few showing a beaded appearance. The bacilli varied a good deal in length, forms longer than anthrax being common, and forms as short as *B. coli* were found. It did not form spores in glucose agar and died out in one week in that medium. In one culture (Major B.) capsules were stained; in the others they were apparently present but it was not possible to stain the actual capsule. The colonies were dense and opaque, and on McLeod’s plates made with blood glucose agar they showed a distinct hemolytic power. The organism is non-motile. It was possible by making use of the hemolysis to isolate the same microbe from two quite harmless wounds, one in the leg, the second in the thigh. One culture (Major B.) killed a guinea-pig in fifteen hours, the culture (Lieut. C. M.) made a pig very ill but it did not die; these were the only cultures injected into animals. There were a large number of cases presenting the same clinical picture in which it was not possible to do blood cultures to verify the diagnosis. From the very rapid onset of the symptoms it was probable that the infection of the blood stream is either at the time of injury or very soon after it.

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**A BRIEF ACCOUNT OF THE METHOD OF PROVIDING BATHS FOR THE BRITISH SOLDIER IN THE FIELD.**

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**Cleanliness,** as is well known to those who have been in the trenches, is a matter of the greatest difficulty under the present conditions. Men have to remain in the trenches without any opportunity of washing or changing their clothes. In consequence, they get covered with lice, chiefly *pediculi vestimenti.* These cause great irritation, and rob them of the few hours well-earned sleep when off duty. The lice inhabit chiefly the shirt, pants, and trousers, in which millions of eggs are laid in a very short space of time. To alleviate this, arrangements are now made throughout the British Army for the men to have baths and a change of underclothing as soon as they come out of the trenches.

The following is the method adopted by the —— Division:—

I will first give a description, together with a plan of the baths themselves, then the routine of bathing the men, and, lastly, the method I have devised, in conjunction with Captain Basil Hughes, of Bradford, for purifying and using the water over again an indefinite number of times.

As regards the building itself, a plan is subjoined. The canvas structure, with which I originally commenced, has now been replaced by a portable wooden building. This was kindly presented by the West Riding of York County Association through the instrumentality of Lord Scarborough and General Monds.
From the ground plan it will be seen that it consists of a large undressing-room, a bath-room with eight showers, the officers' shower bath, a large dressing-room, a room for soiled underclothing, a store-room for the issue of clean clothing, a boiler-room, and, lastly, an ironing-room for the purpose of destroying the eggs and lice in the khaki clothing.

The water is pumped by means of a little petrol engine into a 1,600-gallon tank, 24 feet high; thence it runs by gravity to the two connected tanks which feed the boilers, which are independent of one another. The water—hot, cold, or mixed hot and cold—feeds the eight sprays by gravity, sprays being used to economize water, since only 1½ to 2 gallons are required per man instead of six when using tubs.

Originally every drop of water had to be carried to the baths by means of a motor tank, holding 120 gallons, from a stream about 1½ miles away; as, for convenience of the troops, the baths had to be placed in a field some way from the nearest brook. Now, however, there are three
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sources—a shallow well, providing some 1,000 gallons a day; a storage tank, containing water brought from the stream and rain-water from the roof; and lastly, the concrete well, containing the purified used water. The process of purifying the used water I will describe later. These three sources are connected up to the motor pump. Thus any one may be used separately to supply the elevated storage tank.

The method employed for bathing the men is as follows: 2,000 men can be bathed per diem. The maximum in one day, so far, has been 2,050. The men are sent to the baths in batches of 50 to 75 every half hour, commencing at 8 a.m. and continuing until 12 noon; then again from 2 p.m. to 6 p.m. The men come to the baths without arms as a rule. Here they undo their puttees and boots, and take off their tunics. They then enter the undressing-room in batches of thirty-two, and undress. Their breeches are then handed into the ironing-room,
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where they are ironed in order to kill the lice and nits. The trousers are usually put through the Thresh disinfecter. The men, in batches of sixteen, then pass through to the sprays, handing in to the soiled clothes room their shirts, socks, and pants. Three minutes is the usual time allowed under the hot sprays, during which time they soap themselves all over, the last half minute being used to wash off all the soap. In the summer the last half minute consists of a cold shower. Thence they go into the dressing-room, being served out on the way with a clean shirt, a pair of pants, and a pair of socks. Meanwhile, an attendant has brought round their boots, tunics, and other belongings from the undressing-room to the dressing-room, placing them on a number corresponding with that from which they were taken, the numbers being painted on the tables. When dressed they leave by the exit door and form up outside, another batch of sixteen immediately following through in the same order. Thus it will be seen that the underclothes are pooled. These shirts and pants are put through the Thresh disinfecter in lots of eighty for twenty minutes to half an hour at a temperature of 216° F. Twenty minutes suffices if a bottle of formalin has been poured into the Thresh disinfecter. The clothes are sorted and the rags burnt. The following morning the rest of the clothes are conveyed in wagons to a distributing centre in a village eight miles away. This is the nearest available place where spring water abounds and where labour is obtainable away from the firing line. Here a responsible woman sorts and distributes the clothing to fifty washerwomen who boil, wash, dry, iron, and mend them, and then return them tied up in bundles of ten to the distributing centre. The same wagons, after being washed with cresol solution, return to the baths with loads of clean clothes, each batch of clothes being returned on the third day. Several thousand new shirts, pants, and socks are required monthly to replace wastage.

The last point of interest is the method of using the water over again. This is of the highest importance for two reasons: Firstly, clean water, or even water of any kind, is very scarce in this part of Belgium in summer. Secondly, it is highly objectionable to pour 2,000 to 4,000 gallons of soapy water into the ditch near the baths. If this were allowed, it would accumulate and decompose in the hot sun; since, owing to the flatness of the country, there are no possible means of draining it away.

The following method was devised by Captain Basil Hughes and myself after a number of experiments with a working model.

I give here a ground plan and a sectional plan of the method.

From these it will be seen that the soapy water runs from the bath-house into a mixing-tank. Slaked lime is placed in this tank, and thoroughly mixed by means of a windmill mixer, constructed from a couple of old bicycle wheels and a hop-pole. When the wind fails, the mixing must be done by hand; but this is hard work. The lime throws
Diagram showing Water Supply.
The Filter.
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down the soap as insoluble calcium stearates, bringing down at the same time all the dirt and impurities. The effluent runs through three up and down settling-tanks, placed all on the same level. These are built of brick with concrete floors. The partitions are removable wooden frames with canvas centres. The three settling-tanks are respectively 3, 4, and 5 feet wide. This gradual widening of the tanks tends to retard the flow of the stream, thereby assisting precipitation. All the calcium stearates will be found to have settled down in the first two tanks. The third tank is used for precipitating the lime and removing the soapy oils. This is effected by means of washing soda, which is run into the tank from a drum containing a saturated solution of sodium carbonate. This precipitates the calcium salts—chiefly hydroxides—as insoluble calcium carbonate, which immediately falls to the bottom of the tank. In addition to this, the sodium carbonate causes the soluble oils from the soap to separate out. These oils, which give the water an odour of soap, float on the surface, and are absorbed by means of canvas or sacking nailed on to wooden frames. The canvas is changed daily. From this third settling-tank the water flows into a charcoal filter, containing four inches of powdered charcoal between two layers of sacking. Through this filter it runs into a bricked, concreted well, and is pumped thence into the elevated tank by the petrol pump. Thin canvas screens, stretched on strong wire frames, are placed in the channels connecting the precipitating-tanks. These hold back the scum of lime which separates out on the water cooling. The first precipitation-tank is cleaned out every three or four days, and the mixing-tank daily. The sludge is buried. The sludge, which is odourless except for a slight smell of lime, does not show any tendency to decompose. The water, after treatment, is quite clear, free from dirt, soap, lime, and soapy oils; and furthermore, it gives a good lather with soap on being used again. The same water may be treated by this method and used an indefinite number of times. The only fresh water required is that to replace the loss caused by cleaning the tanks. No great quantity, however, is requisite, since most of the contents of each tank can be pumped into the succeeding one until the sediment is reached.

In experimenting with the working model, in order to ascertain the size of the charcoal filter required for dealing with 4,000 gallons a day, it was shown that the rate of flow through the filter varied directly as the height of the superimposed column of water. A charcoal filter six feet square was found to be adequate. This filter consists of a wooden frame six feet square and eighteen inches high, lined with zinc. The floor, made of zinc, is perforated with holes of medium size. The latter is covered with sacking, on which a layer of powdered charcoal four inches thick is spread. This is covered with sacking, which is changed and washed daily.
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A separate bath-room for officers, on the same principle, has now been added, and as many as thirty-five in one day have taken advantage of it.

The system I have described is characterized by its easy method of construction, its simplicity and mobility. It has now been working for several months, and its results have proved satisfactory in every way. I can strongly recommend this method as highly suitable where large numbers of men have to be dealt with, and more especially in these places where water is scarce.