interesting question whether these bear any, and if so what, relation to the diphtheria bacilli originally present.

PERSISTENCE OF THE BACILLI IN THE THROAT.

The 1,000 cases on which our results are based are all primary examinations, but in several further examinations have been made to ascertain whether the diphtheria bacilli had disappeared, and the subjects were free from infection. From such "repeats" it would seem that the bacilli are commonly to be found in the throat two to three weeks after the attack, but that this period may be greatly exceeded. Thus in one instance the specific organism was found seven weeks, in another nine weeks, and in a third twenty-three weeks after convalescence. In the latter case, the virulence of the bacilli, as tested by inoculation, was maintained to the last, for a guinea-pig inoculated with 0.25 c.cm. of a forty-eight hours' broth culture died in thirty-six hours.

Another notable case was one in which virulent Klebs-Loeffler bacilli were found in the throat of a schoolboy, who, six months previously, had suffered from an illness which, from the occurrence of paresis, was evidently diphtheritic, though not diagnosed as such at the time; in all probability this case was the focus of infection from which originated a small outbreak of diphtheria among the class associates of the boy in question. These and many similar instances serve to illustrate the necessity for a bacteriological examination before a convalescent from diphtheria can be said to be free from infection.

FALLACIES IN THE BACTERIOLOGICAL METHOD OF DIAGNOSIS. There are certain sources of error in the bacteriological method which, if excluded, would perhaps have increased the number of positive results by 2 or 3 per cent. For example, the swab may not be representative, that is, may have been taken from a small area which happened to have no bacilli upon it. In other cases, when the specimen is moist, the profuse growth of saprophytes may crowd out the diphtheria bacilli, and one advantage of a small wool swab over membrane is that it dries quickly, and the development of the saprophytes is thereby prevented. The use of local antiseptic treatment is another source of error, and in all cases the specimen should be obtained if possible before its commencement. The influence of such treatment is well illustrated by the following actual example. A specimen was received cultures from which revealed no diphtheria bacilli. It had been taken shortly after the use of sulphurous acid, and so convinced was the practitioner that he was dealing with a case of diphtheria, that he submitted another specimen from which a profuse and pure growth of the diphtheria bacillus was obtained. On the other hand a tonsil has been received which had evidently been energetically treated with perchloride of iron; and on another occasion some membrane which had been placed for a short time in a weak solution of Sanitas, and still smelling strongly of this preparation, and from both profuse cultures of the diphtheria bacillus were obtained.

CONCLUSION.

In conclusion, we would emphasise the desirability of a bacteriological examination in every case in which the throat symptoms are at all doubtful, for many of our cases which were not regarded clinically as diphtheria have proved to be so. Secondly, since virulent bacilli may be met with in the throat for weeks after convalescence, partial isolation at least should be insisted upon until repeated bacteriological examination has shown the absence of the infective agent.

We have to express our best thanks to Dr. Ruffer and to Dr. Macfadyen, in whose laboratories the examinations were carried out, for permitting us to publish these results, and for advising us with reference to them.

THE German Public Health Association will hold its annual meeting this year at Kiel on September 10th and three following days. Among other subjects on the programme are the Repression of Diphtheria and Sanitary Conditions in the Mercantile Marine.

AN International "Thalasso-Therapeutic" Congress will be held at Tunis in April of the present year. Despite its formidable name, the Congress will deal with no more terrible matters than the advantages of sea-bathing and marine climatology.

TREATMENT OF ASEPTIC WOUNDS WITHOUT BANDAGES OR DRESSINGS.

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THE object sought to be attained in the treatment of surgical wounds is the promotion of sound and rapid healing. The first essential is to maintain the wound in an aseptic condition during its exposure to the atmosphere. After the wound is closed the main requisites necessary to promote healing are:

1. To maintain the parts at rest and the raw surfaces that are intended to unite together in close and constant apposition.

2. To prevent contamination of the wound from external sources.

3. To get rid of excessive discharges.

The means usually employed to obtain the first and second of these requisites is by the use of sutures—varying much in amount and in position—dressings and bandages. So great, indeed, has the belief in the efficacy of the last-named become that surgeons of no mean repute swaddle a large portion of the bodies of their patients in dressings for the supposed protection of an insignificant wound. A great amount of unnecessary discomfort and even suffering is endured by the patient owing to his limbs and trunk being maintained in a stiffened and unnatural position. The movements made by the patient to obtain ease naturally tend to displace the bandages, and when these are employed to maintain the wound in apposition the healing surfaces are disturbed and the healing delayed. In addition, this method of treatment, to ensure success, often necessitates considerable expense for the material and the necessary skilled nursing to watch the dressings. It is a method that the vast majority of practitioners cannot achieve, inasmuch as their practices lie where the expense cannot be met, and where the skilled nursing cannot be obtained.

The first essential for healing is to retain the parts at rest and the parts intended to unite in close and constant apposition. This is effected by the systematic employment of buried catgut sutures. The flaps of a wound—be it of an amputated limb or the raw surfaces of an incised wound of the trunk—are laid together in the position they are intended to assume. The various points of contact are noted, and then sutures of catgut are inserted through the raw surfaces—never penetrating the skin—of sufficient depth to ensure a good hold, and the opposing surfaces firmly drawn together. This is done systematically from the bottom of a wound to the skin edges. The separate sutures are in rows, the number of sutures in each row and the number of rows varying according to the ease or difficulty with which the raw surfaces can be maintained together. When there has been great loss of skin, as in the amputation of a breast with the removal of much skin, the deepest buried sutures extend from the base of one flap to the base of the other across the bottom of the wound. These drag upon the tissues at a considerable distance from the skin edges of the wound. Rows of sutures inserted superficially to these gradually approximate the edges of the wound, till finally the skin edges of the wound come together without tension. The buried sutures of course never come outside the wound. In using the sutures care must be taken not to injure any important structures that may be lying in close proximity to the wound. Rather fine catgut will maintain the parts in contact long enough to ensure adhesion of the raw surfaces before the catgut is absorbed. One often observes the puckers produced in the skin by the buried sutures ten days after insertion.

After the deep sutures have been systematically inserted, the skin edges come easily together and are retained in apposition by a continued catgut suture embracing but a small extent of the cut edges of the skin. When the wound is thus closed in place of using dressings, a solution of collodion is applied over the line of skin incision and for half-an-inch on either side. This solution of collodion quickly dries, leaving a thin transparent film that adheres to the skin with great tenacity, and yet is sufficiently plastic to adapt itself to the wrinkles and inequalities of the skin produced by move-

ments of the parts. Very frequently one light painting suffices to cover the part long after the wound has safely and soundly healed.

The solution of celloidin is made by dissolving one part of celloidin in four parts each of absolute alcohol and sulphuric ether. As this solution quickly dries in the bottle, equal quantities of the alcohol and ether can be added from time to time to produce a solution of the consistence of glycerine as occasion may require. As the celloidin will not set in the presence of water it is my custom to cover the wound for a few minutes with a piece of lint saturated in a carbolic solution until the patient is made comfortable in bed, by which time all oozing from the skin stitches has ceased; then carefully to dry the wound and surrounding skin, wiping it afterwards with a piece of lint soaked in rectified spirit and, in order to dehydrate it more thoroughly, wipe it with another small piece of lint soaked in absolute alcohol. While the part is still moist with the absolute alcohol the celloidin is lightly painted on. As this quickly dries, and contracts in drying, the skin is dragged upon and compressed so that no more bleeding takes place from the wound. The wound is now covered with a transparent film that acts for a time like an artificial epidermis. No bandages or dressings of any sort are required, for the stitches maintain the parts with far greater security and efficacy than the most skilfully applied bandages, and as the discharge-blood from an aseptic wound is absorbable, the wound itself absorbs its own discharge and no contamination from the outside can take place.

The discharges that come from a wound are derived from the blood that is thrown out from the cut surfaces. It frequently happens that towards the end of an operation, the patient being under chloroform, the pulse is weak, the patient's face pale, and the heart is evidently working with its smallest force. During this time there may be little or no bleeding from the cut vessels, but after the operation is over and the patient warm in bed a reaction sets in, testified by the fact of the patient's flushed face and large pulse. At this time smart oozing may take place from the cut vessels in the wound. In the treatment of wounds by bandages and dressings provision is made for this oozing by drainage, or if there be no drainage the effused blood escapes from between the cut surfaces. In the case of the method described above the oozing from the vessels to a great extent is prevented by the firm contact of the raw surfaces maintained by the buried sutures. What does occur becomes absorbed, with no more need of drainage than in an ecchymosis or a hæmatoma produced by a blow with the skin intact. Still if one examines after death the tissues surrounding a wound made within a few days previous to death all the tissues for 6 or 8 inches off will be found saturated with effused blood. I have also seen, in a case of amputation of the arm, fourteen days after the wound had healed, where an accidental blow at the cicatrix caused a small breach of surface, a considerable quantity of bloody serum ooze from the small wound.

From such facts as these it seemed to me desirable in certain cases to get rid of the effused blood. When I operate on a patient whose vitality is good, as evidenced by free bleeding during the operation, and when the wound is large, I employ the following method for drainage. Before the wound is closed at the most dependent part, a small hole is made through the skin and subjacent tissues as far away as possible from the skin edges of the wound. An unperforated piece of drainage tube, of a calibre larger than the hole in the skin, is passed through into the wound. A larger size of tubing is used so that the perforation in the skin may grasp the tubing firmly. Sufficient length of the tubing is passed into the wound and a few perforations made and placed in whatever position is deemed most suitable. The wound is then systematically closed. The piece of unperforated tubing outside the wound is introduced into a bag made of gutta-percha tissue containing a sponge soaked in a strong antiseptic. The mouth of the bag is then closed on the tube and glued to the tube by softening with chloroform the gutta-percha where the mouth of the bag embraces the tube. Where the tube perforates the skin celloidin may be painted so as to ensure perfect closure, but, as a matter of fact, I have found that when the skin has grasped the tube no oozing takes place by the edges of the tube. The drainage is now effected into a hermetically sealed antiseptic receptacle.

Twenty-four hours after the operation I remove the drainage tube and the opening left by the tube is stopped up with a plug of antiseptic gauze.

So far it is assumed that the wounds are aseptic. If the wound be not aseptic and there is no possibility of healing by first intention, then the above method is of no use and cannot be employed. If a wound assumed to be aseptic and treated in the above manner should turn out to be septic—that is, should pus form—it is still applicable. I have failed in a few cases to keep the wound in an aseptic state. Supposing a rise in temperature and a slight red blush round the wound indicates the formation of pus, then a small piece of the celloidin is pricked off with a probe, and the probe inserted between the edges. If pus be present it will well out and the rest of the skin edges will in all probability heal kindly. If the wound be a large one it does not follow that suppuration takes place over its whole extent. Thus, in a case in which a breast was removed and the axilla cleared out, where the incision was over 8 inches in length, a rise of temperature and slight redness at the sternal end of the wound indicated the presence of pus. A small piece of the celloidin was picked off, a probe was passed into the wound, and some pus oozed out. The temperature fell, and the whole wound, save for a small piece about half an inch in extent, healed by first intention, and a little pus discharged only for a few days from the opening.

The advantages of this method are more strikingly seen when the wound approaches one of the natural orifices of the body, where dressings and bandages are not only a source of discomfort, but are an inefficient protection to the wound. Of course, if the wound extends to a mucous surface, then this method in its entirety is not available. I had to remove a large fatty tumour from the gluteal region; the incision extended from within an inch of the anus 9 inches down the thigh. After the operation the wound was treated by the buried sutures and celloidin, the patient lay in bed in perfect comfort, the natural functions being performed without discomfort, and the wound healed in its entirety by first intention. In wounds about the face the method is particularly successful. No skin sutures need be used; the parts are held in position for a few minutes till the celloidin sets, when it exercises sufficient tension to retain the edges in contact. Care must be taken, however, to apply only a small amount of celloidin, as the traction exercised during the setting may produce an artificial temporary ectropion if the wound be near the eyelids.

The particular applicability of this method is found in its use in private practice, especially where no skilled nursing is available. After operating on patients at a distance, I have been able to leave them for days without being seen, knowing well that no accident can happen through meddling with the dressings of the wound. In hernia this method is of very great service, not only in hospital but in cases of strangulated hernias in houses where it was almost hopeless to expect successful results. The rapidity with which sound healing takes place is at times surprising. Thus I was called late one night to see a woman in rather a dirty house some miles away. There was a strangulated hernia which defied all efforts at reduction. I had to operate by the light of two tallow candles, with the patient's abdomen for a table for instruments. The hernia was reduced, an old sac dissected out, and treated by Macewen's method. The wound healed kindly, with so little discomfort that the patient could with difficulty be prevented getting up. On the ninth day after operation she insisted on getting up and pursuing her usual work. I examined her a year later, and found the cicatrix firm and no trace of hernia. I have now operated on a considerable number of hernias both strangulated and for the radical cure in private and in hospital, and all with the very best results, the above method being followed in all cases.

MILK AND TUBERCULOSIS.—The Board of Health of the State of New York has decided to submit and recommend to the Legislature a Bill forbidding the sale of milk containing tubercle bacilli. The Bill will require those who sell milk to show that their cows are free from the disease in question. A proof will consist of a certificate, issued by the Board or its authorised agents, after an examination made by competent persons.