day. A general anaesthetic is usually required to graft any area larger than a five-shilling piece, but for smaller areas I have used local anaesthesia with success.

Summary.

To sum up, I am of opinion that the above described treatment for septic cases has the following advantages:

1. Simplicity.
2. A saving of expense by cutting down dressings to a minimum.
3. Better results than those obtained by other methods.
4. Ununited fractures tend to unite rapidly when once the superficial wound is healed.
5. A very much shorter convalescence for the patient.

In conclusion I may say that the substance of this paper is based on the treatment of many cases which have remained from start to finish under my own personal care.

ON THE RECRUDESCENCE OF LOCAL SEPSIS IN COMPLETELY HEALED WOUNDS

AS THE RESULT OF SOME SURGICAL INTERFERENCE OR PASSIVE MOVEMENT.

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THERE are reasons for thinking that cases are occurring in the military hospitals in the country in which some slight surgical interference—for instance, an incision for the removal of a piece of shrapnel under strict antiseptic conditions—has relighted a violent local reaction in the neighbourhood of a recently healed wound. Further, I have records of several cases under different surgeons in which, after all incisions and sinuses round a compound fracture involving the elbow or hip or other joint had completely healed, even such a simple procedure as passive movement of the joint under an anaesthetic has lighted up quite a violent reaction, the reappearance of the old sepsis, and the formation of local abscesses, although no incision was made nor any solution of skin surface produced.

Struck by the frequent absence in many cases of guiding signs, either local in the condition of the tissues, or general in the condition of the patient, which can be relied on as accurate indications that the original septic process has quite died down, and that all pathogenic organisms in the neighbourhood of the fracture and along the track of the wound have been completely killed off in any given case, we have lately tested this point in some cases by dropping the piece of shrapnel or the fragment of bone removed at the time of operation directly into a culture tube, and I hope to record these results on a subsequent occasion. I wish now, however, to express the opinion that if observations on these lines were carried out by surgeons on an extended scale as a routine procedure, valuable information would probably be obtained on some points in the life-histories of pathogenic organisms in their relation to the body tissues which are now obscure. For instance, we want to know more about the conditions under which pyogenic organisms can dig themselves into the tissues and remain quiescent in sheltered situations without causing any local or general symptoms and without losing their virulence, just as the malaria organism is supposed to bury itself in the bone marrow or the tubercle bacillus to become encapsulated in a lymph gland.

To what extent is the capacity of such organisms to remain alive and virulent the result of the formation of the barrier of fibrous or granulation tissue which surrounds them, or is it aided by the concomitant presence of a foreign body or some devitalized piece of tissue—for example, a fragment of bone—within the uneven surfaces of which the cocci can more readily defend themselves against phagocytic action?

Is the time interval of essential importance, and, if so, how long after the complete healing of a wound under ordinary conditions may we suppose that the cocci or

bacteria which caused the original sepsis can retain their virulence and their capacity for renewed activity?

How does the surgical interference, the incision, or the passive movement under an anaesthetic bring about the renewed activity of the organisms and the reappearance of the local sepsis? For it is quite clear that this result is due to the lighting up of the activity of organisms already present in the tissues, and not to the introduction of a fresh infection. The fact that passive movement without skin incision can bring about the result is conclusive evidence on this point.

Does the fresh mechanical injury operate by breaking through encapsulating barriers of tissue cells or by lacerating capillaries or lymphatics plugged with the cocci or their spores? Such suggestions seem only partially adequate to explain what happens. For, although the injury may set free the organisms, it also causes a refushing of the local area with blood serum, and this might be expected to inhibit the growth of any organisms liberated amongst tissues which have themselves recently experienced and recently recovered from infection, and which should therefore have acquired some degree of immunity against subsequent attack.

The routine examination of the cultural characters of the reactivated organisms and a comparison between these and the characters of the original infection would probably throw light on this problem.

Meanwhile, some highly practical questions also arise. It would, for instance, seem desirable to allow a longer interval of time to elapse after the sound healing of a wound before undertaking any renewed surgical interference in some cases than in others, and at present we do not know how to distinguish the cases in which the longer interval is necessary. Some guidance can be derived from a previous bacteriological examination of the serous fluid withdrawn by a needle from a joint or cavity in the neighbourhood of which the foreign body lies embedded. Thus, in the case of a piece of shrapnel embedded in the cartilage of the outer condyle of the femur and removed from the knee-joint of a soldier at the Leicester Royal Infirmary two months after the healing of the wound, a few cubic centimetres of the serous effusion aspirated from the joint some days before operation proved to be sterile. In this case the piece of metal removed from the cavity in the bone and dropped direct into a cultural tube failed to give any growth of organisms.

In this case also previous attempts to use the joint had brought on considerable effusions on repeated occasions, but these were evidently due to the mechanical effect of the foreign body, which projected slightly into the joint cavity, and not to infection.

Some indication that danger of renewed sepsis does exist may also, I think, be gained at the time of operation from a close scrutiny of the condition of the tissues immediately surrounding the foreign body. If, on cutting down, the piece of metal is found in a distinct cavity, which also perhaps contains some grumous fluid, then it is probably wise to take steps to sterilize the cavity and to drain, instead of completely closing the possibly reinfected wound.

In conclusion, I should like to add that the renewed septic process which I am here describing is no mere slight reaction, or swelling or effusion which subsides with rest and time. It represents a violent reaction on the part of the tissues against a renewed virulent infection. It ends in local suppuration, and in some cases has been sufficiently serious to threaten the limb or even the life of the patient.

FROM statistics published by our Italian contemporary, the *Avvenire Sanitario*, it appears that in the whole of France there were before the war some twenty thousand practitioners. Paris alone had more than three thousand; next came Lyons, Nice, Dijon, Marseilles, and Montpellier. Of the Parisian doctors, five or six earned from £8,000 to £12,000 a year; ten or fifteen from £4,000 to £6,000, while eight hundred earned £400 to £600, and twelve hundred about £320. The rest averaged £160. Of the practitioners in the rest of France, only seven thousand earned professional incomes of more than £280. The others eked out a living by other means, including politics. As French parliamentarians are paid £600 a year, it is not surprising that so many doctors in France take to politics. The present Chamber of Deputies has about eighty medical members.