STERILISER FOR INFECTED DISCHARGES.

By MAJOR H. A. CUMMINS.

Royal Army Medical Corps.

In South Africa, during the epidemic of enteric fever in our Army, having been placed in charge of hospitals in which numerous cases of this disease were treated, I felt the urgent necessity for the satisfactory disposal of infected matters. Under these conditions I was led to experiment in boiling all excreta and slops at once on removal from the wards.

I feared at first that a great nuisance would have been caused by so doing, but found that this was not the case, and that instead the matter after being heated for a few minutes lost the fecal odour; the only smell noticeable was that of ammonia from the urine. During the process of boiling a small quantity of Izal or carbolic acid covered any smell.

I gave the result of these observations in two papers published in the British Medical Journal in 1900 and 1901. Since my return from South Africa in 1901, I have been working on the subject, as I believed there were considerable possibilities in this connection, and have succeeded in designing an apparatus, made for me by Messrs. J. Defries and Sons, London, which can be placed in the annexe of any hospital ward.

It consists of a vessel (F) divided into two compartments, each provided with a siphon (EI), and enclosed in a hearth with a gas or coal fire, and a hood sloped to L, from which proceeds the flue, K. The siphons are connected to a common flow pipe (l) through a valve (CD). The upper and lower parts of the apparatus communicate by perforations in a flange connecting the vessel F with the body of the hearth, through which the products of combustion from the fire rise in a quick stream and so determine a draught which carries all vapours from F up the chimney. The utensils containing the excreta are emptied into one compartment of F, and are themselves placed in the other. An emulsion of crude carbolic acid or Izal (about ½ oz. to the gallon) may be used, which serves for the treatment of a number of charges, but of course is not a necessity. The con-
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tents of F are boiled, thus attaining a temperature at which the infection of typhoid fever is destroyed with certainty.

When it is desired to empty the vessel, the valve (CD) is thrown over to close one or other of the pipes B; water is allowed to flow down the pipe B through the valve A and out through valve J, and a siphon (EI) is thus started which empties the compartment of which the valve is left open.

Steam may be used for boiling where convenient, and the apparatus can be adapted for the treatment of the entire bath-water of an infectious hospital, or for use with latrines abroad.

For field purposes the vessels may be made detachable and nesting, the fire being lit in a trench in the usual way, thus providing a very portable appliance.

In practice the apparatus may be considered a "sterilising water-closet," as there is always a supply of boiling water ready for disinfecting purposes. Doubtless one feels at first prejudiced against the idea of boiling. At Netley, however, I observed the working of two of my sterilisers, one heated by gas in the annexe of the enteric fever ward, and the other in the open air, used for the dejecta of men suffering from bil-
Harzia, and heated by a coal and wood fire, but nothing offensive could be detected either by myself or by the attendants.

The former appliance acted as a powerful air extractor, owing to the exit flue-pipe discharging at the level of the foul air outlets of the sewers. When in ordinary w.c.'s a stool is emptied the odour pervades the annexe for a considerable time, and is most objectionable; but this does not occur in the above apparatus, as all the foul air is at once removed by the strong up-draught of the flue, and is dissipated high in the atmosphere.

Regarding the open-air steriliser, the dejecta of about twenty men, for whom the bucket system was in use, were treated daily for bilharzia. The faecal matter during the process of being emptied from the buckets into the steriliser had, as may be supposed, a most unpleasant smell; but during sterilisation there was no odour, as the vapours passed up the flue, and mixed with the smoke, &c., and were discharged high in the air. The sterilised matters when run off were practically odourless.

This boiling system gives one a fair idea of what might be done in a country like India, where latrines are liable to infection from ambulatory cases of typhoid, cholera and such like. An apparatus of small dimensions is capable of dealing with the contents of a latrine used by one or two hundred men, at the cost of about 28 or 30 lbs. of coal or wood daily.

Anyone who has met the ordure carts abroad knows what an odour comes from them. With this sterilising process no smell would be discovered, as the contents of the carts on the way to the place selected for disposal would previously have been rendered odourless, and in addition harmless. This method could easily be carried out in cholera camps, or in ordinary standing camps, as well as in cantonments.

I have found in practice that sentimental objections soon disappear when the apparatus is seen working, and the advantages to the nurses become apparent. The faecal matter need only remain in the chamber about ten minutes, when it can be run off and fresh water let in as in an ordinary w.c. A great advantage is that the dejecta, &c., of a large number of cases can be treated in a comparatively small apparatus. The bed-pans become clean after a few moments' scalding, and all crevices, got at with so much difficulty under ordinary cir-
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cumstances, are thoroughly purified; and there is no risk to the patient of burning by carbolic acid or other disinfectant in the event of neglect on the part of the attendant to wash thoroughly, as sometimes occurs when such chemical disinfectants are used.

A smaller apparatus, on the same principle, can be made for hospitals, for the sterilisation of sputum and spitting cups of tubercular cases.

The apparatus also provides for the sterilisation of slops, including infected bath-water, if necessary. This, in my opinion, is very essential, as the water used in washing patients suffering from scarlatina, enteric, small-pox, &c., is obviously infectious. The discharges in any other infectious diseases, such as cholera, plague, diphtheria, &c., can be dealt with on this principle.

I have been led, in the case of alvine and other discharges, to prefer hot wet sterilisation to either destruction by heat or to cold chemical disinfection, not merely by the experience which I have had of the apparatus described above, but by a consideration of what appear to me to be the conditions under which the several processes inevitably work. Not only by reason of the extreme infectivity which is liable to occur in liquid discharges, but also by reason of the usual consistency of the discharges in typhoid cases, it is practically indispensable to any scheme of heat destruction that, before the infected mass is burnt, it should be mixed with a sufficient quantity of sawdust or other combustible, to absorb most or all of the moisture. It is then necessary to empty this mass out into the destructor, and then one has left an infected surface which is not only larger than it was before treatment, but much drier and more capable of giving off its infection. It is not until this utensil has itself been thoroughly disinfected that any advance has been made towards reducing the danger from the infected stools; which, on the contrary, has been distinctly increased after each of the manipulations to which I have referred; and for the ultimate disinfection of the utensils in the absence of a heat method, recourse has to be had to chemical disinfection; in regard to which nothing is more clearly ascertained than that it is untrustworthy unless an intimate mixture is carefully made between the disinfectant and the mass to be disinfected, an operation which is repulsive and
dangerous in itself and extremely liable to be neglected. I also think that importance must be attached to the fact that the nearer the steriliser, whatever it may be, is to the patient the less is the danger of infection through splashing, and this distance can necessarily be cut down much more with a hot wet steriliser than with a destructor.

Seeing that oysters and other edible shell-fish can become infected in the tidal waters where they live, it seems very improbable that pathogenic organisms disappear or are crowded out by other microbes in sewers. Consequently it would be advantageous to have a thorough sterilisation of all matters passing into the drains, not only enteric excreta, but slops from patients suffering from any infectious distemper. This view is supported by the consideration that in matters of disinfection bis dat qui cito dat; and if it can practicably be done, it is far better for the discharges of the weaker who find their way into hospital to be disinfected as a matter of routine, than for a certain proportion of them to communicate infection to the drains, as well as to the privies, and to the staff, during a period of uncertain or missed diagnosis.

I am greatly indebted to the authorities at the War Office and those at the Royal Victoria Hospital, Netley, for having given me facilities for carrying out my experiments in this subject.