Boots and Socks.

For boots we use sealskin and deerskin. Deerskin boots are the warmest, but are not watertight; we use them in hard frost.

Our boot materials are, as are all our garments, soft, light, and water and wind tight (Fig. 4). There are no nails and no pegs. The sole is soft; we use no thread; all are sewn with tissue from tendons, and as these swell with wet they never leak. We soak the boot or rub it over with tar and oil. It wants careful treatment to keep it from tinting or rotting, as we use raw or green skins. These are the most watertight. The hair is shaved off, and so there are no holes left in the leather. Occasionally we tan these skins and then soak them in tar and oil. It would be hard to get any number of these boots from Labrador now, as the

FIG. 4.—Boot.

coast is shut off from communication. They could not be obtained in any quantity till autumn, though a few thousand pairs of the tanned boots might be obtained in a few months, especially if the old sealskins from the Newfoundland fishery were purchased for the purpose. I think, however, skins of pigs or goats or dogs, and possibly sheep, would serve just as well. The features are, first, that they should be absolutely soft and very thin, so that the foot can move in every joint and keep warm. They are large and loose, and strap or tie round the knee. Very often, especially in spring, we carry the boot above the knee and tie it again, as then we can kneel to shoot or crawl on wet ground. The boot will take easily three pairs of socks. Very often in wet weather we use a pair of shoes of the same material, or of tanned skin inside the boot, and then two pairs of socks. These will keep dry on wet ground all day. The outer thin boot when of tanned skin "seeps water" a little, and the inside shoe keeps that from the sock. The looseness of the boot would prevent anything like "trench foot" from pressure. The boots are perfectly good on stony ground, the number of socks inside prevent the stones cutting the boot, and very soon the wearer does not notice the inequalities. We use them often, long after all the snow is gone, on our rocky hills and shores.

The sewing is always done with sinews. The fascia lumborum of the deer is dried and thread made from it by tearing the fibres and twisting them. This swells with the wet and prevents any leaking. Also the sewing is done exactly like sewing bowel; the stitches go only half way through the skin.

To demonstrate the way they resist water I would say our kajaks, one of which I always use for shooting on the sea, are only of one single layer of this sealskin, sewn together with this same sinew in this way, and they never leak a drop. I have driven my kajak through rough water, hunting all day, and never got damp even. One can run and jump in this costume as one did in football flannels. Among our doctors we have had more than one 'varsity runner and other athletes, and it is the unanimous opinion that when we get rid of our hard boots at the beginning of the winter, and abandon our conventional European clothing we begin to know what ease and comfort in moving is, and what resisting cold and wet means. There is no hard boot made that will save a foot from frost-bite. The sealers travelling over the sea ice put a thin tap or sole, pegged into our thin sealskin boot, so that they can screw in the "chisel" and "sparble" that prevents slipping.

This soft boot also allows yet another very important improvement over any hard boot. There is so much room in the boot that if the feet are cold and wet socks can be discarded and grass or hay used instead. The hay is just twisted into a hank loosely and bound round the foot, enough to enable one to distribute it around in the boot. A wisp is first put into the toe and on the sole. Hay is cheap—grass is easy to get. The air spaces are very warm. It takes a lot of water to wet hay. The foot sweats less in hay than in wool. There is no reason,

however, why one sock should not be worn inside the hay. When hay is wet, it can be changed by putting it into the cap or capot to dry from the heat of the body, as a scout does his matches. The "Lap" always uses grass in his skin boots, and wears the change grass in his tam-o'-shanter or knitted cap. The soft wading stockings are rendered almost useless in a hard boot—as the boot must be large and clumsy. They could readily be used in a perfectly soft boot.

A vamp is a low shoe made in wool (Fig. 5). The shops sell them. But much the best are those we make by

FIG. 5.—A, Vamp in knitted wool. B, Cross sections of vamp with wisps of raw wool drawn in. C, Vamps one over the other.

knitting the vamp, and then drawing in wisps of raw wool through the meshes, so that all the raw wool is inside. This gets trodden into a thick soft layer. The wool can be left greasy if preferred. It is very warm, and not easily wetted. To show how soft a boot is I would add that when one is wet and it has been taken off we turn it inside out and hang it up to dry. If a raw skin boot is hard, when we are putting it on we rub it on a boot stick and break it soft again, or just throw it in a bucket of water. The boots are so light that a spare pair could easily be carried to the trench and used as a pair of waterproof bags for rations if necessary. We never use any overcoat, hard hat, or hard belt, or any clumsy, heavy, hard contrivance at all.

Lice and fleas cannot breed in canvas and linen, as they can in hairy sheepskins and goat, and the heat necessary can yet be retained.

CHLORAMINE IN THE TREATMENT OF WOUNDS OF THE MOUTH AND JAWS.

By STAFF SURGEON A. R. FISHER, R.N.,
H.M. HOSPITAL SHIP "REWA."

(Report to the Medical Research Committee.)

THE septic character of all gunshot wounds involving the mouth and the disadvantages attending the use of the common antiseptics led me to try in these cases a new agent—chloramine (toluene sodium sulphochloramide).

The suggestion was made to me by Dr. H. D. Dakin, by whom the preparation was made. He advised a 2 per cent. aqueous solution for use as an irrigant and mouth wash.

During the months of October, November, and December, there was a great falling off in the number of surgical cases received on board this ship, but I was able to try the effect of this agent in seven cases, and in all the result was highly satisfactory. Where necessary, the usual surgical procedures were carried out under an anaesthetic, such as the opening up of external wounds, the removal of loose bone, teeth, foreign bodies, and ragged portions of tissue, the arrest of haemorrhage, and the suturing where possible of severed tissues—for example, the soft palate. Tubes were inserted through the wounds and the mouth to allow access of the injected fluid to all the damaged surfaces. The external wounds were dressed in the usual way, but the distal ends of the tubes were allowed to project outside the bandage, so that the reagent could be introduced frequently without disturbing the dressing. Irrigation was carried out every hour during the day, and as often as possible during the night, the patient sitting up in bed. Three or four syringefuls (2 oz. capacity) were injected through each tube, the fluid returning through the mouth into a receptacle. The patient was fed through a tube, irrigation with the chloramine solution being carried out immediately before and after.

Chloramine, besides being a powerful antiseptic, has the property of penetrating the tissues, and is not so readily neutralized by albuminous discharges as the simpler chemical antiseptics; also it is bland and quite pleasant to use, being non-irritant.

Of the 7 cases treated with chloramine, 5 were compound fractures of the jaw and 2 were flesh wounds involving the mouth. The following are clinical notes of these cases:

CASE I.

P. C., wounded at Anzac on October 6th, was operated on nine hours later under an anaesthetic for a rifle-bullet wound of the upper jaw. The bullet had entered the right cheek just below and in front of the malar prominence, shattering the right supramaxilla, ploughing up the soft palate, removing some teeth of the left upper jaw, and then passing through the left cheek, leaving a large ragged wound. The wounds and surrounding skin were cleansed with hypochlorite solution, the ragged edges cut away, and many small fragments of bone removed. A tube was inserted through the exit wound into the palate region and another through the mouth; the latter was kept in position by a safety-pin through the bandage. The mouth was irrigated every two hours with chloramine and the wounds dressed twice daily. He was fed every four hours through the tube.

Six days later he was able to gargle for himself and drink fluids. On October 18th he was discharged to H.M.H.S. *Aquitania*. The wounds had remained clean, and there had at no time been any purulent discharge or offensive smell from the mouth. I am informed that ten days later he was landed in England with the wounds almost healed and the mouth condition satisfactory.

CASE II.

F. L. sustained a shrapnel wound of the right upper jaw on October 13th at Helles. He was received on board twenty-four hours later suffering from marked dyspnoea. Under chloroform he was found to have a compound fracture of the right upper jaw and laceration of the palate. The wounds were cleansed, and a shrapnel bullet and a tooth were removed from the posterior pharyngeal wall. No tubes were inserted. The patient was able to gargle frequently with chloramine and to drink fluid.

On October 18th he was discharged to H.M.H.S. *Aquitania*. During this period the breath remained inoffensive and the tongue clean.

CASE III.

W. G. T. was wounded at Anzac by shrapnel on October 27th. Two days later he was received on board, and examined under an anaesthetic. He was found to have extensive flesh wounds of the right arm, and a compound fracture of the right lower jaw; all wounds were very septic and the breath fetid. The wounds were irrigated and dressed with hypochlorite, and a chloramine mouth wash ordered to be used every two hours.

On November 2nd, when the patient was discharged to hospital at Malta, the external jaw wound had cleaned up considerably, all surrounding inflammation had subsided, and only a slight purulent discharge remained; the mouth had become quite clean, and the breath inoffensive.

CASE IV.

T. G. was wounded at Suvla on November 8th. An operation was performed sixteen hours later for a penetrating rifle bullet wound; the entrance was at the right mastoid process, and the exit through left cheek; it had injured the base of the skull, the hard palate, and the left supramaxilla. The right ear was cleansed with hypochlorite and plugged with gauze. The wound of entrance, through which cerebro-spinal fluid was leaking, was cleansed and dressed, and a tube inserted through the exit wound into the palate. Daily dressing and hourly irrigation with chloramine was used.

On November 13th he was discharged to hospital at Alexandria, the wounds clean, and the mouth being inoffensive.

CASE V.

W. T. received on December 7th, near Salonika, a rifle bullet wound at the angle of the left lower jaw, causing compound fracture of jaw. There was no exit wound.

He was received on board this ship on December 14th; the wounds were very septic, the mouth foul, and the breath exceedingly offensive. There was much submaxillary swelling and adenitis. The external wound was treated with frequent hypochlorite dressings and the mouth with chloramine wash. The condition rapidly improved, the oral discharge decreased, and the submaxillary swelling subsided. On December 20th a bullet was detected lying on the right side deep to the floor of the mouth. It was extracted through a skin incision. The patient is now making a good recovery.

CASES VI AND VII.

The other two cases were both recent flesh wounds involving the buccal cavity, but not injuring bone. They both remained clean and healed in a few days.

The number of cases treated is small, but the results were so encouraging that a short account of this method may be of value. No such rapid and satisfactory results have followed the application of the antiseptics commonly in use.

COMBINED PREVENTIVE INOCULATION AGAINST TYPHOID AND PARATYPHOID FEVER AND BACILLARY DYSENTERY.

BY

J. PRATT JOHNSON, M.B.LOND., D.P.H. OXON.,

AND

A. J. MILNE, M.B., D.P.H.,

ASSISTANT MEDICAL OFFICER OF HEALTH, JOHANNESBURG.

(Preliminary Note.)

It has been shown by Widal, Sicard, Castellani, and others that the employment of mixed bacterial vaccines has a sound experimental and clinical basis, and marked success has followed the use of a mixed typhoid + paratyphoid A + paratyphoid B vaccine for preventive inoculation both in Europe and German South-West Africa.

We have made investigations into the possibility of amplifying the scope of preventive inoculation so as to afford protection not only against typhoid and the paratyphoid infections but also against bacillary dysentery. The intense toxicity of *B. dysenteriae*, especially in the Shiga strains, constitutes a serious difficulty in regard to the use of dysentery vaccine. In a short note published in the *BRITISH MEDICAL JOURNAL* of August 8th, 1914, Broughton-Alcock points out that this may be largely overcome by submitting the bacteria to a treatment with normal heated serum, and by employing this technique he was able to use doses of 350 and 700 million dysentery organisms in some 200 cases, producing reactions which were never marked nor inconveniencing. The reduction in the amount of local reaction is due to a non-specific action of the serum on the bacilli. Our method depends upon the use of a dysentery vaccine completely sensitized with a heated polyvalent dysentery serum. The vaccine is prepared from Shiga, Flexner, Kruse, Hiss, and Russell strains in equal proportions. In all some 150 inoculations were carried out among individuals kept under close observation for some fourteen days; 60 per cent. of these were actually engaged in heavy manual labour, which they carried on during the period of observation.

For the purposes of comparative observations and controls a small series of inoculations were carried out among hospital patients, who volunteered, with varying doses of untreated dysentery vaccine, both alone and mixed with typhoid + paratyphoid vaccine.

CONCLUSIONS.

1. Inoculations with untreated dysentery vaccine, either alone or combined with a typhoid + paratyphoid vaccine is not under any circumstances justified, owing to the severity and duration of the local reaction.

2. Complete sensitization of dysentery vaccine produces marked reduction in local reaction, and general reaction is very exceptional.

3. The use of a typhoid + paratyphoid vaccine, combined with sensitized dysentery vaccine, is a practical proposition from a military point of view, and can be employed in doses sufficiently large to produce a satisfactory immunity, while the local reaction is practically in all cases slight. Such a vaccine should contain in 1 c.cm. *B. typhosus*, *B. paratyphosus* A, and *B. paratyphosus* B 500 million in a ratio of 2, 1, 1 plus *B. dysenteriae* (sensitized) 250 million. A dose of 1 c.cm. is recommended as a first inoculation, followed by a second inoculation of the same amount after an interval of seven or eight days. A third inoculation may be made, but is not essential. It is important that the inoculations should be made in subcutaneous tissue over muscle. In our experience the pectoral region is convenient. In order to ensure accurate doses, a 1 c.cm. syringe with a moderately fine needle should be used.

4. *Agglutination Reactions.*—After one inoculation of a combined untreated vaccine specific agglutinins are found in the blood after an interval of nine to fourteen days for each of the four organisms present. Immunity is therefore rapidly produced, and it would appear that complete sensitization of the dysentery organisms not only reduces the local reaction, but produces a much more rapid and satisfactory immunization, owing to the more complete disintegration of the treated organisms and the absence of any mechanical obstruction (such as localized fibrosis) to the blood supply of the affected area.