

closets proved completely unattractive to flies and that there was no nuisance from unpleasant smell. The only disadvantage found was that success depends to a large extent upon the degree of supervision of maintenance used.

SIMPLE MEANS FOR TESTING THE EFFICIENCY OF IMPROVISED DISINFECTORS AND DISINFESTORS.

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DISINFECTION and disinfestation by means of improvised apparatus can be surprisingly efficient, comparing favourably with the results obtained in manufactured machines.

In circumstances where it is necessary to use makeshift methods the usual facilities for testing, such as *témoine* tubes, commercial witnessing tubes, thermocouples, or registering thermometers, will not be available. Resort must therefore be made to improvised methods of testing.

DISINFESTORS.

The surface temperature of articles in a disinfestation chamber should be raised to 70° C. It is unnecessary to reach higher temperatures. Indeed, one of the disadvantages of improvised disinfestation chambers is that articles are liable to become scorched. Therefore a simple temperature indicator is of value both as regards a safe upper and lower limit.

Starch forms a gel at 68° C. but although pure starch may not be available in the field flour is a good substitute.

The method consists of mixing flour and water into a batter, the consistency of thin cream. A little of the batter is placed in a small glass tube and it should run freely on tilting. The tubes should be freshly prepared and used within a period of twenty-four hours. They should be shaken thoroughly immediately before being fixed to the clothing by means of thin wire.

Any small glass tube of the Durham type will do. It may be possible to obtain them from a mobile hygiene laboratory; if not, tubes that have held tablet medicines or the like should be used. An open glass tube cut in sections and sealed at one end by heat or other means suits admirably. It is unnecessary to close them while in the disinfesting chamber. After use the tubes should be cleaned out and used over again.

On heating, no change occurs until a temperature of 60° C. is reached. At 70° C. cooking takes place, the batter becoming solid and somewhat translucent. When this has happened it is unnecessary to go on raising the temperature. If several of the tubes have been distributed about the chamber on the clothing and all have "cooked," one can be confident that disinfestation has been effected.

It will perhaps be possible to put in some tubes, which can be withdrawn easily

from the chamber for observation at intervals, say after a contact period of perhaps twenty minutes has elapsed.

Prolonged heating at temperatures below 60° C. does not produce any change in the batter. At temperatures between 60° C. and 70° C. the time taken for "cooking" is greater than the time required to kill lice and their nits. For example, lice and nits are killed after an exposure to 60° C. dry heat for half an hour, but these conditions will not cause the batter to set.

DISINFECTORS.

In the case of improvised disinfectors there is downward displacement of air by current steam. The steam issuing from the outlet of the disinfecting chamber can itself be used as an indicator. When steam has issued at full bore for three minutes, disinfection should be complete in a current steam disinfector of good design.

Full bore steam means a strong jet from the vent, uniform in intensity, after all puffs (due to air being expelled) have ceased.

The condensation temperature of steam at about 100° C. is self-controlling and cannot, in such apparatus, be appreciably increased. Thus no harm can come to the usual fabrics disinfected in apparatus using current steam. But some check on the temperature reached throughout the mass of the material will be reassuring.

More use should be made of the potato which can be an accurate guide to temperatures of about 100° C. A potato will not cook at temperatures below 100° C. A slice of potato will have to be maintained at boiling-point for five minutes before it becomes mealy in appearance and for the skin to break away. At 100° C. a mealy ring begins to appear at the junction of the parenchyma and cortex at a depth of about a quarter inch below the skin. Disinfection will not be achieved until the potato is softened and the mealy ring appears.

When using a potato as an indicator of temperature, slices of about quarter inch in thickness are cut. These are distributed among the articles in the disinfecting chamber, particularly in spaces where it is suspected that disinfection may not take place, such as at the bottom corners of the chamber.

The physical agency of heat is used to kill, both in disinfection and disinfestation and, as might be expected, satisfactory indicators are to be found among substances of organic origin—even among the limited range that is available in the Field.

Ability to check the efficiency of the apparatus used, increases the operator's interest and confidence in his work—essential considerations if we are to ensure that the job is done thoroughly.

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