

A THERMOREGULATOR AND RELAY ASSEMBLY¹

STUDIES on longevity in *Drosophila melanogaster* necessitated the construction of an incubator² having a minimum temperature variation. For this reason, it was necessary to construct a temperature control assembly capable of functioning for several months without attention.

Fig. 1 shows the wiring of the incubator. The relay³

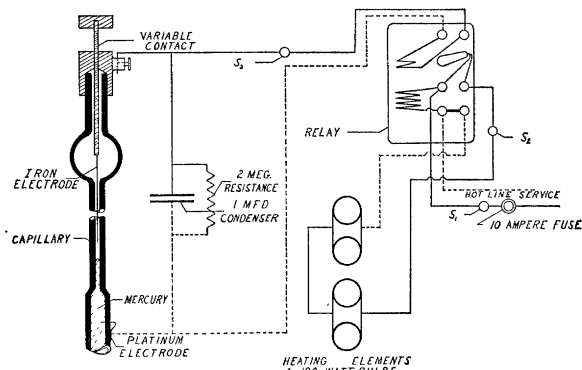


FIG. 1

employed was of the repulsion-transformer type having a "Mercoïd" contact. In this relay the "Mercoïd" element was reversed so that the load line contact would be broken when the pilot circuit was completed by the thermoregulator. The reversal was accomplished by removing the bottom adjusting screw and turning the contact element in its mounting.

By bridging the contact points of the thermoregulator with a one microfarad condenser, it was found possible to eliminate much of the spark caused by the "make" of the pilot circuit. It was found, however, that the charge stored on the condenser caused a fairly heavy spark on the "break" of the pilot circuit. A two megohm resistance was inserted as a shunt to dissipate the energy on the condenser. The resistance was high enough not to interfere with the storing of the charge on the condenser, but it allowed the charge to leak off during the time interval between the storing of the charge and the breaking of the contact. The heating elements were put in series, two-by-two, as recommended by Bridges. It was also thought best to protect the complete assembly through a 10-ampere fuse.

The thermoregulator first used was similar to that employed by Bridges. It was found, however, that a film was formed on the inner surface of the capillary after about one week of continuous operation. This threw out of adjustment the setting of the thermoregu-

lator by shorting the regular contact points. To prevent the film formation, 95 per cent. ethyl alcohol, as recommended by Powsner,⁴ was substituted for the toluene. This substitution aided, but after a time the film formed again. Analysis showed the film to be an amalgam of the silver from the variable contact. Since iron oxide does not form an amalgam, an iron wire was substituted for the silver electrode.

The temperature was checked every twelve hours during a continuous run of three months, and was found to vary less than $\pm 0.05^\circ \text{C}$. At the end of the experiment the thermoregulator was removed and the capillary examined. The only mark on the capillary was a faint black ring just above the contact end of the electrode.

DONALD GREIFF

MARQUETTE UNIVERSITY

⁴ L. Powsner, *Physiol. Zool.*, 8: 475, 1935.

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² C. B. Bridges, *Amer. Nat.*, 66: 250-265, 1932.

³ The relay is manufactured by The Mercoïd Corporation, Chicago, Illinois. The type number is V2-3A.