can meet the views of both schools to a great extent. By making our incision a simple puncture we are able to close the wound at once against infection because by the suction we can evacuate the abscess to such an extent that there need be oozing of pus out of the wound which is the means by which the abscess becomes infected when the large incision is used: the small puncture has time to seal itself and close before tension can again arise within the abscess cavity. Often tension does not occur again. If it does the process is repeated, a lesser quantity of pus being obtained on the second occasion. The amount of evacuation obtained is quite sufficient and should meet the requirements of the open method school. Of course, the deep parts under the deep fascia are not completely evacuated, but sufficient pus is obtained from them to relieve tension and to thereby help the process of repair. In this way I have apparently cured tubercular mediastinal abscesses, after evacuating three or four ounces of pus at two sittings with one week's interval. No mixed infection was seen at the site of puncture which was so healed that a fresh puncture had to be made to permit of the second evacuation. Such abscesses when treated by the open method are exceedingly dangerous and troublesome, requiring as they do at times the excision of ribs and scraping of bones. The first thing to strive for in the treatment of tubercular abscess is the prevention of mixed infection. In suction we have, I think, the best method of attaining this, whilst at the same time allowing us to do something useful for the patient.

I have cured some fistulas *in ano* without other operation than that of suction. As in the axilla, so about the hairy perineum, suction is exceedingly useful.

In conclusion, I may remark, that in the method of suction of abscesses we are indebted to Biers for one of the very greatest advances in surgery in recent times. It is a treatment which is applicable to the commonest of all surgical conditions, and which is a great improvement on all previous treatments. It has the great charms of speed, simplicity, and comparative painlessness. It is an invention which is like many other great inventions: it is so simple and efficacious that now that it is known to us, we wonder how it is that no one ever thought of it before.

SANITATION IN THE HILLS.

By L. REYNOLDS, M.B.,

CAPT., I.M.S.

FOR the last year as medical officer of the Lawrence Military Asylum, Sanawar, I have been engaged in trying to improve on the usual pattern of latrine and to find some method of disposing of the night-soil satisfactorily. The latrine as constructed in this country is far from perfect. The ideal latrine from a hygienic point of view would have no walls and no roof, nature's powerful germicide, the sun's rays, the cheapest disinfectant and one of the best, would have full play and ventilation would be perfect. Unfortunately the rains necessitate some form of shelter and our ideas of decency demand privacy.

In designing the latrine here described I have kept the following points in mind :—

1. The sun's rays must be brought to play upon the whole of the inside of the latrine for as many hours in the day as possible.
2. Ventilation must be amply provided for.
3. Rain must be kept out.
4. Privacy must be maintained.

The first thing to consider is the site, a most important point. Sometimes there is little choice but if possible the latrine should be placed on the khud side facing south, with a steep decline immediately in front. There are two great advantages in this. (1) The sun plays upon the latrine for a longer period in the day than it would if facing any other direction. (2) The screen in front of the latrine is reduced to a minimum and in exceptional cases may be dispensed with altogether. (In one latrine I have constructed the front screen consists of a wood paling only 3 ft. high and perfect privacy is maintained.)

Description of the Latrine.—The latrine is constructed of angle iron and corrugated iron sheeting and rests upon a floor paved with flag stones. For plan see figs. 1 and 2. The height

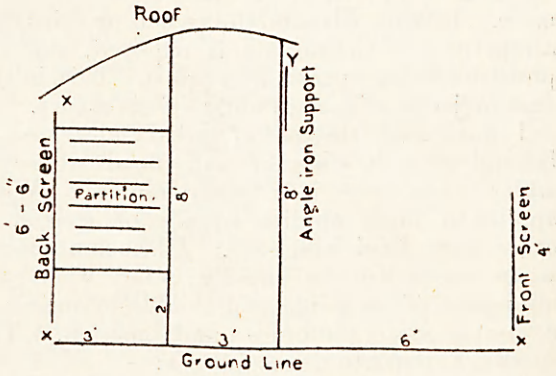


Fig. I Section of Laterine from before backwards
X = Spaces for ventilation.
Scale ⅕ to 1 ft Y = Canvas screen

of the front and side screens and the size of the openings for ventilation marked X depends entirely on the surroundings, the lower the screens and the wider the openings, the better provided that privacy is maintained and that the interior does not get wet in the rains. The partitions between the seats extend from 2 ft. above the ground to 5 ft. 6 ins. Note the absence of any door to the compartments and the wide opening between the roof and the front screen, allowing free entrance of sunlight and air. The

seats are round, bound at the edge with hoop iron and fit into a ring of angle iron supported on three legs of the same material. The pan of enamelled iron slides beneath the seat and is maintained in position by three iron slots. The wooden seat is easily removed for washing, etc., and the commode is not attached in any way to the ground. Height from floor to top of seat 12 ins., this allows ample room for full sized pan and is not too high. In the rains a canvas screen 18 ins. wide, eyeletted above and below at intervals of 18 ins., is hung from the roof by a

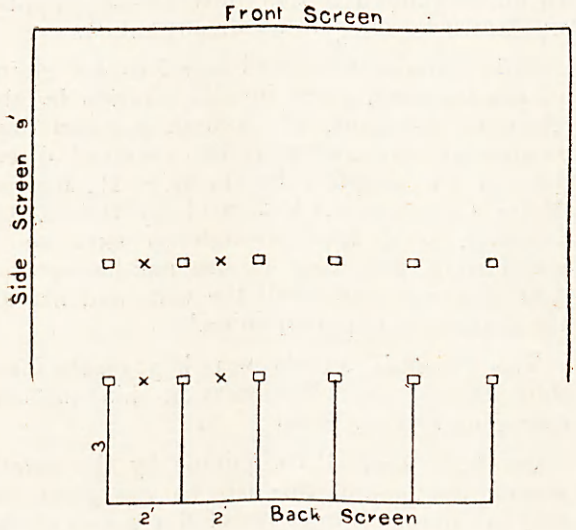


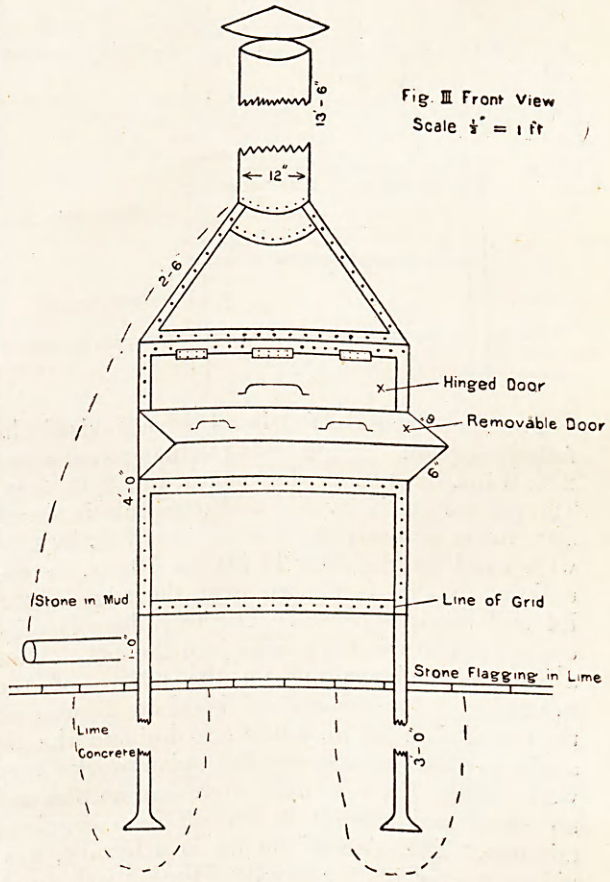
Fig. II Ground plan
x = angle iron supports to roof
Scale $\frac{1}{8}$" to 1 ft

series of hooks immediately in front of the uprights supporting the front of the roof, leaving a gap of 6 ins. above for ventilation (see Fig. 1). Between showers the screen is raised by hooking up the lower set of eyelets. This screen is used in the rains only.

A latrine of this type was erected eight months ago and has given entire satisfaction. Ventilation is perfect and the seats do not get wet in the heaviest rain.

Disposal of Excreta.—The trenching system is impossible in Sanawar on account of the nature of the ground and lack of space. Moreover, it seems that nitrifying organisms are singularly deficient in the soil of the hills and consequently excreta are broken down very slowly. At Dalhousie little change was found to have taken place after the trenches had been filled in for over a year. To overcome this difficulty incineration was adopted. The incinerator here described is the result of a year's experience. It is very satisfactory, costs nothing for fuel and very seldom gives rise to any unpleasant smell. One incinerator of this type is sufficient for the whole of Sanawar (pop. 800).

Description of Incinerator.—(Figs. 3 and 4.) The incinerator is made of $\frac{1}{4}$-in. sheet iron and 2-in. angle iron. It consists of a square chamber 4 ft. by 4 ft. joined by a truncated cone to a chimney 13 ft. 6 in. high (this height is necessary to get sufficient draft). The floor of the chamber is formed by a number of loose iron bars 1 in. by 2 ins. placed on edge, the ends, resting on a flange, are hammered out so as to leave an interval of 1 in. between the bars when in position. By this arrangement the grid is easily removed for cleaning purposes. There is a 1 ft. interval between the grid and the ground, which is paved with flagstones. The incinerator is supported by continuations of the angle iron with the ends beaten out. These extend 3 ft. below the surface and are embedded in concrete. On one side (see Fig. 4) there is a movable door just above the grid. This is held in position by a flange above and three loops and staples below. By removing this door the whole of the inside of the machine can be readily cleaned and the grid removed piecemeal. With the exception of the doors in front, the movable door at the side, and



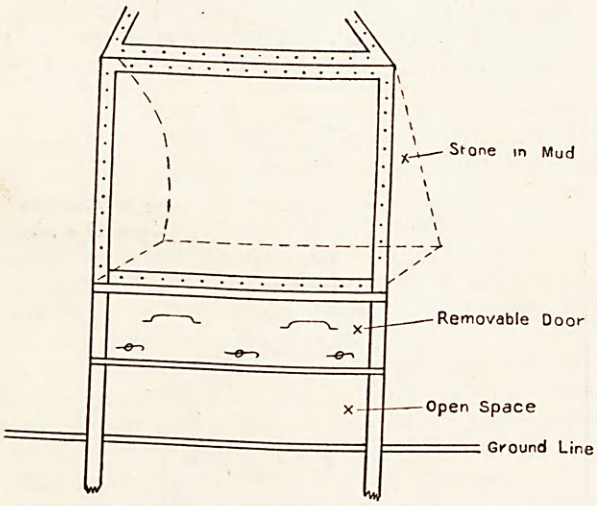
the open space in Fig. 4, the incinerator is covered from the base of the chimney to the ground with stone in mud (see Fig. 3) bound where necessary with strips of iron sheeting 3 ins. broad. To provide for sufficient draught a series of iron pipes, 3 ins. diameter, lead from the space below the grid through the mud crust to the exterior. This mud covering makes a considerable difference to the amount of heat which escapes by

radiation from the walls of the incinerator. To feed the incinerator the removable door is taken off (see Fig. 3) and the hinged door raised and hooken up (hook not shewn). Below the removable door there is a lip of iron sheeting slanting downwards towards the interior of the incinerator. Into the shoot thus formed the filth, etc., is thrown, layers of night-soil alternating with layers of rubbish.

All the solid matter and part of the liquid is disposed by this one incinerator. Cost of construction about Rs. 50. Cost of fuel nil; litter, rubbish and pine needles suffice.

This incinerator was constructed under the supervision of Mr. Cousins, the head clerk, to whom I am much indebted for valuable suggestions.

Fig. IV Side View



For the disposal of urine I have devised the following plan. A hole is dug in the ground about 2 ft. 6 ins. by 3 ft. at the mouth and 3 ft. deep. The pit mouth is levelled and over this is placed a lid made of corrugated sheet iron 3 ft. by 4 ft. with a sliding trap door 14 ins. by 10 ins. in the middle. Earth is heaped over the edge of the lid and stamped down. The trap door is only opened when urine is poured into the pit. After a few days depending on the nature of the ground and the amount of liquid to dispose of, the old pit is filled in, a new one dug and the lid again applied as above. This plan works very well. With little trouble there are no flies and no smell and the lid is applied in a couple of minutes. The size of the lid is arbitrary, providing it overlaps the mouth of the pit well on all sides.

THE SUBCUTANEOUS INJECTION OF QUININE IN MALARIA.

BY HUGH STOTT, M.B., B.S. (Lond.),

LIEUT., I.M.S.

AT the present day, when one hears so many undoubtedly competent men belittle the subcutaneous injection of quinine, in the treatment of malaria, it seems to me that the enclosed chart might prove of some interest to your readers.

The case was at its commencement diagnosed by Lieutenant-Colonel Burton, I.M.S., as typhoid fever. At an early date, however, he was apparently suspicious of a superadded malarial infection, for on the 19th March 1910 he placed the patient on quinine by the mouth grs. x twice daily—and this was continued until 12th April 1910, by which time the temperature chart shewed an undoubted tertian infection—apparently unaffected by the quinine already taken.

This quinine amounted in all to 480 grains of the sulphate, given in acid solution by the Hospital Assistant, who himself saw each dose swallowed—the salt used was obtained direct from a tin supplied by the M. S. D., Madras. Major Clements, R.A.M.C., Sanitary Officer, 9th Division, was kind enough to examine a specimen of the drug for me and he reported that 'this sample gives all the tests and has all the characters of pure quinine.'

The patient's bowels were kept on the loose side, during its administration his motions averaging two per diem.

On 12th April 1910, quinine by the mouth was omitted, and on this date he was given his first subcutaneous injection of five grains of the bisulphate of quinine. Following this, for five days he was given a daily injection of seven grains of the same salt. On the day of his sixth injection the temperature fell to normal and remained normal for 27 days, when he was discharged from hospital for six months' sick leave.

He did not complain of any pain as a result of the injection, nor did any lump or induration form.

I am inclined to think that, in this case, the orally administered for some unknown reason proved inoperative, and that the patient has much to thank the subcutaneous injection for.

His medical history sheet shewed no previous entry of malaria nor did the patient himself think he had ever been attacked before. His spleen was not enlarged and he did not display any severe symptoms nor signs of malignant infection.

Malarial parasites were looked for, but not found on 16th March 1910, and again, but after he had been given much quinine, on 11th April 1910. A differential count on the latter date shewed polymorphonuclear cells 85 per cent., large mononuclears 5 per cent., and small mononuclears, etc., 10 per cent.; but though our blood examinations failed, from the chart it is difficult to believe that the case in its latter days was not one of malarial infection.