atmosphere by this means are one cause of enteric fever in Dublin.

In every camp, also, there is, in spite of all possible efforts at removal, a certain amount of organic matter, largely the result of pollution by animals, which decomposes on or close to the surface of the soil, and, having dried in the sun, is distributed in the form of dust.

The remedy for these evils must vary with the circumstances of the case. Where military considerations permit of such a measure, frequent change of camping ground is naturally to be recommended, but the occasions on which this step is feasible must be most infrequent. The position of individual tents may, however, be readily altered, and this should be done as frequently as possible; the surface covered by a tent rapidly becomes foul, and, the temperature in the interior of the tent—in bell tents, at least—being higher, as a rule, than that of the surrounding atmosphere, must naturally tend to cause undesirable emanations from the soil. The aspirating influence of a blockhouse on the ground air would be greater than that of a tent, and danger to health would be proportionately increased. This defect, as far as blockhouses are concerned, could be remedied by some form of impermeable flooring. Such an arrangement would constitute something more than a theoretical advantage, as the soil pollution tending to occur inside these structures must exercise a marked influence on the health of the occupants.

When the necessary implements and labour are available, buckets may be substituted for trench latrines, and all refuse removed and buried at such a distance from camp as to render pollution of the soil a matter of no practical importance. When the above method cannot be carried out—and this will usually be the case—and sufficient space is available, latrines and refuse pits should be shallow in order to subject their contents rapidly to the influence of nitrification, and frequently filled in, in order not to overtax the agencies on which the process depends. The contents of latrine trenches and rubbish pits dug several feet deep are removed from the influence of those nitrifying agencies, which, it must be remembered, being aerobic, are to be found in the upper layers of the soil only. The conditions in such a case probably resemble those found in a septic tank, liquefaction of organic matter taking place under the influence of anaerobic organisms. Percolation under these circumstances would seriously endanger neighbouring water supplies. These disadvantages must, however, at times be overlooked, and under some circumstances need never be considered. In actual practice every method is found to have its disadvantages, and even with the greatest care and with unremitting attention all organic matter will, as already stated, be neither removed nor buried, as a certain amount—the result largely of faecal pollution by cattle—must under ordinary circumstances remain adherent to the surface of the soil.

Much may be done to minimize risk; but, having regard to the ordinary circumstances of warfare and to the present state of our knowledge, a certain degree of danger remains, which must be regarded as an unavoidable incident of active service in the field.

THE SUPPLY OF PURE WATER TO TROOPS IN THE FIELD.

By JAMES FERGUSON LEES, M.D.,

Late Medical Officer 1st Battalion the Connaught Rangers, South African Field Force.

OWING to the liability of filters to go wrong or break, as well as the immense labour necessary to produce a sufficient supply of pure water in this way, purification by filtration is unfitted for general use in the field. Chemical purification is also, *per se*, of little use, since the addition of any chemical agent in sufficient quantity to destroy infection would be inadmissible.

The most efficacious method of sterilizing water is undoubtedly by boiling, the main objection to this method being the length of time required for cooling before the water is fit to drink; but a constant supply of water, sterilized in this way and at any time available, might be attained by preparing each night in advance the water supply for the next day.

With this object in view, I have designed the water-cart shown in the accompanying diagrams.

On arrival at the final halting place for the night, the water-carts would be driven up to the source from which it was proposed to draw the following day's supply of water, and the settling tanks removed by a man on either side of

each cart catching hold by the lugs, G, and swinging the tank with its attached furnace over to the ground, using the hinge, K, as a fulcrum. When the tank is in position on the ground—as shown in dotted lines in Fig. 1—the hinge at K is open and the tank then loose from the cart.

Fig. 1.—Water-cart consisting of an iron tank B, the carrying tank, fixed on the body of the cart, provided with a tap, T, and covered by a lid, L, which should be bolted down, but at the same time easily removable, for occasionally cleansing the tank. Attached to the carrying tank is a semi-rotary hand-pump, C, with a suction-pipe S, and a discharge-pipe D. This pump is worked by the handle H, which fits over the square-head E. Outside and inverted over the carrying tank is another tank, A, called the settling tank, provided with a furnace, F, and hinged to the cart at K by an open hinge. Lugs, G, are attached to the settling tank on either side for lifting it.

The water-carts, with their carrying tanks full of pure water previously prepared at the last night's halting place, would then drive to their allotted positions in the camp, and from them the whole water supply for cooking and drinking would be drawn. In the meantime, the settling tanks would have been filled with water from the proposed source, fires lit in the furnaces, and the water in each boiled for half-an-hour.

Should the water be thick with suspended organic or mineral matter, alum (6 gr. to the gallon of water) should now be added to precipitate this. A previous addition of iron perchloride ($2\frac{1}{2}$ gr. to the gallon) may be necessary for this precipitation should there be no lime present in the water. The water should be left standing in the tanks all night to allow of it cooling and settling.

FIG. 2

FIG. 3

Fig. 2.—The water cart with the settling tank removed.

Fig. 3.—The settling tank on the ground. P, a pipe for drawing off the water fitted with a perforated rose, R, covered with an asbestos filtering cloth.

In the morning, by connecting the pipe, P, with the hand-pump at S by means of a flexible hose, the supernatant clear water in the settling tanks could be drawn off into the water-carts in a few minutes. The settling tanks would then be cleaned out and placed again in position over the carrying tanks.

By thus preparing each night a quantity sufficient for the next twenty-four hours, a supply of pure water which would be available at any time during the march or on arrival at

the final halting place might be obtained. With carrying tanks of a capacity of 20 cubic feet, each water-cart would contain 124 gallons, or about 11 cwt., of water, which ought to be sufficient to supply a company for twenty-four hours.

As regards the amount of fuel required to boil this quantity, since 1 lb. of wood contains 6,600 thermal units of heat, at a moderate computation, allowing for a loss of 65 per cent. of heat by radiation, etc., 35 per cent., equivalent to 2,310 thermal units, would be available for boiling; and taking the initial temperature of the water as 60° F., to raise the temperature of 124 gallons to boiling point would require about 82 lb. of wood. Allowing 30 lb. to keep it boiling for half an hour, we should require, roughly, about 1 cwt. of wood for each water-cart. One hour and a-half ought to be sufficient to bring the water "to the boil," and this would allow plenty of time during the night for cooling and settling.

Such a water-cart, complete and filled with water, would only weigh about 22 cwt. The settling tanks, considering the rough handling they would undergo, would require to be strong, but need not weigh more than 3 cwt., with furnace complete. Using the hinge at *K* as a fulcrum this weight could easily be manipulated by two men.

To carry out these arrangements a special staff would be advisable. One man to superintend each water-cart would be sufficient, and, allowing one cart to each company, this would make a water staff of eight men to each regiment. These men would be under the control of the regimental medical officer, whose duty it would be to see that the purification of the water was efficiently carried out, and who would be responsible for the water-carts being ready to start each morning at the appointed hour.

The carrying tanks ought to be thoroughly cleaned out periodically, as occasion offered, and the men's water-bottles placed in one of the settling tanks and sterilized by boiling. In South Africa, during the late war, each regiment was provided with three or four water-carts, which on the march accompanied the first line of transport. The water-carts, being thus massed together in one part of the column, were out of the reach of the great majority of the men, who, in consequence, were compelled to fill their water-bottles, when emptied, with water from any wayside pool or stream. This, under the present system, does not matter much, as the water-carts themselves are replenished from similar sources; but if these carts were filled with a supply of pure water for this to be of any use it would be necessary for them to be distributed along the line of march at such frequent intervals as would ensure a supply of sound water being within easy reach of any part of the column. This would, of course, entail an increase in the number of water-carts, of which I think, there should be at least one to each company.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

THE TREATMENT OF OCCIPITO-POSTERIOR PRESENTATIONS.

I CONSIDER occipito-posterior presentations are far more common than is generally believed. Most practitioners would, in a given difficult case, straightway apply one or other of the many varieties of forceps, and drag the fetal head through the pelvis. Hence many ruptured perineums, many lacerated cervixes, and other conditions, all of which make work for the gynaecologist.

The orthodox textbook treatment is to wait and see whether rotation takes place when the fetal head reaches the perineum. Exhaustion of the patient does not appear to be taken into account; and, further, rotation does not always take place.

The question of version might well, therefore, be considered, and I believe it preferable in all such cases when the procedure is practicable; delivery is expedited, and the fetal head presents the same diameters to the maternal pelvis as in normal occipito-anterior presentations. Consequently the risks to the maternal structures are minimized. I do not think the child is endangered, because the maternal passages are quite sufficiently dilated by delivery of the hips and shoulders. The most important point is bringing down the arms as soon as resistance is detected.

It might be objected that the introduction of the hand into the uterus is a dangerous proceeding, but it must be remem-

bered that the uterus is adequately protected from sepsis by the membranes, which separate that organ from the accoucheur's hand, and are expelled soon after delivery of the child.

I have adopted this treatment in occipito-posterior presentations for two years, with the happiest results, whilst previously I regarded the condition as a serious difficulty.

Wolverhampton. W. STANTON MERCER, M.R.C.S., L.R.C.P.

HEAT APOPLEXY.

THE paper in the BRITISH MEDICAL JOURNAL of September 20th, 1902, by Dr. Henderson, late of Shanghai, is of much interest to medical men in China. One very true point is the difficulty of diagnosing whether the hyperpyrexia is due to heat apoplexy or to malaria; but the treatment by lowering the temperature must be prompt, as one cannot wait for a blood examination. Coma due to malarial hyperpyrexia is more dangerous than heat apoplexy. Coma, that is to say, a purely heat apoplexy temperature, is less fatal than a lower temperature in coma from malarial hyperpyrexia. Heart failure is certainly the danger, especially in cases which remain unconscious for hours after the high temperature has been brought down, so that it would seem to be good treatment to strengthen the heart before it begins to fail. But there is an asphyxial type of case in which bleeding is urgently called for. The following case illustrates what seems a good method of treatment:

On August 22nd, 1902, I was called at 5 p.m. to Gunner M. The ward-master was tearing off his clothes, and said that the axillary temperature (after one minute of a 3-minute thermometer) was 109.8°. The patient was quite unconscious, with general muscular spasms. As he could not be taken into the open air (a most important point) he was carried as near the door as possible and placed under a punkah. The head and back of neck were rubbed with ice, and his body thoroughly sluiced down with ice-cold water. The temperature was thus rapidly brought down to 101°; the pulse was fair; but, warned by previous experience, I gave mv of liq. strychninae and mxx of tinct. digitalis hypodermically. Later on, as the pulse got weak, friction was made over the cardiac area, and a large sinapism then put over the heart. I am of opinion that this early attention to the heart had a large share in saving the patient. He remained unconscious till early next morning, and was then in a dazed condition. He was again washed down with iced water at 10 p.m. and at 3 a.m., as on each occasion his temperature had risen to 105°. He recovered, and is now at his duty.

In this station the evil influence of badly-ventilated rooms in bringing on hyperpyrexia is very marked, and the importance of treating such cases in the open air cannot be overestimated. It may, of course, be argued that strychnine may greatly increase the tendency to spasm; each case must be judged separately. I once had a case in India where no medicine had been used, and chloroform had to be administered to overcome the prolonged spasms of the respiratory muscles which threatened the patient's life. This, of course, was no case for strychnine.

Hong Kong.

S. F. CLARK,
Major R.A.M.C.

CONGENITAL OBLITERATION OF THE COLON.

I WISH to record a few details of this case on account of its rarity, and because I lately read an account of one somewhat similar in the BRITISH MEDICAL JOURNAL. The child (male) was born at the eighth month of fetal life, and appeared to be in very good health, and, so far as could be judged, had full use of all the organs. On the second day, however, it was noticed that all the faeces passed were very small in quantity, and consisted chiefly of a little discoloration of the napkin.

On examination per rectum, the little finger could only be passed in about 1½ in. to 2 in. Glycerine injection was given, with the result that a column of sebaceous matter was expelled nearly 5 in. long, without meconial colour or odour. Medicine was tried by the mouth, and the result was always sickness and vomiting, but no motion of the bowels. The vomit was decidedly faecal later, with a very foul smell. A distinct swelling was seen on the fifth day in the left hypogastric region, and notably no swelling in the situation of the descending colon. Then it was obvious that some developmental or physical obstruction was the cause of the trouble. The question of operative interference was considered, and a specialist called in, but this could not be supported with any hope of success on such a young infant. The child lived for three weeks and two days, gradually getting more and more emaciated. Occasionally it fastened to the breast and took nourishment, until sickness came on and all was ejected, when nourishment was again taken with the same result until death. A necropsy was generously allowed, when the condition diagnosed was found correct, the large intestine terminating in a balloon-shaped *cul-de-sac* at the