

THE BACILLUS WELCHII.

THE PRINCIPAL CAUSATIVE ORGANISM OF GAS GANGRENE.

By JOHN HATCHER.

Though the *Bacillus welchii* is the commonest causative organism of gas gangrene, it is not quite the only one; the others are the *Vibrion septique*, or *Bacillus* of malignant œdema, and the *Bacillus œdematiens*. All these organisms are spore-bearing anaerobes, and are always present in the soil, frequently in large numbers. It is probable that their source is animal fæces; that is, of course, why war wounds contaminated with well-cultivated soil which is heavily manured is particularly dangerous. Our knowledge of the soil anaerobes, and in particular the *Bacillus welchii*, was greatly advanced by the experiences of the last Great War, and already the medical Press bears evidence of some of the fruits of the present conflict. The problem of gas gangrene has, however, proved to be something more than a simple bacteriological problem, demanding alone careful investigation. It is a well established fact that the presence of *Bacillus welchii* is by no means uncommon in infected wounds, yet by no means do all these cases develop gas gangrene; in fact, the vast majority certainly escape this dreaded complication of battle injury. Much research has in the last few years been devoted to this aspect of the problem, and it would appear that quite a number of factors enter into consideration. For example, the extent of the injury; perhaps, the effect of other bacteria with which the wound may be infected; probably, however, the principal, if not the determining, factor is infection of lacerated muscle, certainly this is vitally important in its spread.

Collection of Specimens.

It is extremely important that material for examination should be collected from the deepest part or parts of the wound. The type of collection outfit used depends largely on the amount of pus available; if possible, it is advantageous to obtain a reasonable amount, and under these circumstances a test tube may be used. A very convenient method of obtaining the pus is to use a pasteur or capillary pipette. Both the test tube and pipette must, of course, be sterile. It often happens that the pus available is scanty in amount, and a small wool swab attached to a swab stick contained in a test tube is more satisfactory. These swabs are very easily made by winding a tiny pellet of pulled-out cottonwool round one end of a wooden applicator stick, of the type used for throat swabs; this is then placed in a plugged test tube. If the specimen is to be collected by the surgeon in the theatre, it is more satisfactory to include the whole of the applicator stick in the plugged test tube; this plug may then be removed by an assistant at the operation, and the sterile stick gently tipped into the surgeon's hands without fear of contaminating his sterility.

The *Bacillus Welchii*.

The *Bacillus welchii*, or, as it is known in the new bacteriological nomenclature, the *Clostridium welchii*, was first described in 1892 by Welch and Nuttall, who found it while conducting *post-mortem* examinations. Fraenkel, Veillon and Zuber, all published the results of their researches on this organism. It was, however,

the last war which saw the greatest development in research both on the *Bacillus welchii* and in curative methods to deal with the distressing condition known as gas gangrene which is liable to follow wound infection with this organism. During the present war the matter has somewhat naturally received considerable attention, though much of the work has been directed to the toxic factors. The bacillus is, as bacteria go, a large organism, somewhat short but stout of stature, it is gram positive and a spore bearer. It may be fairly easily grown on suitable laboratory culture medium, but being a strict anaerobe, only under those conditions. The accurate laboratory identification of this organism is rather more difficult for this reason than with the aerobes. The *Bacillus welchii* under normal conditions is an inhabitant of the large intestine of both man and animals, and incidentally it has been found that in certain conditions, as, for example, in the case of pernicious anaemia, the number present is very greatly increased. It is also known that the multiplication of these organisms is greatly affected by the reaction of the medium in which they find themselves, and it is thought probable that in the case of pernicious anaemia this is due to the achlorhydria, or absence of free hydrochloric acid, which is a feature of the disease. For successful infection to take place dead tissue of some sort must be present, and these very circumstances are usually fulfilled in deep war wounds, particularly when parts of the patient's clothing, probably contaminated with soil, are carried deep into the wound. Toxic products find their way into damaged muscle fibres, where the *Bacillus welchii* multiply and produce gas. Antitoxin is produced by slowly immunising horses with toxin of the *Bacillus welchii*.

ONE HUNDRED CIVILIANS BLINDED BY ENEMY ACTION.

Every Help Vital.

One hundred civilians in this country are now known by the National Institute for the Blind to have lost their sight by enemy action. These are additional to blinded members of the fighting and civil defence services.

News of the hundredth casualty reached the Institute only a few days ago, a year after its occurrence. Owing to the delay the wounded person lost the advantages of early specialised training so important in such cases.

Hospitals have been asked to report these casualties as soon as possible so that expert help can be given immediately. The patient can then be comforted through the period of shock and may even begin Braille.

On discharge from hospital the men and women become guests at the Institute's homes of recovery, where they are prepared for the new life ahead. Very young victims are received as boarders at the Institute's Sunshine Homes.

Wireless for the Blind—Response to Appeal.

More than £13,000 has already been received in response to the Christmas broadcast appeal for the British "Wireless for the Blind" Fund. Most of the 23,000 gifts were accompanied by sympathetic messages, many in verse. One of these ran:

Ah, what a wondrous gift is sight:
The joy to watch a bird in flight,
Trees and flowers and stars to see—
And everything without a fee!
In gratitude I feel it right
To send along my widow's mite.

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