such attacks are, as a rule, materially lessened in frequency. When repeated quinsies have occurred, further attacks may be prevented by removing the source of the infection—namely, the tonsil. For lymphatic gland infections, where tuberculosis is suspected, tonsillectomy is indicated, and the course of the glandular enlargement determines whether more extended operative measures may be needed. In pyogenic infections of the glands the tonsil must be dealt with when the acute lymphadenitis has subsided or been operated on, if suppuration has supervened. Chronic glandular enlargement, of the mild or moderate degree, is so frequently met with in hypertrophied tonsils, that when the tonsil recovers its normal character the glands subside also. No tonsil should be removed when acutely inflamed. For more distant infections, when the tonsil is suspected of being the focus, removal is indicated when the general condition is satisfactory.

In all these cases total removal is the operation of choice; it presents no greater danger than incomplete removal, and can be readily accomplished by the guillotine alone, by a method first described by Mr. Whillis and myself in January, 1910. While these methods directed to the individual are of great importance, there is no doubt that prevention of tonsil infection should be our chief aim. This is to be obtained by the advances of hygiene—personal, in the home, and in the school. The maintenance of nasal respiration, the prevention of dental caries, and the proper supply of food, in sufficient quality and quantity, will greatly diminish the prevalence of this condition. The provision of a cleaner air supply and the prevention of infection by milk are measures needing attention. When that delicate balance between health and infection is upset, and the tonsil, a useful organ, becomes diseased and incapable of recovery, a timely removal of this focus may prevent more grave illness and disability. The question of infection of the tonsil and from the tonsil is not to be summed up in some form of operative procedure, but by attention to the numerous measures that have been indicated.

THE STERILIZATION OF THE SKIN WITH TINCTURE OF IODINE.

By J. LIONEL STRETTON,

SENIOR SURGEON, KIDDERMINSTER INFIRMARY AND CHILDREN'S HOSPITAL.

THE method of sterilizing the skin with tincture of iodine which was originated by me, and which was first described in the BRITISH MEDICAL JOURNAL, August 14th, 1909, was received, as I expected, with a considerable amount of scepticism. In spite of this, it has rapidly gained favour and is now very widely adopted. The remarks which I read from time to time in the press make it evident that some of those who use it are not thorough in their methods; some adopt alterations and some deny that the method is efficacious. At such a juncture it may be well for me to state my further experience, to amplify my description, to emphasize the importance of some of its details, and to reply to some of the criticisms.

I have now used the method in upwards of 3,000 cases. It is unnecessary to publish a detailed list of these. It includes most of the operations a surgeon is called upon to perform. Among these cases I have never seen a stitch abscess, and I feel confident that the skin was in all cases sterile. Of course, I only refer to cases in which an aseptic result can be expected. You can hardly blame your skin if you find a *Bacillus coli* infection after the removal of a quiescent appendix! Even in cases which are septic previous to operation the skin incisions heal more surely and more rapidly. My extended experience has increased my confidence to such an extent that I never have any anxiety of skin infection. Of course I do not claim that it will secure asepsis in all cases. There are many other channels of infection besides the skin, some of which we may never be able to control. The one which always appears to me the most difficult is infection from within. Take, for instance, traumatic effusions of blood which have no direct communication with the atmosphere. How often they become infected! Or injuries into a joint without any breach of surface where

infection supervenes. If by any chance a surgeon had aspirated such a joint before it became infected, few would believe that the germs entered by any other channel than the wound which he inflicted.

The solution I originally used was the tincture of iodine (B.P.). It is prepared by dissolving 2½ per cent. of iodine and 2½ per cent. of potassium iodide in rectified spirit. In an endeavour to save the funds of the hospital I tried a solution of the same strength in methylated spirit, but I soon found that it produced so much irritation and lacrymation that I was obliged to resume the original compound. I now use the tincture in the theatre and a similar solution made with methylated spirit in the wards. It was probably my effort to save the hospital funds which caused another surgeon to imagine that he had discovered the rectified spirit solution. He evidently did not read my paper carefully, or he would have learnt that my original work was done with tincture of iodine (B.P.), which is made with rectified spirit.

The method of application is similar to that which I originally described. A wide area of skin is painted half an hour before the patient is brought into the theatre. It is allowed to dry, and is then covered with a sterile towel. When the anaesthetic has been administered another painting is performed. It would be more correct to describe it as a rubbing, for I now use a small swab held in a pair of forceps, with which I rub the solution over the surface, taking special care over the hairy regions. If there is any occasion to increase my incision or to make a new one beyond the limits of the application, a further rubbing is easily performed. The little swab is dipped into the wide-mouthed bottle in which the tincture of iodine is stored, and if a further application is necessary a fresh swab is used. This is preferable to using a brush which is constantly dipped into the bottle. It has the further advantage that the stopper can be immediately put into the bottle, and so prevent evaporation or contamination. If a brush is left standing in the bottle this is impossible.

When the operation is completed the line of incision and about an inch margin is freely swabbed with the tincture. A sterile gauze dressing is usually applied, but in some cases, especially after hernia operations in children, no dressing is used. In septic cases I have packed in gauze soaked with the tincture. In all after dressings a free application is made. As a rule, the wounds are not uncovered for a week, but occasionally more frequent inspection is desirable or dressings are not applied. In such cases I swab with the tincture every day and have never seen any ill effect.

All the casualty wounds at our hospital are treated with it. Immediately they are seen a free application is made. After the necessary exploring, trimming, and stitching is complete a second application is made before the sterile dressing is applied. The improvement in results in these cases is most remarkable.

My patients are now admitted to the hospital the day previous to the operation. This saves them from the harass and distress of waiting and from the former elaborate and alarming preparations. The house-surgeons and the nurses are saved an enormous amount of work, and the hospital is saved the large expenditure which was formerly necessary for preliminary preparations. In twelve months this would amount to a very considerable sum.

Various modifications have been practised. Some have adopted a 2 per cent. solution, some an acetone mixture, and some a colourless solution, while others either wash the skin beforehand or paint on various solutions. I fail to see any justification for these alterations. If tincture of iodine is efficient, why alter it?

It was suggested that it was necessary to insist on a fresh solution for fear of decomposition, and then it was discovered that the formation of hydriodic acid which occurs if a solution of iodine in spirit is kept for any length of time could be prevented by the addition of 2½ per cent. of potassium iodide. These observers either failed to read my original paper, which states tinct. iodi B.P., or they forgot that the B.P. tincture contains 2½ per cent. of potassium iodide. If it is kept in a properly stoppered bottle, it will remain good for an indefinite time. If there is any evaporation, it becomes stronger and too irritant. Messrs. Oppenheimer have put it up in small

wide-mouthed stoppered bottles properly sealed, which forms an ideal method of using it.

It is inaccurate to speak of the sterilization of the skin with tincture of iodine as the Continental method or to describe Grossich's solution as tincture of iodine, because his is a 10 per cent. solution of iodine in rectified spirit. It is almost identical in strength with our liquor iodi fort., which was formerly known as liniment of iodine. There is a very wide difference between that and the tincture. I would not use such a solution myself, and I do not believe any British surgeon would. I do not know if the skins of our countrymen are more tender than those of Continental inhabitants, but I am aware that a single painting with a strong solution (liq. iodi fort.) will produce acute dermatitis in many people. This is a condition no one would welcome in the region of a surgical wound, and for this reason, I expect, the method was not adopted in this country. It was not until after I had made my experiments with tincture of iodine and published my results that the method was adopted.

One surgeon wrote to me advocating a colourless solution because "it isn't so dirty." Surely stains are not dirty. As a matter of fact, I regard this staining as one of the important advantages of my method, because it defines the exact area of skin which has been sterilized. Previously we were at the mercy of a third person, and even if the duty was thoroughly performed—which I feel sure was mostly the case—we were unable to be certain where the boundaries were situated. If the surgeon's fingers become stained, the stain can easily be removed by washing them in a 3 per cent. solution of carbolic acid, or a $\frac{1}{2}$ per cent. solution of cyllin.

I have never seen any dermatitis result from the use of tincture of iodine. There is sometimes a limited amount of desquamation. My experience is in entire disagreement with an observer who states that it is unsafe to use it in young children. I have many times applied it to babies, some only a day old, and I have never seen any irritation from it.

A question has been raised as to the pain caused by its application. Applied to the unbroken skin there is no pain at all, but when it is painted on a cut surface it produces a smarting or burning sensation, which rapidly passes away. It is so slight that some young children submit to it without complaint. I have made very careful observations on this point, and I have also tried the effects upon myself.

It has been suggested that it is dangerous to use it over the abdomen for fear of damaging the viscera if they escape and come in contact with it. I have no such fear; indeed, it is my custom to allow coils of intestine, etc., to rest on the skin which has been sterilized with tincture of iodine, and I have never seen any ill effect. I regard it as superior to sterile towels or gauze, because there is always a possibility that the process of their preparation may not have been perfect.

I understand that some surgeons still insist upon a preliminary scrubbing and washing. This is not only unnecessary but positively harmful, and the same applies to a wet compress applied before the operation. They both cause swelling of the epithelial cells and prevent the tincture of iodine penetrating to the deeper layers of the skin. It causes the germs to be shut up in snug little nests, and as the skin dries they are able to infect the wound. It does not signify how dirty people's skins appear. They come in from the works begrimed with dirt, sometimes positively black, but surely we need not fear a little carbon. Skins which look clean may be far more dangerous from a surgical point of view. If a bath is desired it should be given twenty-four hours before the operation. It is not necessary, and in some instances it is a source of additional discomfort and anxiety.

Some think this method of sterilizing the skin is of little use, and it is true that, so far, there is little bacteriological proof to support it; but the clinical evidence is so overwhelming that it cannot be ignored.

Carbolic acid may be stronger, but it would hardly do to paint it on the skin; to use it in the wounds must cause a considerable amount of destruction and sloughing. I do not think many men would care to use pure carbolic acid on an ordinary lacerated wound of the forearm and I in 20 carbolic outside. It would be difficult to prevent the acid getting on to the skin and burning it, and although I to 50

carbolic may be as strong as tincture of iodine, it lacks the penetrating virtue of the iodine, while it possesses the disadvantage of swelling the epithelial cells and shutting in the germs.

Most surgeons continue to shave their patients; this, too, is quite unnecessary. If it is done it should be done dry, or the swelling of the epithelial cells already referred to will be produced. In head cases there is so much hair, and it so hampers procedure, that it is best to dry-shave it; but in other situations it is quite sufficient to clip the hair away with scissors along the line of proposed incision. This is done when the patient is under the anaesthetic. The preparation as a whole is repulsive, especially to women, and shaving the privates is more objected to than all the rest put together. In addition to this, when the hair is growing again it causes irritation which is at times intense. To avoid shaving is another great advantage of my method—perhaps far more important than some surgeons realize.

I am pleased to see that the method is being used to a large extent on the battlefields, and I feel confident that it will be of great value. In emergencies of all kinds it is most useful. There is no looking up of basins or bowls which may or may not be septic, no crying out for sterile water which, if procurable, may contain germs, no mixing of carbolic acid, no nailbrush, no scrubbing. The simple application of tincture of iodine gives far more security. The surgeon's hands can be sterilized in the same way. I do not advocate it as a routine because the skin might not stand an unlimited use of it, but when it is necessary to use the hands so soon that there is not time to prepare them properly, it can be adopted with confidence.

That tincture of iodine is an efficient application for sterilizing the skin I am confident, and I wish that those who use it would adopt the measures I have indicated. This would add to the efficiency of their technique and save their patients a considerable amount of discomfort.

TYPHUS FEVER IN PALESTINE, 1913-14.

BY

C. H. CORBETT, M.B., CH.B. EDIN.

OWING to the havoc now wrought by typhus fever in Serbia it cannot fail to be of interest to report the salient points of an epidemic of this disease in Palestine, 1913-14.

Typhus is a rare affection in Palestine, and occurs in smaller or larger epidemics in certain localities about every ten years, and many physicians in the European or American hospitals in Palestine and Syria have never seen the disease. It is, indeed, highly probable that the epidemic of 1913-14 was the most widespread that has occurred in recent years.

In the spring of 1913, at the English Mission Hospital, Jerusalem, we were astonished at the virulence of the affection which was revealed to us by an infected family admitted to our wards.

This group of patients demonstrated the comparative mildness of the disease in childhood and early youth, whilst the severer type was witnessed in the mother. From these cases a nurse and a middle-aged ward woman became infected; the former recovered after a veritable fight for life, while the latter died—our only death in a series of not fewer than 20 cases.

Subsequently children and adults, individuals from various large families in congested and uncongested districts, received treatment; in all cases of adult infection a critical and anxious period was passed.

After we had attended to about 15 cases there was a lull in the storm, till Hebron was swept with the disease, and the exodus from Abraham's city reminded one of Lot's flight from Sodom.

Again there was a decrease in the number of cases while the coast towns received their spell of the pest, till, in the spring of 1914, I saw a Nubian boy in his house suffering from a continuous fever which I could only then diagnose as typhoid (his skin was too black to see a rash). He was admitted to our hospital on the ninth day of the illness, and was put on sodium sulpho-carbolates, grs. xx, every four hours. On the twelfth or thirteenth day he had the crisis, and I fondly imagined that a typhoid fever had been aborted. A few days later, however, his nurse