heater. This system is adequate for rooms with a capacity of up to about 16 m³ and for temperatures of up to 40°C.

Temperature recording is by a Cambridge recorder which is mounted externally and, over a period of over one year since the installation of the hot room, the internal temperature has remained constantly at the set temperature (37°C). Local temperature variations within the hot room have been observed but they are small (about $\pm 1^\circ\text{C}$) and individual areas maintain a constant temperature. Frequent and prolonged opening of the door does not result in more than minor variations in temperature and a very rapid return takes place.

Comment

The cost of construction of the complete hot room was about £310, a figure which is substantially lower than that which one would expect in quotations from most sources for an insulated heated room of the

same dimensions. It is also very much lower than the cost of individual incubators which could provide the same volume of heated space. The hot room can be dis-assembled very readily and modifications of size and shape could be made readily. It has been in service for over one year and has proved satisfactory in every way. We describe it in some detail as the component parts are readily available and as our solution may be helpful to other workers faced with the same problem of providing incubator space at low cost.

We are grateful to Murr Internal Constructions Ltd, 171-173 Worton Road, Isleworth, Middlesex, for the construction of the room, to Mr A. R. Taylor of Accuron Ltd, Cambridge, for advice on heating systems, and to Mr J. B. Anderson, FRICS, King's College Hospital, for much help. The expanded polystyrene panels were obtained from J. W. Roberts Ltd, Bolton, Lancs.

A simple device for counting Jerne's plates to detect haemolytic antibody-forming cells

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The plaque technique introduced by Jerne, Nordin, and Henry (1963) is a method which serves for the detection and enumeration, among lymphoid

cells, of those producing antibody of a given specificity. Dilute suspensions of lymphoid cells are plated in agar together with red cells. The cells which synthesize antibody against the red cells (or against other antigens previously attached to them) sensitize the surrounding red cells. When complement is added the antibody-red cell complexes lyse, leaving clear plaques.

We have developed a simple apparatus which greatly facilitates the counting of Jerne's plates. No benzidine staining of the plates is required. A diagram of the device is shown in Figure 1. A beam of parallel rays of light which hits a plate perpendicularly is diffused by the red cells incorporated in the agar: in the plaques, where the red cells are lysed, the light is

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Fig. 1 Diagram of the device, A Lamp (25 W); B Diaphragm supporting bone or ground glass ($\varnothing$ 5 mm); C₁ and C₂ Lenses: focal length about 18 cm ($\varnothing$ 10 cm); D plate; E Image of diaphragm hole; F Virtual image of the plate.

Diaphragm B is placed in the focal plane of the lens C₁; the eye of the observer in the focus E of lens C₂.

not diffused. Therefore when the plate is placed in D the light passing through the plaques entirely converges on the image E of the diaphragm hole B in the focal plane of the lens C₂. Placing the eye in E an enlarged virtual image of the plate is seen: the plaques appear very bright, sharply contrasting against a dark background (Fig. 2).

A second system of observation is possible: by slightly moving the eye sideways (from E to E₁) the virtual image of the plate is still visible but in this case it is formed only by the diffused rays and the plaques appear dark against a lighter background (as in the dark ground illumination of Fig. 2). This second reading system, which requires no manoeuvres but a slight movement of the head of the operator, may be very helpful in the recognition of bubbles or other imperfections that might masquerade as plaques in the overlay.

If a photographic record of the plate is wanted an objective can replace the eye in E and be diaphragmed so that its aperture coincides with the image of the hole of the diaphragm B: a real image of the virtual image F is obtained; the plaques appear bright. Placing a small screen before the objective so that the non-diffused light is excluded (in this case the objective must not be diaphragmed), only the diffused

Fig. 2 A Jerne's plate as seen from position E (top) and from position E₁ (bottom).

Group of plates	1	2	3	4
No. of plates in the group	9	10	6	5
Plaque numbers (range)	1-50	51-150	151-300	301-500
	a ¹	b ²	a	b
Observer A	17	17	114	108
B	19	18	118	113
C	22	21	118	112
Averages	19.3	18.6	116.6	111.0
a - b				
$\frac{a - b}{b} \times 100$	3.6	4.8	6.3	13.7

Table Results obtained in comparative reading of Jerne plates using the apparatus described or direct observation against the daylight

¹a Mean number of plaques counted with the aid of the apparatus

²b Mean number of plaques counted against the daylight

light gives the image and therefore the plaques appear dark.

The results of an experiment in which plates were read independently by three observers against the daylight, or with the aid of our apparatus, are given in the Table. It can be seen that numbers of plaques counted with the apparatus are consistently higher. The difference between numbers of plaques counted with the apparatus and numbers of plaques counted

against the daylight ranges between 3.6% for the plates with one to 50 plaques and 13.7% for the plates with 300 to 500 plaques.

Reference

Jerne, N. K., Nordin, A. A., and Henry, C. (1963). The agar plaque technique for recognizing antibody-producing cells. In *Cell-Bound Antibodies*, National Research Council Conference, edited by B. Amos and H. Koprowski, pp. 109-125. Wistar Institute Press, Philadelphia.