great advance in the treatment of all cases of haemorrhage combined with shock. The solution can be easily made and sterilized and stored in suitable glass bottles.

The Value of Team Work.

The last lesson from the war to which I should like to draw attention is the extreme value of what I can only call team work in research, diagnosis, and treatment; and I think that perhaps this is the most important of all the lessons which the war has to teach us, and not only us as a profession but the Government, or rather the Ministry of Health, also. Consider for a moment the disadvantages under which we at present labour. We are the victims of a half-fledged, inadequate piece of legislation which is founded apparently upon the supposition that disease can be dealt with effectually by giving bottles of medicine or liniment to the sick, or that if this fails and the sick get worse they can be sent to one of the overcrowded voluntary hospitals with which the Legislature has nothing whatever to do. Anything more unsatisfactory to the sick, or demoralizing to us as a profession, it is hard to imagine.

I should like to bring to your notice an able and altogether admirable letter in the *Lancet* of June 14th last, by Dr. Flemming of Bradford-on-Avon, entitled "The general practitioner's hospital," in which he puts his finger on the crying need of the present day, namely, the establishment of an adequate number of what might be called auxiliary hospitals throughout the country, staffed by teams of general practitioners, to which all practitioners can have access, and to which they can send cases requiring clinical observation of any kind, rest, or treatment which cannot be carried out in the sick person's home. The present general and special hospitals would still be amply filled by cases of severity or difficulty, but they are essentially and always will be the hospitals of the specialist and consultant, and should be reserved as such. He demonstrates that no medical service insurance scheme can be efficient without such provision—provision to enable the general practitioner to diagnose, observe, and treat his cases adequately and to the satisfaction of himself as well as of the sick.

War has shown the extreme advantage of men in this way working together, not in rivalry but for a common end, helping to solve knotty problems, picking each other's brains, and not only gaining valuable knowledge, but conferring untold benefits upon those under their care.

That which is new and up to date to-day is old and obsolete to-morrow, and it is only by some such means as Dr. Flemming has described that we can keep our heads above water, maintain our interest in our work and our cordial co-operation with each other. Let us insist, then, that this is our due, that we should be given opportunity to meet and work together for the common good more often than is ever now possible, so that it may be less hard to maintain our self-respect and our pride in a profession which at the best is most arduous, which, speaking generally, is inadequately paid, and which makes a very great demand on the qualities of unselfishness and self-sacrifice.

The outlook for our future is surely encouraging. The nation and the Government know full well that they owe a great debt to the medical practitioners of this country and of the empire; without them war on a large scale would have been impossible, and the record of their work and its results will for all time be a reminder of how large a part is played by our profession in the welfare, prosperity, and happiness of all. Moreover, there is, and will be in the future, a department of State and a responsible Minister with whom we can deal.

No doubt the aftermath of war will bring us anxieties—these are universal; we must, however, possess our souls in patience, and remember Bacon's dictum that the greatest innovator is time. Do not let us be in a hurry, but study to preserve that unity which is the only sure measure of success.

PROFESSOR A. HOPEWELL-SMITH has received the honorary degree of D.Sc. from the University of Pennsylvania.

At the recent elections in Germany only one member of the medical profession, Dr. Hartmann, was returned to the National Assembly. Three physicians, Drs. Abderhalden of Halle, Schlossmann of Düsseldorf, and Struve of Kell, were elected to the Prussian Assembly.

NOTE ON RE-AMPUTATION.

BY

A. E. CHISHOLM, F.R.C.S. EDIN.,
LATE CAPTAIN R.A.M.C.,
EDINBURGH.

UNFORTUNATELY a primary amputation frequently fails to yield a satisfactory result. One main cause is, no doubt, that the circumstances under which the first amputations were done did not tend towards good healing. Patients brought to the casualty clearing stations were often in a low condition, and infection was always present. In many cases the amputation was performed above the zone of infection, but this was not always a reasonably correct procedure. Very often the wound was wisely left open and packed. The resulting delayed union tended towards cicatrization and contraction, and the scar was apt to become adherent to the end of the bone. Should sepsis develop, the result must often be imperfect healing with possibly sequestrum formation and sinuses.

Some Reasons for Re-amputation.

1. Adherent scar with weak or partial healing. If the scar is terminal, and especially if adherent to bone, it is apt to become irritated by pressure of the artificial limb. If lateral and adherent to the bone near its end, there is apt to be trouble from dragging. Such scars may break down. "A large or a small adherent scar is not necessarily an indication for re-amputation. Many cases with an adherent thin scar do well—in fact, far better than they would do with a better scar and a shorter stump. It is when the stump is conical and has a large terminal scar or ulcer that a re-amputation may become necessary" (Huggins).

2. A chronic granulating surface, especially if terminal and near the end of the bone, is very likely to lead to weak and unsatisfactory healing with adhesion to the end of the bone, or healing may fail altogether.

3. The presence of sinuses. Huggins says: "No aseptic operation should be performed on a stump until all sinuses have been healed for two or three months." I hesitate to express an opinion contrary to one with so large an experience, but I think that at least in cases with very mild sepsis in the sinuses, much time may be saved and a good result obtained by re-amputation, provided certain precautions are observed.

4. Sequestra. It is usually wiser to re-amputate than to be content with removal of the terminal sequestrum; time will thus be saved as the separation of the sequestrum need not be waited for; and if removal of the sequestrum alone be performed, the resulting end of the bone is likely to be irregular and ill adapted for weight bearing. Further, the sinus leading to the site from which the sequestrum has been removed will be somewhat septic, in many cases terminal or nearly so, and will tend to heal rather slowly with an inclination to form a cicatrix firmly fixed to the bone.

Although sequestrectomy, in the lower limb at least, should rarely be considered a final operation, it is a very sound procedure when active sepsis is present, and when it would be unjustifiable to re-amputate. The sequestrum may be removed and the track cleaned and the wound left open. When the sepsis has abated the radical operation may be performed. In the upper limb, where end bearing is not required, sequestrectomy may be found sufficient.

Prevention of Haemorrhage.

It is rarely, if ever, necessary to employ a tourniquet in re-amputating. If the main vessel be properly controlled by digital pressure, very little blood should be lost. There is good evidence that there is not only an immediate reactionary hyperaemia when the tourniquet is removed, but that there is a greater liability for reactionary bleeding to take place several hours later if a tourniquet has been used than if digital pressure has been employed alone. The main vessels should be cut through late and clamped early. It is well to superimpose the fingers of the two hands in controlling the femoral artery, so that alternate relief may be given without changing position.

In amputating through the thigh without a tourniquet some slight haemorrhage may take place from the uncontrolled terminals of the obturator and sciatic arteries, but these can be quickly clamped.

In operating below the knee pressure on the femoral artery in the groin, if properly applied, should satisfactorily control bleeding. It is more difficult to find the main vessels in this region than in the thigh, because of their proximity to the bones and because of the tendency to retract, but the difficulty is not great. In the upper limb there should be no difficulty in obtaining a good purchase over the brachial artery digitally. It is common to find a good deal of firm fibrous tissue extending for some distance up the line of the greater vessels. This causes so great a diminution of the lumen that no digital pressure may be required at all, but it is wise for someone to be ready to apply it in case of need.

The Operation.

I have found the following points of practical value in re-amputating:

1. Avoid a terminal scar. It is usually easy to achieve this in the thigh, but it is otherwise in the leg, if amputation has previously been performed fairly high up. Sometimes, owing to lack of skin, it is not possible to avoid a terminal scar and yet retain enough bone for the fitting of the artificial limb. The scar must take its chance, so as to preserve the joint, in such a case. But troublesome adherence may be avoided by guarding against infection, and also, possibly, by including a thin layer of muscle in the flaps; a retention suture left in for a few days will tend to prevent the scar from adhering in the wrong way to the bone; the retention suture should be guarded with rubber tubing to prevent it from cutting into the skin.

2. It is rarely necessary, and probably rarely wise, to include muscle in the flaps. A good fibrous pad is formed between the skin with its integuments and the sawn end of bone.

3. Re-amputate clear of the disability for which re-amputation is being performed, and try to make sure that no further operation will be necessary. The object of re-amputation is to get a good sound serviceable stump. It is far better to sacrifice a little extra bone, provided it can be spared, as it usually can, than to risk a poor result with the possibility of yet another re-amputation having to be performed some weeks or months later, just because the operation has been too close to or within the danger zone. Therefore the flaps should be cut clear of the scar unless there is some real reason in a special case against such a procedure. The scar especially should be avoided if there is the slightest suspicion of sepsis.

It would appear that pathogenic micro-organisms may lie latent in scar tissue for considerable periods. According to Huggins, the clinical evidence that a stump is ready for re-amputation is the disappearance of oedema from the skin and deep structures. It may be necessary to cut through and often include in the flaps the deeper scar tissue and sometimes lateral scars, but the scar in relation to the end of the bone should be avoided.

For the thigh I have usually employed antero-posterior flaps, the anterior one being the larger and forming the pad for the newly sawn bone end. Rarely if ever is it good treatment to dissect the adherent scar off the bone end, undercut the skin, and suture, leaving the bone intact. Even if the end of the bone be healthy, such a scar is likely to be terminal and to re-adhere, thus reproducing the former disability.

4. In dealing with terminal sequestra a difference must be made between those cases in which there is little or no active sepsis present and those in which sepsis is pronounced.

5. Re-amputation should not be performed in presence of a really actively septic wound. Healthy granulation is not a contraindication, but a really septic granulation surface should be considered a danger signal. The folly of hastening matters in such cases has been proved. The new wound, in spite of the greatest care during operation, is very likely to become septic, the lymphatics presumably being loaded with micro-organisms. The patient may develop general toxæmic symptoms, and the wound will in all probability break down. In many such cases another re-amputation will be necessary at a much later date. Thus time will be lost, an unnecessarily short stump will result, and health will be at least temporarily impaired. In operating on cases where healthy terminal granulation existed, I have been in the habit of swabbing it with pure carbolic, and then covering it over with gauze clipped on to the skin before starting to cut the flaps.

6. If the wound fills up with clot—for example, after a reactionary hæmorrhage—it is well to open it right up under a general anaesthetic, clear out the clot, re-suture, and drain in the usual way. Otherwise there will be great risk of a septic state ensuing.

7. If skin is scanty, and if it is important to preserve the length of the stump with a view to future function and fitting, extension may be applied by means of glue or strapping stretching from the stump to some form of wire splint. This may be in use for days or even for weeks, prior to operation, and a considerable gain may be achieved.

8. In amputation a short distance below the knee it is well to apply a posterior splint before the patient comes out of the anaesthetic, for there is a great tendency for the knee to assume the flexed attitude of rest, and, if convalescence be delayed, a certain amount of contracture of the hamstrings, often difficult to overcome, may take place.

9. If sepsis appears in a mild form after operation, fomentations or Carrel's treatment may be applied for a few days.

10. If re-amputation has to be performed in presence of a sinus only very mildly septic, or if the muscles do not look very healthy on section, a flavine pack will be found of value, the wound being left open with a view to delayed primary or secondary suture later. Or bipp may be applied, suturing the wound and providing drainage for serious oozing for a few days.

11. In amputations below the knee the anterior edge of the tibia should be bevelled so as to prevent the sharp edge from pressing on the anterior flap. It is important also to divide the fibula about a quarter of an inch higher up than the tibia, otherwise fitting of the artificial limb will be interfered with. According to Huggins it is important to preserve the interosseous membrane so as to prevent outward displacement of the fibula.

12. My usual routine, before suture of the wound, has been to swab the fresh raw surface with ether, which, besides acting as an antiseptic, tends to encourage bleeding, so that small vessels which might lead to troublesome bleeding later on can be ligatured at the time of operation. Ether tends also to show up unhealthy muscle by the fact that it may not react so well to the stimulus. This especially applies to avascularized damaged muscle seen soon after the infliction of the primary wound. The wound is then closed and sutured accurately. A narrow rubber dam is introduced at each end of the wound. These drains are left in for two or three days and then removed provided no sign of infection has appeared. A thin rubber dam provides very efficient drainage and is much to be preferred to tubing in most cases.

In my series of cases the average time of operating since the last amputation has been about six months, ranging from two to thirteen months. No doubt time is an important factor from the point of view of latent sepsis, but my experience tends to show that the clinical condition of the stump is of even more importance.

It cannot by any means be claimed that all wounds heal up by first intention. But if these rules are adhered to there will be few, if any, failures. Many cases will heal right away. Some will show a mild reaction which will soon subside.

ACCIDENTAL TRANSFERENCE OF THE MALARIAL PARASITE IN THE COURSE OF TRANSFUSION.

By ALFRED S. GUBB, M.D.,

SURGEON TO AUXILIARY HOSPITAL No. 102, ALGIERS.

THE following notes seem to point to the transference of the malarial parasite in the course of the operation of transfusion of blood, and as instances of such accidental contamination appear to be extremely rare—in fact, I know of no other example—I have thought it worth while to place the case on record:

A soldier back from Salonica arrived in Algiers in November, 1918. While in Salonica he had suffered a good deal from a pernicious form of malaria, and when sent into Hospital No. 102 he was profoundly anaemic, his blood only containing some 2,220,000 red corpuscles per cubic millimetre. At first he appeared to be gaining ground; he was cheerful, his appetite was good, and there was no fever.