I have found the tincture of iodine to be a simple, readily obtainable and effective agent for the preparation of a small patch of skin preliminary to the insertion of the needle of the hypodermic or of the antitoxin syringe. For a year past I have been using a 0.5 of 1 per cent. iodine solution for purposes of hand disinfection in all cases in which rubber gloves were not worn. As a routine practice I wear gloves in operative work. In a certain class of cases gloves are undesirable. Again, a glove may be punctured or torn in a septic case, and the surgeon will feel the need of a reliable antiseptic, both for the protection of himself and his future patients. The use of this solution is simple and time-saving. The technic I practice is as follows: Thorough scrubbing with nail brush, green soap and running hot water. Cleanse the hands in a systematic manner. Take each part in a certain order every time, so as not to skip any part. Pay particular attention to the nail folds, subungual spaces and the skin between the fingers. Clean under short-clipped nails with a heavy metal nail file. Scrub again, wash off soap in running hot water, remove residue of soap by immersion in 70 per cent. alcohol. Immerse in iodine solution for five minutes, rinse in sterile water or let the solution dry on the hands. The light brown stain can be removed by washing in dilute ammonia water after the operation is over, or if left alone will soon disappear.

In the preparation of the site of incision I invariably observe the following routine: The evening prior to operation the area is covered by a green soap poultice, which is allowed to remain for several hours to loosen the dead and scaling epithelium; the part is shaved, going wide of any possible incision, then carefully cleansed by the use of a soft nail brush or gauze pad, liquid antiseptic soap and sterile water followed by alcohol. After this a compress wet with 1-5.000 bichlorid is applied, covered with oiled silk or other protective and secured by a bandage. This is undisturbed until the next day after the patient is under the anesthetic, when the compress is removed and the part is treated to a second cleansing with antiseptic soap, gauze pad and sterile water, followed by dilute alcohol; the solution of iodine is then applied and allowed to dry on the skin. Naturally in emergency cases much of the treatment preliminary to the use of the iodine solution will have to be omitted.

The solution of iodine used for the hands may be made up with dilute alcohol or prepared according to the following formula: Iodine 2.5 gm., potassium or sodium iodid 5.5 gm., water 250 c.c. This gives a 1-100 solution, which can readily be diluted to the desired strength. In a long series of cases in which the iodine solution has been used as described, the results from a clinical point of view have been excellent, and it is easy to conclude that as a chemical agent for at least the partial sterilization of the skin iodine is the most satisfactory substance we possess.

It must not be forgotten that this, the most harmless of antiseptics, and its compound iodoform are active agents, and as such should be used carefully. Under certain conditions they are very toxic. The pyogenic membrane lining an abscess cavity seems to be practically immune. Patients suffering from septic infection will tolerate more than the usual amounts administered. The feeble and aged are often susceptible. Iodoform irritation on the exterior of the body usually takes the shape of a severe dermatitis, not any worse, however, in character than that occasionally produced by the use of a bichlorid compress on a sensitive skin.

My conclusions are that iodine is the antiseptic *par excellence* for the skin of the hands and operation site. The solution of iodine is easily prepared and is stable. It does not coagulate albumin or form inert compounds with the tissues. It is of more value in many ways than either carbolic acid or bichlorid of mercury and not nearly so poisonous.

THE PRACTITIONER'S PART IN THE MOVEMENT AGAINST TUBERCULOSIS.*

J. C. WILSON, M.D.
PHILADELPHIA.

This remarkable exhibition and the popular interest it has aroused, which grows wonderfully as it is removed from one city to another, marks an epoch of transcendent importance in preventive medicine.

The great pests—the oriental plague, typhus, leprosy, smallpox, typhoid fever, tuberculosis—have been the scourges of mankind through successive historical epochs because of ignorance. Enlightened modes of living and knowledge of the ways by which they spread and by which they can be prevented have restricted the prevalence of these diseases in civilized communities and greatly robbed them of their terrors. Two of them only remain to-day as world pests—typhoid fever, which could not exist in a community such as Philadelphia but for the cupidity of the spoilsman, and tuberculosis, the very existence of which as a modern plague is threatened by the spreading influence of this exhibition and the great societies under whose auspices it is held.

THE MOVEMENT AGAINST TUBERCULOSIS.

In this building, on its walls and in the cases, are displayed, on a scale never before undertaken and with a precision and definiteness never before possible, facts in regard to tuberculosis which to a stricken people are glad tidings of great joy, and the facts are for the people. The exhibition is free and it is popular. Earnest and trained men, having knowledge, are here to make the subject plain and are striving faithfully and patiently to enlighten the duller eager intellect as to the simple means of prevention and the reasonable hope of cure.

With reference to cure it is possible to be over-enthusiastic. I fear that we are sometimes betrayed by our earnestness into that error. As physicians we must cultivate in this matter the judicial temperament. In individual cases we must shun the cruelty of holding out false hope. But as regards prevention there is no limit to the promise that can be fulfilled. It is only needed that the facts be known and used. Here we can not be too strenuous. Fired with a genuine enthusiasm, we can rouse the people to do the things needful, for the whole matter touches them and in sorrow they know it. Animated with a confident hope based on knowledge, we can hold out a promise of relief, the fulfillment of which is in their hands, for as the people live shall they suffer or be free. I am not of that sanguine temperament which permits me to look forward to the stamping out of consumption and the other tuberculous diseases in a decade or two or even in a generation; still I firmly believe—a belief that finds support in the history of the rise and decline of the other pests which I have named—that this great plague of our civilization can not continue to prevail as it has, but that in a future so near

* One of the addresses to physicians read at the Free Exhibition on Tuberculosis at Philadelphia.

that it will be seen by some who are here to-night this foul disease as it now prevails will also become chiefly of historical interest in our western civilization even as leprosy, the bubo plague and typhus are—a wolf baying at us and hanging on our flanks, but easily repelled and giving us no real trouble so long as we are on guard.

The three great signs of the times are (a) the diffusion of knowledge, (b) the rousing of the people, (c) organization.

a. The knowledge is simple enough. The bacillus found by Robert Koch in 1881 and its modes of existence and conveyance constitute the gist of it; but such is the inertia of ignorance that a quarter of a century passed before it became the possession of the people as a motive.

b. The rousing of the people from an apathy more than oriental is full of promise. Consumption is their affair. In ignorance they bore the evils of it and were helpless; in knowledge they will destroy it. In the way of action there were two great stumbling blocks—the doctrine of heredity, of which, in the old and paralyzing sense, science has made an end, and the conception of a pretuberculous state, which never recommended itself to sober, pathologic judgment and has now wholly ceased to darken counsel in regard to a comparatively simple infectious process. We now know beyond doubt that the symptoms once thought to indicate the pretuberculous stage are the clinical phenomena of tuberculous infection.

c. Organization has been of slow growth, but has gained momentum with the years. Its beginnings were in the private sanitarium. Then, in response to facts not to be gainsaid, came the public sanitarium. If the rich could be helped and cured, why not the poor? Then followed the association of the sanitarium with the laboratory. If patients got well, why not use them for statistical purposes; their sputa and blood for research; laboratory animals for elucidation and control; different localities and environment for comparison and the study of the part played by altitude, temperature, humidity, soil and all the factors which enter into the complex subject of climate for the part which they play in the prevention and cure of this fell pest? It followed that the influence of sociologic conditions, the home, the school, the workshop, the factory, food, habits, clothing, marriage, the rearing and care of families, should be carefully studied from the scientific standpoint as etiologic factors, and that the duty of the state and municipality to the people in the management of the disease in its early and curable stages and its developed and transmissible periods should be more and more carefully investigated. There have been devoted and unselfish men in our profession ready on all sides and in every country for this great work; and, imbued with the scientific spirit and altruism of medicine, these men have been eager to avail themselves of every opportunity to meet and discuss the subjects so near to their hearts. Hence local and national societies and international congresses. Need I say to you that the two societies under the auspices of which this exhibition is held, the National Association for the Study and Prevention of Tuberculosis and the Pennsylvania Society for the Prevention of Tuberculosis, occupy, in the scope and results of their work, the foremost place in the orderly progress of this great scheme of organization?

You have carefully studied this exhibition. You have noted its wide scope. All of us have been deeply impressed with its lessons not only to the people for whose

enlightenment it was arranged, but also for the members of our profession. It is an object-lesson of the highest significance. Here you have seen in convincing array the results of the labors of the specialist, the pathologist, the bacteriologist, the phthisiologist, the sanitarian, both general and special, the health officer, the climatologist, the diagnostician, in the broad and in the narrow sense, and the tentmaker. It is true that the pharmacologist and the manufacturing druggist are not to any great extent in evidence. Like the ancients with their elements of fire, air, earth and water, we seem to have reduced our principles of treatment to fresh air, sunshine, abundant food and rest—four elements of irreproachable character. If we were to venture to add to this most respectable list, the additional measure would, it seems to me, by common consent, be household and personal cleanliness.

But I find in this great exhibition something lacking. The reason this something is not here is, I believe twofold: First, that it is little understood and, therefore, sadly overlooked, and, second, that such things as are known of it are difficult to depict and not well fitted for popular demonstration, scarcely adapted, in fact, in the present state of knowledge, for very positive assertions from the professional point of view. That “something” is the recognition and diagnosis of the very beginnings of tuberculosis in the human being.

THE PRACTITIONER'S PART.

This statement brings me back to the theme of my discourse—“The Practitioner's Part in the Movement Against Tuberculosis.”

In the matter of the individual case, this is the one thing needful. The work of all the specialists whom I have named has to do with the cases that are known to be tuberculous, that almost any tyro can recognize. It is only the practitioner, the family physician, the *haus arzt*, who sees the cases in their very beginning—and often, alas! too often, not even he. For some twelve or fifteen years I have been the local examiner for patients applying for admission to the Adirondack Sanitarium, and in all that time I have only once had referred to me a truly incipient case of phthisis even under the very conservative requirements of the national association, promulgated last year. These are:

“Slight initial lesion in the form of infiltration limited to the apex or small part of one lobe.

“No tuberculous complications. Slight or no constitutional symptoms (particularly including gastric or intestinal disturbances or rapid loss of weight).

“Slight or no elevation of temperature or acceleration of pulse at any time during twenty-four hours, especially after rest.

“Expectoration usually small in amount or absent.

“Tubercle bacilli may be present or absent.”

If we consider three facts in regard to tuberculosis, especially tuberculosis of the lungs, we are overwhelmed with the importance of the practitioner's part in the great movement which is now occupying the attention of the world. These facts are: First, that tuberculosis at the beginning is a local infection; second, that at this stage it is not transmissible; third, that at this period it is curable.

1. *Pulmonary Tuberculosis a Local Infection.*—We are not here to discuss all forms and phases of a subject on which volumes have been written. The teachings of pathology are quite clear. A man may be tuberculous and not consumptive. In fact, every sufferer from consumption, in the ordinary sense, is at first and for an

indefinite period merely tuberculous and not yet consumptive. The local tuberculous lesion may elude physical examination and cast no shadow in the x-rays. As it develops and extends and new lesions develop, toxins are produced and the toxemia causes symptoms, rapid pulse, slight rise of temperature, accelerated respiration, loss of appetite and weight and nervous erethism. If the lesion is peripheral there is pleural irritation and unproductive cough; if it causes bronchial irritation there is hacking cough, with a slight morning expectoration. As it extends, cough becomes more marked and constant. Tubercle bacilli are scarcely present in the beginning, while the lesion remains closed. They are the outcome of a necrotic process; the lesion breaks and becomes open. In any case negative results are inconclusive. Repeated examinations must be made. Their absence even then does not justify a negative diagnosis. This is a stumbling block to many practitioners. As the lesion extends, physical signs appear; at first uncertain and elusive, later more distinct and significant. They are deficient expansion, slight relative dullness with heightened pitch, enfeebled respiratory murmur with the bronchial character misnamed harsh and increased vocal fremitus; but all so little marked as to require careful, even repeated systematic examination for their detection. A history of pleurisy, especially of pleural effusion, is very significant.

2. *Tuberculosis of the Lungs Not Transmissible in the Early Stages.*—So long as the lesion has not undergone necrosis, except in extremely rare cases of tuberculous bronchitis, tubercle bacilli are not present in the sputum, and the patient is not as yet a menace to the health of those surrounding him. If the disease is arrested at this point, the lesion becomes obsolescent and the patient recovers without being aware that he has been tuberculous and without having played the part of a distributing center for the disease.

3. *Curability of Phthisis in the Stage of Incipency.* The frequency of obsolescent tuberculous lesions found on the postmortem table in the bodies of those who have died of other diseases, variously estimated at from 30 to 70 per cent., affords incontrovertible evidence of the curability of phthisis at this period. It is impressive to reflect that probably in all cases such cures are spontaneous, the lesions usually being too circumscribed to have given rise to recognizable physical signs. Dr. Norris concludes a recent paper on the "Diagnosis of Incipient Pulmonary Consumption" with the following statement: "High as the mortality from tuberculosis is, a greater number of individuals recover from the disease without knowing they ever had it than die of it."

How many others who traverse the thorny path of progressive tuberculosis to its ghastly end might be saved from such a fate by early diagnosis and treatment can never be known until the practitioner recognizes his part in the great anti-tuberculosis movement and, discarding with the misleading phrases, "slight bronchitis," "spot on the lung" and "pulmonary catarrh," all false sentiment and fear, does his duty with the courage, promptitude and skill of the American physician.

1509 Walnut Street.

Training of Children.—S. Merrill, Concord, N. H., says that it is important that children should be trained with a view to fitting them mentally as well as physically for the wear and tear of the life which they will have to encounter.

Special Article

THE PHARMACOPEIA AND THE PHYSICIAN.

CHAPTER XVI.

CIRCULATORY STIMULANTS (CONTINUED.)

STRYCHNIN.

Strychnin, unlike digitalis, has no perceptible direct action on the heart, but produces its circulatory effects wholly by its influence on the centers, except in so far as the local action on the alimentary canal is concerned; this may be disregarded in the present consideration of strychnin, which is commonly injected hypodermically when its circulatory effects are desired.

Therapeutic doses of strychnin cause a rise of blood pressure by stimulation of the vasomotor center; the reflexes are increased, leading to improved tone of the voluntary muscles, and increased muscular activity always tends to increase the heart rate; this tendency, however, is counteracted by the stimulation of the vagus center by strychnin, the heart being slowed or showing little change in frequency. If the slowing is excessive there will be a fall of blood pressure despite the vasoconstriction, but this does not usually occur. If the tendency to increased frequency predominates over the vagus stimulation the rise of blood pressure is further augmented.

As strychnin operates readily to produce its effects it is a most valuable remedy when a quick rise of blood pressure is required. So rapidly are its effects elicited that convulsions may occur in a frog within two minutes of the injection of a toxic dose, and after massive doses rabbits may give a single convulsive leap into the air and be apparently lifeless from paralysis of the respiratory center when they strike the operating table.

Biberfeld has investigated its mode of action on the respiratory center. He depressed the respiration by morphin, after which strychnin was injected; this usually resulted in a greater increase in volume (sometimes even exceeding that before the administration of morphin) than in frequency.

It has been suggested that morphin depressed the reflex excitability, while strychnin tends to make all reflex efforts maximum.

Biberfeld agrees with previous investigators that strychnin does not cause increased irritability of the center for sensory impulses coming from the lungs, but considers the chemic stimulation of the blood the essential factor.¹

The following preparations are official:

STRYCHNINA.—U. S.—This is an alkaloid obtained from *nuxvomica*; it is also obtainable from other plants of the *Loganiaceæ*.

Strychnin is only slightly soluble in water 1/6400, but is soluble in 110 parts of alcohol.

STRYCHNINÆ SULPHAS.—U. S.—This is the salt of strychnin that is most extensively used in this country; it contains five molecules of water and approximately 78 per cent. of strychnin alkaloid. Strychnin sulphate is soluble in 31 parts of water and in 65 parts of alcohol.

1. Owing to the frequency with which poisoning by strychnin occurs, its toxicology deserves brief mention here.

As is well known, strychnin causes a characteristic type of convulsion rather closely resembling tetanus. The amount of the alkaloid that is necessary to produce this toxic effect is much greater, however, than is usually supposed; but, on the other hand, when once a large amount has actually entered the circulation, there is little hope of ultimate recovery. As death is due to paralysis of the respiratory center life may be prolonged, and a possible recovery brought about, by carrying on artificial respiration. This, however, should be begun before natural respiration ceases or even before it becomes very greatly depressed.

Strychnin requires several days (3 to 8) for its total elimination. Diuretics hasten elimination and may be of benefit when the amount of the poison that has been taken does not greatly exceed the minimum fatal dose.

Cushny advises strong tea (infusion) when the patient is seen with the strychnin in the stomach. This advice seems to be based on a misconception of the capacity of tea tannin for forming the insoluble tannate.

The fact that strychnin acts directly by paralyzing the respiratory center fully explains the possible danger that may result from the use of a stomach tube, and it will not be necessary to repeat this frequent caution.