flower on the table by your bedside, or you may find another diversion in the agility and grace of a goldfish as he glides through the water in his big glass bowl. In the cold of

winter, there is nothing more beautiful than to see constructed before your very eyes the delicate architecture of the frost king as he builds his castle of ice in the tumbler of water on the table. Each is a very little thing, to be sure, but it is the summation of little things that makes or mars a man.

Later, when the first feverish flare-up of the battle has subsided, there comes an opportunity to get back to that from which we all have strayed too far—that something which is taught us by the bluebird as she builds her nest just near where we lie—that something which we see in the lights and shadows, in the heights and depths of some mountain vastness—that something which we feel in the "wild witchery of the winter woods." Who like you has equal time to garner in Nature's treasures and to receive the benediction that comes from a constant sojourn with the simple, the beautiful, the true!

Another opportunity afforded us by Time is the opportunity to dream. People in general are much too ready to scoff at the dreamer, but the greatest achievements the world has known have been the realization of dreams. Abraham Lincoln was a dreamer; Pasteur was a dreamer, and Christ was a dreamer; and we have reason to give thanks for the dreams they dreamt. At the twenty-fifth anniversary of the founding of the Adirondack Cottage Sanatorium, Dr. Trudeau said: "I dreamed a dream of a great sanatorium that should be the everlasting foe of tuberculosis, and lo! the dream has come true." [1] And of what do *you* dream?—

[1] "The Beloved Physician," by Stephen Chalmers, page 27.

the gramophone's rag-time? the stakes in the jack-pot? the glitter and tinsel of life? Or do you dream of a something grand and worthy with which you will repay the world for the time you have taken? Even if, as Stevenson says, "we come not within sight of the castle of our dreams," there, nevertheless, is a valuable treasure to be found underlying the mere act of dreaming. In India, the Hindoo child is trained to give at least one-half hour of every day to relaxation, tranquillity, and meditation, and in this fact William James finds an explanation of the wonderful self-possession of the natives.

As strength returns, there will come an added zest to thought. Dreaming, that unguided drifting of the mind, will voluntarily take on a pilot and by reflection steer a definite course. You will find in the bivouac of battle an opportunity to unravel those mental tangles which the stress of active life has left moldering in the storehouse of the mind. You will have the time to gain a clear idea of where you stand, to find yourself, to acquire a degree of self-knowledge unrealized before. The mind, like a child, will naturally run away from that which is serious and stern and strange, and until the real happiness that underlies serious thinking is discovered, the mind very often will slip away to play with trivialities. It is by no means wise that the mind should ponder continually over that which requires concentration, but the day should never pass without some little corner of it, if only five minutes, being given up to reflection that enriches character.

In time, when the true happiness of serious reflection is realized, there will be a tendency more and more marked to get away from the petty thoughts, which too often are tainted with envy, jealousy, pride and prejudice, and there will come a day when you deliberately set out to find topics on which your mind may feast. There will occur to you such questions as—Why am I living? What is my life's objective? What is goodness? What quality more than any other makes for happiness? Where does duty to self end and selfishness begin? What constitutes success? and the like. Every phase of life is suggestive of topics, but if you have difficulty in finding them, secure one of the many excellent topic calendars which have a worth-while thought for every day in the year. Make that thought the text of your reflection hour, and ponder it over until you have its truth never to be forgotten. A little of this each day, not enough to tire you, and you will surely see you are gathering in some spoils of war.

Then comes the opportunity for reading. Is the full time of the battle to be wasted on cheap novels, indifferent magazines and newspapers? Or is a little of each day to be devoted to the reading of something that is really valuable? Think of the opportunity to learn through the reading of biography how other men have lived and made good; think of the opportunity to profit, through the reading of history, by the virtues and mistakes of rulers and governments; think of the inspiration and power that is yours for the taking in the essays and poems of the great masters. Everybody pro-

fesses to long for an opportunity to gain these things which men know are good, but when the opportunity comes, with what bitterness it is regarded! No man is expected to enthuse over illness, or even to welcome it, but what cannot be cured must be endured, and he who can find in misfortune treasures which, when the wreck is cleared away, will enable him to meet the world on a higher plane than that on which he left it, may live to bless the blow that felled him. Thus we find Dr. Trudeau writing: "The struggle with tuberculosis has brought me experiences and left me recollections which I never could have known otherwise, and which I would not exchange for the wealth of the Indies!" [2]

Fine as are those spoils of war which are found by diligent search, they are not to be compared to the wealth of treasure which lies strewn along the road of renunciation. Not one man in a thousand would travel that road from choice. Christ is probably the only man who has travelled it absolutely, and so far have men strayed from the teachings of Christ that, in the eyes of the world, achievement is everything, and renunciation is—well, it is all right for a sick man. Yes, it is all right for a sick man, and if during illness the sick man can learn some of the lessons renunciation teaches, his battle will not have been fought in vain. "In this world," as Henry Ward Beecher says, "It is not what we take up but what we give up, that makes us rich." This being so, surely the man with tuber-

[2] "An Autobiography," by E. L. Trudeau, page 317.

culosis should come out of the conflict wealthy in spiritual conquest!

The first treasure of renunciation is self-reverence. No matter how you treated yourself before the conflict, once on the battlefield you have to begin to take yourself seriously. You gain a more perfect valuation of the qualities within yourself which make for strength. You gain a more perfect perspective of yourself in relation to the world, and you gain a greater reverence for your body itself.

Then come self-knowledge and the knowledge of others. Napoleon wrote: "When I was happy, I thought I knew men, but it was fated that I should know them in misfortune only." But valuable as it is to know who are one's friends, it is in no sense as valuable as the knowledge of one's self. To learn your limitations, to know what you can depend on yourself to do, and wherein you are liable to miss fire: this is knowledge that would save many a man from ruin.

Above all, however, renunciation brings self-control. "It is notorious," writes William James, "that a single successful effort of moral volition, such as saying 'No' to some habitual temptation, or performing some courageous act, will launch a man on a higher level of energy for days and weeks, will give him a new range of power."[3] Many a time must the tuberculosis warrior say "No." If he does not say it, and act upon it, he loses his battle. In this disease more than in any other, physical restoration is dependent on moral victory.

[3] "Memoirs and Studies," by William James, page 250.

The reward of the sternly fought fight lies often in a return to bodily health, but come life, come death, the greatest gift to the earnest fighter is spiritual power.

"Self-reverence, self-knowledge, self-control,
These three alone lead life to sovereign power."

If he who before his illness was a weakling and the victim of his own desires learns through renunciation what he must to regain life and strength, he may go back to the world a ruler of men, simply because he has conquered himself. "Strength is born in the deep silence of long-suffering hearts; not amidst joy."

But if triumphing over the disease is not everything, and if "the true success is in labor," how is it that the spoils of war seem to be so unequally divided? How is it that one man, though tottering on the brink of the grave, has found in the privation of illness many of the most beautiful attributes of character; while another, to whom life would seem to offer much more in comparison, has found in the struggle little but disappointment, sorrow, and bitterness? To understand fully you must know the two men, and find out from the actions of each what it is each strives after. You will find of the one that his greatest object in life is to find happiness for others. His greatest concern is that his fellow-patients, the nurses, the doctors, everybody with whom he comes in contact, shall receive something from him that will be helpful and make them happy. The long hours of rest, the giving up of good times, and the strict discipline of the battle, are not a burden, because he is making each sacri-

fice, not for himself, but for the loved ones at home, and to do it for them is a privilege, not a privation. The more he strives, the greater is his measure of success; the more happiness he gives to others, the greater is the happiness which comes to him. His illness has afforded him unusual opportunities for thinking of others; and so he looks back upon his illness with strange inward peace.

The second man, on the other hand, has for his greatest object in life the securing of happiness for himself. He likes or dislikes his fellow patients, the nurses, the doctors, everybody with whom he comes in contact, just in proportion to the amount of happiness which they bring him. The long hours of rest and strict discipline of the battle are as gall and wormwood to him, because they represent just so much good time thrown away, that he might have spent in following his own desires. There is nothing but bitterness to him in renunciation, because in every act of giving up there is something of what he holds most dear that has to be sacrificed. He thinks continually of what he wants—every hour of every day is filled with fear that he will not get it. He thinks also of what he does not want, of what people think of him, of what respect and kindness people ought to show him. Can aught but disappointment, discontent, sorrow, and bitterness be the lot of such an objective in life?

From out the fourteenth century come, yet again, the immortal words of Thomas à Kempis: "Know that the love of thyself doth hurt thee more than anything in the world. . . . If thou seekest this or that, and wouldst be here or there to enjoy

thy own will and pleasure, thou shalt never be quiet nor free from care: for in everything somewhat will be wanting, and in every place there will be some that will cross thee. . . On this sin, that a man inordinately loveth himself, almost all dependeth, whatsoever is thoroughly to be overcome; which evil being once overcome and subdued, there will presently ensue great peace and tranquillity. It is but little thou sufferest in comparison of them that have suffered so much, were so strongly tempted, so grievously afflicted, so many ways tried and exercised. Thou oughtest therefore to call to mind the more heavy sufferings of others, that thou mayest the easier bear thy little adversities. And if they seem not little unto thee, beware lest thy impatience be the cause thereof. . . I have often said unto thee and now again I say the same, Forsake thyself, resign thyself, and thou shalt enjoy much inward peace. . . Then shall all vain imaginations, evil perturbations, and superfluous cares fly away, then shall immoderate fear leave thee, and inordinate love shall die."

APPENDIX

DISINFECTANTS

Carbolic acid, formalin and corrosive sublimate act very slowly in killing bacilli in moist sputum because they "coagulate" or clot the outer layers of sputum and so wall off the inside parts from the action of the disinfectant. Thus 5 per cent. carbolic acid requires at least twenty-four hours to be effective, even in smears of sputum.

Those disinfectants which dissolve the sputum are best. Lysol in 2 per cent. solution for general purposes, and calcium chloride (chlorinated lime) for spittoons, chambers, and other receptacles containing infected excretions, are best. A 2 per cent. lysol solution should always be on hand, and is made by adding to two and a half pints of water one ounce or two tablespoonfuls of pure lysol. Chlorinated lime is sold in powder form in tins with perforated tops, and is either dusted on the excretions or used in 2 per cent. solution (about one ounce to a quart of water).

DISPOSAL OF SPUTUM

The regular sputum box filler should never be allowed to contain more sputum than fills the lower half up to the small square opening. When this limit has been nearly reached, sawdust should be added to a level with the top of the box. The filler is then removed from the tin box holder and

wrapped in several plies of newspaper, the more the better, and securely tied. The parcel thus formed is placed in a bed of *red hot* coals.

Disinfection of sputum by boiling is dirty and unsatisfactory. If for any reason sputum cannot be destroyed by burning, it must be thoroughly disinfected by being treated with an equal quantity of 2 per cent. solution of chlorinated lime before being disposed of in any other way.

The tin sputum cup holder should be boiled before a new filler is inserted.

ACCIDENTS WITH SPUTUM

When sputum falls on the floor, it should be soaked into and wiped up with absorbent cotton which is wrapped in a newspaper and burnt. A 2 per cent. solution of either lysol or chlorinated lime should be poured on the area of floor contaminated, and allowed to soak for at least an hour before being wiped up.

DISINFECTION OF CLOTHING

Smears of sputum on clothing, bedclothes or other places should be attended to immediately after they are discovered, by wiping with old pieces of cotton, soaked in a 2 per cent. solution of lysol. The pieces of cotton should later be burned. After disinfecting with the lysol, the smeared article should be placed in the direct rays of the sun, for at least six hours, in order to disinfect other possibly infected areas not covered by the lysol. For further and more thorough disinfection, fumigation is necessary.

DISINFECTION OF THE HANDS

For general purposes and habitual use, a good brand of carbolic soap and hot water is all that is necessary. Where, however, the hands become contaminated with visible sputum, it is well to soak them for a minute or two in a 1 per cent. lysol solution after washing them. Before drying, they should be thoroughly rinsed in clean water.

CARE OF TOOTH-BRUSH

Unless a tooth-brush is occasionally disinfected it becomes a harborer of many varieties of germs. An occasional boiling, or a soaking of it for twenty-four hours in some disinfectant, is of advantage. The ideal scheme, however, is to have a long glass bottle with a perforated partition raised one inch from the bottom. To a depth of one-half an inch from the bottom is placed undiluted (commercial) formalin, the fumes of which fill the bottle and create an antiseptic environment for the brush. The bottle, of course, must be kept corked, and the brush should be rinsed carefully before using.

MOUTH WASH AND THROAT GARGLE

Ordinary baking soda (soda bicarbonate), one-half teaspoonful to a third of a tumbler of warm water, is good for general and habitual use as a gargle. Used regularly three times a day before meals, it is a preventive of colds and other infections.

DISINFECTION OF DISHES AND EATING UTENSILS

To disinfect dishes satisfactorily, there is required an ordinary dish-pan or pot, fitted with a

wire-netting basket or a perforated steamer which supports the dishes from resting on the base of the dish-pan. The supporting basket prevents the dishes from cracking, as is liable to happen when they come in direct contact with the bottom of the heated pan. Also it affords an easy means of lifting the dishes out of the boiling water after they are sterilized. When the pan is properly covered, five minutes' actual boiling will render the dishes and utensils perfectly safe for all practical purposes.

DISINFECTION OF SMALL ARTICLES

To disinfect small articles, such as a valise or dress-suit case, which have no apparent smears of sputum, it is sufficient to wipe them over with a 2 per cent. solution of lysol and then place them in the direct rays of the sun for six hours.

LAUNDRY

Soiled linen, particularly handkerchiefs, should be handled as little as possible, and, where feasible, should be placed in the laundry bag by the patient himself. When the laundry is done at home, handkerchiefs, at least, should be soaked in a 2 per cent. solution of lysol for twenty-four hours before washing.

DISINFECTION OF MOPS AND DUSTERS

Boil for ten minutes or soak over night in a 2 per cent. solution of either lysol or chlorinated lime.

FUMIGATION

For each one thousand cubic feet of space in the box or room to be fumigated, at least eight ounces

of the commercial (40 per cent.) formalin should be mixed with one pound of lime and two and a half to three ounces commercial sulphuric acid. The formalin is placed in a water pitcher with half as much water. The sulphuric acid is added slowly. The lime is placed in a china or earthenware basin resting on several plies of newspaper on the floor. As soon as the fluid is poured on the lime, fumes are liberated and are very dangerous if inhaled. Consequently, everything must be in readiness for an immediate exit and fastening of the door as soon as the lime and fluid are mixed. If possible, an experienced man should be employed for all fumigation that is extensive. The fumes should not be liberated under six hours at least, and eighteen hours gives the best results.

DISINFECTION OF MATTRESSES, PILLOWS, BEDCLOTHES, ETC.

Fumigation will not destroy the tubercle germs in a visible smear of sputum. Consequently, all smears must be treated as in disinfection of clothes before the articles are placed in a fumigation box or a room which is being fumigated.

DISINFECTION OF ROOMS AND HOUSES

All smears of sputum should first be treated as described under the heading "Disinfection of Clothing." The doors of cupboards and the drawers of bureaus should be opened, mattresses should be stood on edge or hung over clotheslines suspended for the purpose. Clothes should be hung up where the fumes may envelop them. All water

should be removed from the room. Strips of glue paper (sold for the purpose) should be pasted over all cracks in the windows and doors, keyholes, etc. The materials in right proportion for the space of the room should be used, as under the heading "Fumigation." After fumigation is completed, all woodwork should be scrubbed with a hot solution of soda, and where possible the woodwork should be repainted and the walls rekalsomined or repapered.

PASTEURIZATION OF MILK

To pasteurize milk, it is placed in a closed vessel, or constantly stirred, while it is raised to a temperature of 150° F. (65° C.) and maintained at such temperature for twenty minutes. Regular pasteurizers are on the market, but some home improvisations are satisfactory.

Unless the milk is going to be used immediately after pasteurization, it should be placed in the ice box and rapidly cooled.

BEEF-JUICE PREPARATION

Fresh, lean beef of the cheapest and toughest cuts, such as brisket or rump, should be heated superficially in a dry saucepan until of a gray color on the outside. The meat is then placed in a meat press (sold at most hardware stores) and the juice expressed. If it be difficult to bring pressure to bear, a piece of iron piping may be used on the handle of the meat-press to afford additional leverage.

INDEX

Date Due

MAR 0 4 1979			
MAR 18 1979			
MAY 14 RECD			

PRINTED IN U.S.A. CAT. NO. 24 161 BRO DART