A SYSTEM OF LATRINE CONSTRUCTION FOR DISPOSAL OF LATRINE CONTENTS BY INDIVIDUAL INCINERATION.

By Surgeon-General W. G. MacPherson, C.B., C.M.G., K.H.P.

Owing to the difficulties connected with the constant trenching of ground for latrine purposes in billeting areas, it became necessary to devise some method by which these difficulties could be satisfactorily overcome. Another consideration was the necessity of avoiding an extensive provision of ordnance receptacles for the construction of latrines on a removal system, and for diminishing as far as possible the danger of transmission of disease by the agency of flies.

The system which I finally determined to try during last summer was based on the shallow trench system, but substituting shallow trays for trenches, and individual incineration of excreta for individual covering of excreta with earth.

Empty biscuit tins or other suitable tins were cut in half to form two trays, as shown in the sketches, and an incinerator was made out of an empty cresol or paraffin drum, material which was generally thrown on to dump heaps or into refuse pits.

The general construction of a latrine with receptacles and incinerators of this nature is shown in the accompanying sketch plans.

The method of using a latrine of this construction is for the individual to use the latrine in the same manner as he uses a short shallow trench; and, immediately after use, to empty the contents of the tray receiving fecal matter into the incinerator, and of the tray receiving the urine into a urine absorption pit.

The advantages of the system are:

1. That the necessary material is constructed out of what would otherwise be waste produce of the army, and therefore costs nothing.

2. That each individual burns his own excreta and disposes of his own urine immediately after they are passed and without any other fuel.

3. That this process can go on continuously for an unlimited period of time on the same ground, and on an extremely small area of ground.

4. That it can be carried out anywhere without taking into
W. G. Macpherson

SYSTEM OF LATRINES OF BISCUIT TINS FOR INCINERATION OF EXCRETA.

a = Biscuit tin cut along dotted lines.
b and c = The two trays thus formed.
d and e = Method of placing the trays on the ground, as latrine receptacles.
f and g = Plan of trays placed as latrine receptacles with position of feet a-straddle.
In tray "g" a bed of straw or other dry combustible material.
l = Triangular piece of tin soldered on to tray to strengthen foot piece.

h = Plan of a latrine screened enclosure.
1. Trays in position.
2. Heaps of straw or other material for placing in trays as at "g."
3. An incinerator as "k."
4. A urine absorption pit or receptacle.

k = An incinerator of empty paraffin drum with perforated bottom, standing on bricks, and built in with puddled clay.
A System of Latrine Construction

consideration the nature of the soil on which the latrines are placed.

It differs therefore from the shallow trench system in so far that there is no process of extension of trench latrines continuously over a considerable area of ground, that questions of suitability of soil do not arise, that, as regards the disposal of excreta in a sanitary manner, there is no greater or more inconvenient work thrown upon the individual than in the shallow trench system, and that, while in both cases supervision is necessary, supervision is more easily carried out than in the shallow trench system.

The fact that flies appear to be completely absent from latrines of this nature is an important point, and one which I did not anticipate at the time this method was devised. It appeared to me, however, that, even if flies were attracted to latrines of this construction, there would be no opportunity for them to settle on excreta, because of the fact that the excreta were immediately incinerated.

The first trial of this system was entrusted to Lieutenant-Colonel L. P. Demetriadi, R.A.M.C. (T.F.), who with his staff and especially with his quartermaster, Lieutenant R. D. Matthews, R.A.M.C. (T.F.), displayed marked ingenuity and enthusiasm in adopting this system in his unit, at a time when much embarrassment was being felt in consequence of the constantly widening area of ground required for disposal of excreta on the shallow trench system.

It may be mentioned incidentally that the first experiment with such a system was almost certain to be a failure unless it was entrusted to a unit determined to make the underlying principle a success.

The result of the experiment has surpassed all expectations. It has now been on its trial for periods varying from one to four months in units where very large numbers have had to use these latrines; and in no case has it failed to meet all the requirements of a simple, immediate and efficacious means of disposing of excreta and urine.

The following extract from a report by Lieutenant-Colonel Demetriadi indicates the manner in which the system is being used by his unit, and the results of a prolonged experience and severe test:

"We have made a thin concrete bed for the tins to stand upon. This bed is about a yard wide from back to front, and made to accommodate the number of tins required, but it is only necessary to have a space of twelve inches between each set."
"The method of usage is as follows: Pieces of newspaper are placed in the rear tins, and each man does this before he leaves the latrines. When he has finished, he empties the urine out of the front tin into the urine pit, and generally takes hold of the four corners of the newspaper and places it and the contents into the incinerator. He then places a fresh piece of paper in the tin ready for the next user. Newspaper is generally easy to procure, but if not, grass, hay, straw, or old rags will do equally well.

"Being a clearing station, our patients are constantly changing, and we find it necessary to explain the working of the system to them. We have also affixed a notice board, giving instructions. During the three months of working here, I have only known one occasion when a tin was not emptied. At night I find it advisable to have a lamp burning.

"The attention required by a sanitary orderly is not great, and does not by any means take up a man's whole time, but there are certain things to be done daily. Every morning the tins are washed out with a solution of cresol and water (though it is seldom that they get soiled in any way), and the outsides gone over with an old lather brush dipped in equal parts of cresol, oil and water. The concrete platform is swept, and sprinkled with a little cresol. The incinerators, which are seldom out, are seen to. If the fire is extinguished, a few hot ashes are brought from the cook-house, and a handful of small coal used; though the only time we have to use coal is perhaps after a pouring wet night. We have a small table in the compound on which stands a bowl containing a solution of cresol, and a clean towel, renewed daily, for use when a man soils his hands. The orderly also sees that newspapers are cut to the required size, and hung on a nail close at hand, and a box for latrine paper is kept supplied. We have canvas screens round the place, and a canvas top was erected over the tins.

"The advantages of the system are: (1) Practically no cost. (2) No pollution of ground. The same ground may be used for years. If I had not adopted this system I should have been compelled to remove my camp on account of shortage of space. (3) Entire absence of flies at the latrines. They are practically nil in my camp; first, because no fecal matter is available, and secondly, flies do not like the heat and smoke from the incinerators.

"In conclusion, I wish to say I have used Surgeon-General Macpherson's system since the second week in July last with the most satisfactory results. It has never once failed and we have had as many as two thousand men here in one day. Many officers get
the impression that fecal matter will not burn, and have said so to me, but if these instructions are carried out it will be found that it will burn extremely well and the little ash that remains is as fine as flour. I believe the system to be perfect and shall certainly adopt it in any camp or unit of which I may have command. It is cheap, clean and sanitary, and most appreciated by the men.”

At two other units of the same size and importance as that of Lieut.-Colonel Demetriadi's which were established subsequently, the latrines have been constructed and used in the same manner and have given the same satisfaction.

I consider it essential, however, that any unit adopting this system should be determined to make it a success. If this attitude towards the system is adopted, success is assured and the system will be appreciated by all ranks, on account of its cleanliness and the small amount of trouble involved in disposing of latrine contents. Officers make use of individual incineration just as readily and willingly as others, and there is no difference between their latrines and those of non-commissioned officers and men in the units referred to.

One or two points of practical importance should be attended to:

(1) The incinerator should not, and need not, be larger than that provided by an empty ten-gallon or five-gallon paraffin drum. Good vent-holes must be made in it at the lower end; and it is best to surround it with clay or cement. Lieut.-Colonel Demetriadi's unit has constructed the incinerators according to the following description, which he has kindly given to me. (It should be understood that his description refers to the making, for the paraffin drum, a cement jacket, which, when set, is placed upright in position. The object of this jacket is to make the incinerator more lasting, as it was found that the clay puddled round the drum, as shown in the sketches, got cracked from the expansion of the drum by heat).

The following articles are required: A barrel (minus bottom) or built-up outer frame, two old paraffin tins (minus bottom), cement, sand or shale, and pieces of scrap iron. The paraffin tins form a model for the cement jacket—which should be about 4 in. thick—and consists of one part cement to five parts sand. When finished the incinerator should stand about 30 in. high, but as a paraffin tin is only 17 in. high it is necessary to place one tin end to end with the other. At the point where the tins join, and about 12 in. from the ground, some pieces of iron should be passed through so as to form a grid for the tin to rest.
upon when working. When the cement dries, the tins should be withdrawn, one up and the other down. It is now necessary to cut four oblong holes in the bottom of the cement jacket, front, back, and both sides, for draught purposes, the front hole being larger than the others so as to provide facilities for cleaning out. A bottomless paraffin tin is placed on the grid inside the jacket, but this must be cut from top to bottom and the diameter lessened slightly so that the heat will not cause the tin to expand to such a point that it will crack the cement jacket. Further, it is necessary when making the jacket to strengthen it with pieces of old iron or wood. When finished it should be whitewashed.”

It should be added that the cement jacket should be as thick at the top as the bottom, and not as shown in the sketch of the incinerator with jacket of puddled clay. Also the paraffin drum should project for an inch or two above the top of the jacket, to prevent the edges of the latter being chipped when the men empty the contents of their trays into the incinerator.

One incinerator of this type, according to Lieutenant-Colonel Demetriadi, proved sufficient for the excreta of 1,000 men in twenty-four hours during a period when his unit had to deal with a large number of men. As a rule one of these incinerators should be placed alongside every ten sets of trays.

(2) The urine absorption pit should be constructed in the same way as urine absorption pits are now constructed in cantonments in India; namely, by filling a pit of 4 ft. to 6 ft. deep and 4 ft. square with stones or cinder and covering over the top with sods, except where an empty biscuit tin, with perforated bottom, is placed to act as a funnel into which the urine is emptied.

(3) Both urine pits and incinerators should be close together and close to the latrine trays, as shown in the sketches. Otherwise the men will not take the trouble to use them properly.

(4) The material which has proved most satisfactory for placing in the tray receiving the excreta is a sheet of newspaper, but dry grass or straw are equally useful. In some cases sawdust and chaff have been used, but are not so satisfactory, because fecal matter is not so readily held up on a bed of either of these substances and is apt consequently to adhere to the trays.

(5) The advantage of having the trays placed together as shown in the sketch is that the back and front tray cannot be separated from one another, as is likely to be the case when two trays are placed together flat on the ground. The piece turned down to make the back tray rest obliquely on the ground should
be strengthened by soldering a triangular piece of tin to the angle. Otherwise this foot-piece is apt to bend forward in time. The edges of the trays should be turned over so as to take off their sharpness.

I am greatly indebted to Lieutenant-Colonel Demetriadi, Lieutenant Matthews, and the unit which the former commands, for the manner in which they have carried out all suggestions for establishing this latrine system, for many practical improvements, and for making the working of it so markedly successful that it is now becoming a well-known method of solving one of the most important problems of sanitation affecting an army in the field.