consuming, simpler and more sensitive than the standard chemical methods.

The criticisms of Dr R. J. Merrills and Dr K. R. Adam are acknowledged. The samples of urine were kindly supplied by the biochemical laboratory at Margate Hospital.

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Quick-drying sterile cabinet for culture plates[1]

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One of the most time-consuming processes in a busy bacteriology laboratory is the drying of agar culture plates after they are poured. This is usually done in ordinary incubators or ovens and a large load may take up to two hours to dry. I therefore tried drying plates in an oven equipped with a circulating fan, and with air ducts to allow dilution with fresh air (Gallenkamp OV 150 BS size 3). This speeded up drying enormously, but caused an unacceptable level of aerial contamination of the plates. Ultraviolet bactericidal units (Hanovia 06029 model 11 with 12-in. tubes) were therefore fitted to the back of the oven (Fig. 1) and a marked reduction in contamination was thereby achieved (Table I).

Only small loads could be dried satisfactorily in this oven and some plates were found at first inspection to be not completely dry and had to be replaced in the oven for a few minutes. This of course slowed up the process and increased the risk of contamination. Also, drips of condensate from the agar surface fouled the shelves, which had to be cleaned frequently.

A new cabinet (Figs. 2-3) was therefore designed with much larger air intakes and outlets and with longer UV tubes (Hanovia 06031, model 12, 24-in.). This allowed the shelves to be spaced far enough apart to minimize shadowing of air by the load or shelves. Air is admitted to the underfloor space via 11 1½-in. holes in the rear wall, and thence to the chamber by 36 ½-in. holes in the floor. Immediately above these holes are three 500-watt elements which heat the incoming air. They are controlled by an adjustable thermostat and by an over-temperature cut-out. Additional air is also admitted through two 1½-in. tubes beside the UV tubes. The air exits are six 1½-in. holes in the roof. A microswitch, operated by the door, is fitted to the UV transformer circuits so that both units are switched off by opening the door and on by closing it. A plate glass window is let into the door so that the UV tubes can be seen to be working. The UV transformers, fan, and heater are all separately controlled by switches on the front panel. Construction of the cabinet is in 20 SWG stainless steel. No thermal insulation is required. Heating up is very rapid (15 min.) due to the elements lying free in the chamber.

METHOD OF TESTING

Two ovens were tested, the Gallenkamp with 12-in. UV tubes and the special cabinet made by Messrs Laboratory and Thermal Equipment Ltd, which had

[1]All enquiries regarding purchase of this equipment should be addressed to Messrs Laboratory and Thermal Equipment Ltd, Greenfield near Oldham, from whom further details, including price, are available,

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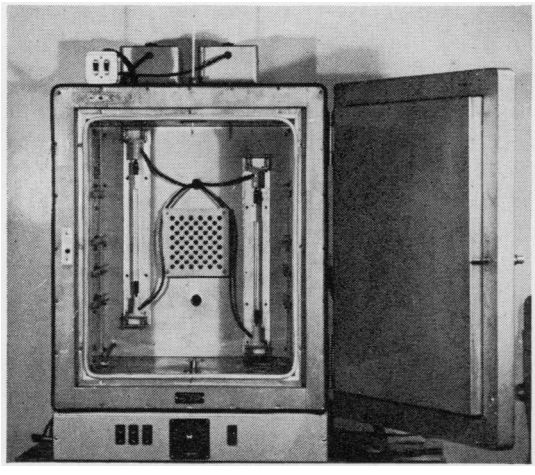


FIG. 1. *Gallenkamp oven with shelves removed, showing method of installation of UV tubes.*

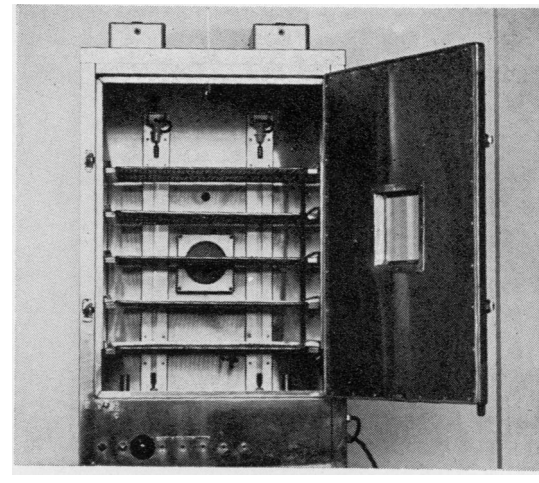


FIG. 2. *Special (L.T.E.) oven, showing shelves, UV tubes and transformers, fan casing, and window.*

24-in. tubes. The minimum time necessary for drying a normal load was first determined. Natural atmospheric contamination was used and plates exposed with and without UV radiation under the same conditions. To ensure reproducibility, each experiment was repeated three times.

In the case of the Gallenkamp oven four shelves were used, with a load of 40 plates (Fig. 1). This load was dried at the temperature and time selected, with UV tubes off. The fan was off during loading but was turned on two min or 10 min after loading. At the end of the drying period, the fan was switched off, the shelves were removed one by one and the plates inspected. Wet plates were replaced in the oven with fan on for three to five min and then removed. The shelves were replaced and the oven allowed to stabilize at the appropriate temperature range. A second load of plates was then treated in the same way except that the UV tubes were switched on during the process.

A third load of plates was dried simultaneously in an incubator of the same internal dimensions as the oven and with a similar arrangement of shelves. The same technique was used except that there was no fan or UV radiation and a longer time was required for drying. Control plates (undried) had sterile filter paper inserted into their lids. All plates were incubated at 37°C for 48 hours and the number of surface colonies read.

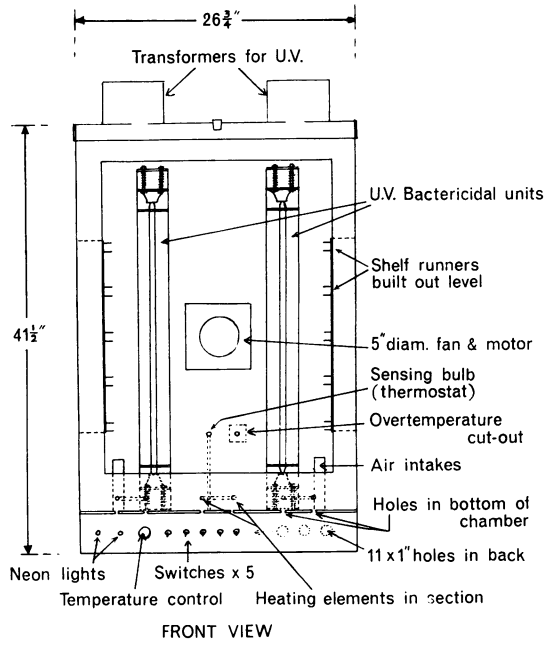
In testing the special LTE cabinet, which had five shelves, a full load of 120 plates was used. The technique otherwise was similar apart from the time of drying, which was much quicker, one minute being allowed before the fan was turned on, and 10 min with the fan on. Nutrient agar was used in these tests but blood agar and other types of culture media can be dried without damage.

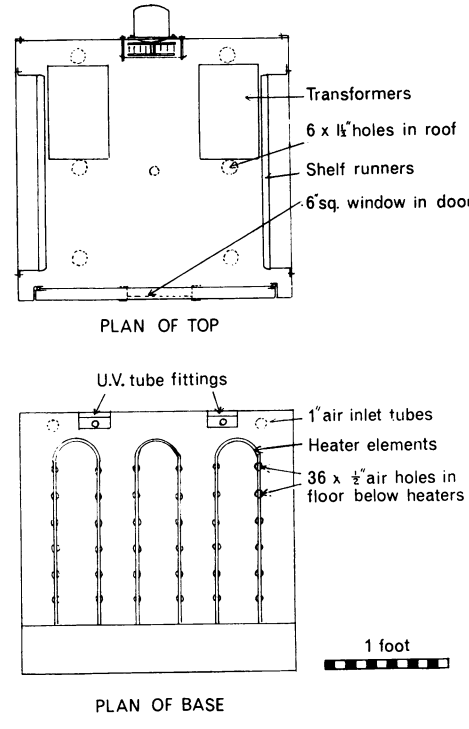
TABLE I

RESULTS OF TESTS ON GALLENKAMP OVEN WITH 12-IN. UV TUBES

Approximate Temperature (C)		*Contamination Rate (Total of Three Experiments at Each Temperature)*			*Filter Paper Controls (F.P.C.)*
		Gallenkamp Oven		*Incubator*	
		Ultraviolet Off	*Ultraviolet On*		
35°	Total	115/120[1]	59/120	86/120	32/120
	Total minus F.P.C.	83/120	27/120	54/120	0
	% reduction in drying contamination		67·5%		
45°	Total	86/120	11/120	45/120	17/117
	Total minus F.P.C.	68·6/120	0	27·6/120	0
	% reduction in drying contamination		100%		
55°	Total	63/120	18/118	67/120	14/80
	Total minus F.P.C.	42/120	0	46/120	0
	% reduction in drying contamination		100%		

[1]Numerator = no. of colonies after incubation. Denominator = no. of plates.
Duration of exposure at 35°C—10 min (fan off), 35 min (fan on). Incubator—120 min.
Duration of exposure at 45°C—2 min (fan off), 20 min (fan on), 5 min extra (wet plates). Incubator—75 min, 5 min extra (wet plates).
Duration of exposure at 55°C—2 min (fan off) 12 min (fan on), 3 min extra (wet plates). Incubator—15 min, 10 min extra (wet plates).





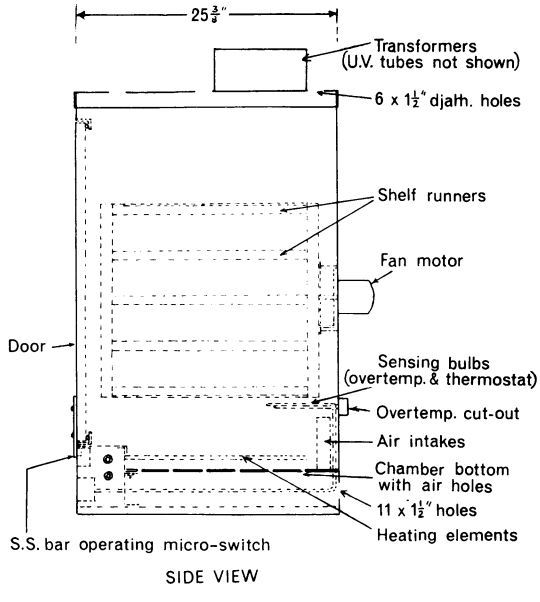


FIG. 3. *Drawings of special (L.T.E.) oven, showing front, side, and plan views.*

RESULTS

Table I shows that a marked reduction in contamination was effected by using UV radiation in the Gallenkamp oven. After subtracting the number of colonies estimated to be due to the pouring process (*ie*, filter paper control or F.P.C. level) a 67·5% reduction at 35°C, and a 100% reduction at 45°C and 55°C were found. Plates dried in the incubator at 35°C showed a level of contamination intermediate between the ultraviolet radiation-dried plates and those dried in the oven without ultraviolet radiation. At 55°C, incubator contamination was similar to that in the oven without ultraviolet radiation.

The temperature range chosen for testing the special Laboratory and Thermal Equipment cabinet (38-48°C) proved to be satisfactory both for speed of drying and for prevention of contamination, so other temperatures were not employed. Table II gives the results with this cabinet. After subtracting the filter paper control colonies, 96 colonies on the 359 plates dried without ultraviolet radiation were reduced to nine colonies on the 360 ultraviolet radiation plates, a reduction of 90·7% in drying contamination.

TABLE II

RESULTS OF TESTS ON SPECIAL (L.T.E.) CABINET WITH 24-IN. TUBES

Approximate Temperature (C)		*Contamination Rate for Three Experiments with L.T.E. Cabinet*		
		Ultra-violet Off	*Ultra-violet On*	*F.P.C.*
38-48°	Total	121/359	34/360	13/186
	Total minus F.P.C.	96/359	9/360	0
	% Reduction in drying contamination		90·7%	

Duration of exposure 1 min (fan off), 10 min (fan on), no extra time

SUMMARY

A new type of cabinet for drying culture plates is described, which dries 120 plates in 11 minutes with negligible contamination.

Acknowledgements are due to Mr Dobbin, senior technician, and other members of technical staff whose help was invaluable, and also the South Eastern Regional Hospital Board (Scotland) for grants enabling the work to be carried out.

A custom-built hospital blood bank

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The siting of the stored blood required for transfusion in a busy general hospital is most important. Observation has shown that many laboratories, torn between the need to provide easy accessibility by hospital staff and by laboratory staff, have been forced to site their blood bank in relatively inconvenient positions. The construction of a new wing of the John Bonnett Clinical Laboratories in 1959 allowed us to attempt a solution in ideal circumstances. This unit has now been working for eight years and has been found to provide a satisfactory solution to the problem. In an era when extensive laboratory building is contemplated our experience may be of value to those whose responsibility includes the blood bank.

The transfusion laboratory was sited on the ground floor leading off the main entrance hall of the laboratory wing, thus making it readily accessible to visiting hospital staff. The siting of a conventional blood bank refrigerator in the hall was discarded as, although this would have been of convenience to those collecting the cross-matched blood, the staff manning the transfusion laboratory would have been continually moving from the refrigerator to the transfusion room and back throughout the course of the day. It was therefore decided to build a specially designed refrigerator into the wall separating the transfusion laboratory from the main hall. The refrigerator was divided into two sections. One half was only accessible from within the laboratory; access to this half was through two doors (see illustration A), and its use was reserved for blood stored and not cross-matched. The other half of the refrigerator was again accessible from the laboratory side by two doors; in the top half of this section was installed a series of round trays pivoting on a central axis. This form of blood storage is common in Scandinavia. A modification introduced was that the trays were divided into compartments, each compartment having a number. Each tray rotated independently of the trays above or below. The lower part of this section of the refrigerator was left unshelved. This section could also be entered from the hall outside the laboratory through two duplicate doors see illustration B. The upper of these doors opened onto the rotating trays and as this was used by non-technical staff two perspex sheets were placed on either side of the opening leaving a gap of some eight inches in the centre to allow blood bottles to be removed. This was an attempt to reduce heat exchange when the door was left open. The lower part of this section, as previously stated, was unshelved and was designed for the reception of crates of blood from the Blood Transfusion Centre. Should the laboratory be

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