subject to elongation or other distortion. This type of scale should find many useful applications.

References

1. Neuberger, Hans. *Science*, 1948, **107**, 23.
2. Willis, H. A., and Philpotts, A. R. *Trans. Faraday Soc.*, 1945, **41**, 187.

Continuous Recording of Body Temperatures of Mice

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A record of the body temperature of experimental animals often yields significant information. The usual techniques of thermometry require frequent observations in order that a temperature change of short duration may not be missed. A technique which we have developed for the continuous recording of subcutaneous temperature in mice, using a sensitive recording thermocouple, is described below.[1]

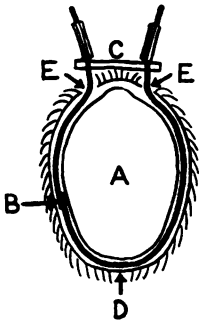

Fig. 1. Cross-section of mouse illustrating location of thermocouple: (A) body of mouse, (B) junction of thermocouple, (C) fiber collar, (D) incision over sternum, (E) incisions over scapulae.

With the mouse under ether anesthesia, three small longitudinal incisions are made: one over the sternum and two posteriorly over the midscapular regions. The thermocouple wire is passed into one of the posterior incisions and manipulated through the subcutaneous tissue to the anterior chest region and around to the other side so that it exits through the second posterior incision. The three incisions are closed by sutures, the thermocouple being left in the subcutaneous tissue of the anterior thoracic region with one wire passing beneath the skin around to the posterior thoracic region of each side (Fig. 1).

The wires are passed through a fiber yoke which is attached to the fur on the back of the animal with collodion. This serves to keep the wire leads from contact with each other. Small cylindrical glass beads, approximately ¼" long, are threaded onto each wire for a distance of about 5", thus providing adequate insulation for the wires and preventing tangling and breaking of the leads when the animal moves about. The beads are prevented from separating by knotting the wire after the last bead has been threaded (Fig. 2).

[1] Thirty-gauge iron Constantan enameled wires, silver soldered to form a thermocouple junction, were connected to a Leeds & Northrup Company Speedomax recorder.

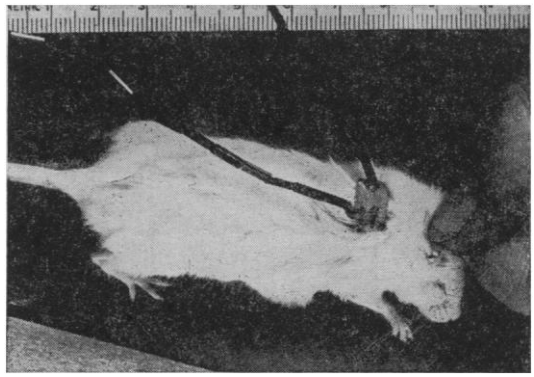

Fig. 2. Lateral view of mouse with thermocouple in place.

The animal is placed in a mason jar of suitable size with a wire mesh insert in the screw-top ring. The lead wires are led through short pieces of rubber tubing secured in this mesh and connected to the terminals of the recording device (Fig. 3). By the use of a Speedomax multiple-point recorder it is possible to record the temperatures of as many as 10 animals simultaneously.

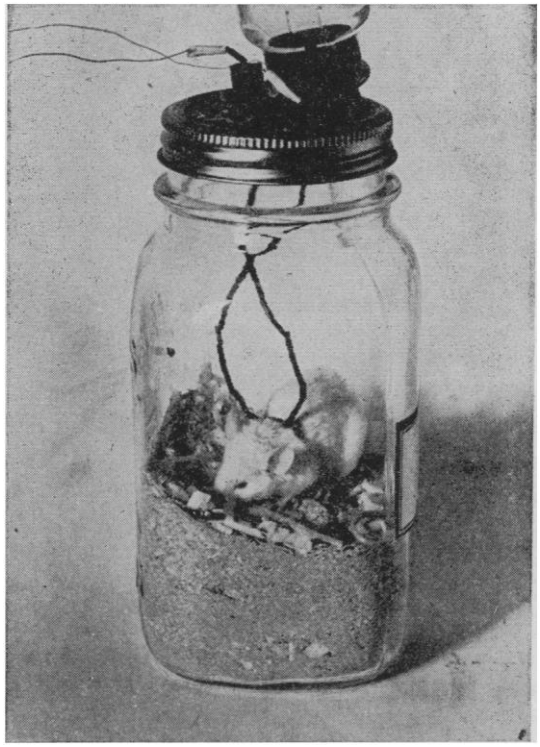

Fig. 3. Method of housing mouse when connected to recording thermocouple.

This method provides a means for the accurate recording of body temperatures of mice continuously over

periods of a week or longer (Fig. 4). Mice prepared in this manner are able to move about without apparent discomfort. It is not necessary to disconnect the thermo-

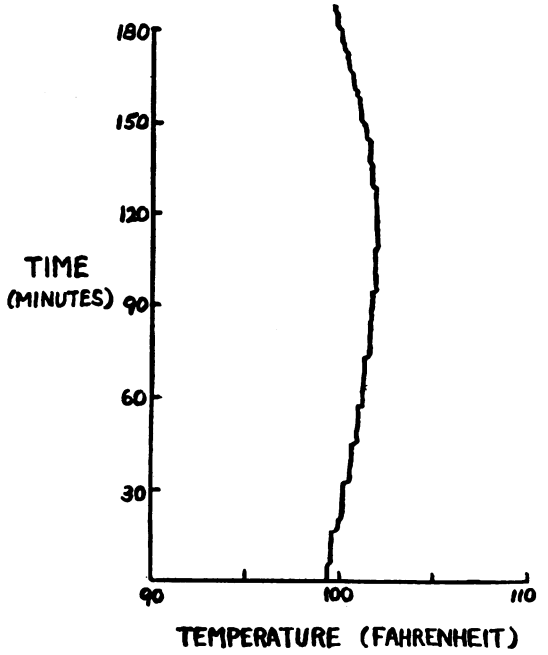

FIG. 4. Sample of temperature record.

couple to permit handling, feeding, or injection of the animals.

If, in the course of any particular experiment, the animal fails to show a variation in temperature, a pyrogen should be injected before disconnecting the apparatus. A prompt rise in temperature will demonstrate the fact that the apparatus would have recorded a temperature change had one occurred.

This technique is readily adaptable to other experimental animals and should prove of great value in work where temperature records are desired.

A Method of Securing Living Mosquitoes to Mounts in Studies of Problems Concerning Flight

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While investigating the effects of reduced atmospheric pressures on wing vibration in *Aëdes notoscriptus* (*Culicidae*), use was made of the stroboscopic technique developed by Williams and Chadwick (*1*). The apparatus was modeled on that of the above authors, and a full description of it will be found in their paper. Initial difficulty was encountered in suitably attaching mosquitoes to the necessary mounts without injuring them or interfering with the normal flying attitude. In the method of Williams and Chadwick the insect under examination is fastened to the free end of a narrow strip of paraffined paper, the tip of this mount being fused to the dorsal posterior part of the insect's abdomen. This technique, while satisfactory in dealing with relatively robust insects such as *Drosophila,* proved inadequate when applied to mosquitoes. The latter insects have a delicate articulation between the thorax and the slender abdomen. Thus, when they are attached to any form of mount by the abdomen, the anterior part of the body is unsupported and hangs downward. Any flight movements are sporadic and unnatural, as the normal flying attitude cannot be attained.

The solution seemed to lie in having the connection between mount and insect at the thorax rather than at the abdomen. A ventral attachment was rejected as undesirable, as it interfered with the response from the tarsal stimulus used in initiating flight movements. The obvious alternative, a dorsal attachment so placed as not to interfere with the flying attitude, was tried and found satisfactory. A mount of 36-gauge brass wire was so bent as to curve down onto the anterior part of the mesonotum of a mosquito, without entering the field of vibration of the wings or affecting the position assumed by the legs during flight (Fig. 1).

Before being fastened to the mount, a mosquito was lightly anesthetized by a brief exposure to ether. A minute quantity of quick-setting glue was placed on the tip of the curved wire, which was gently pressed against

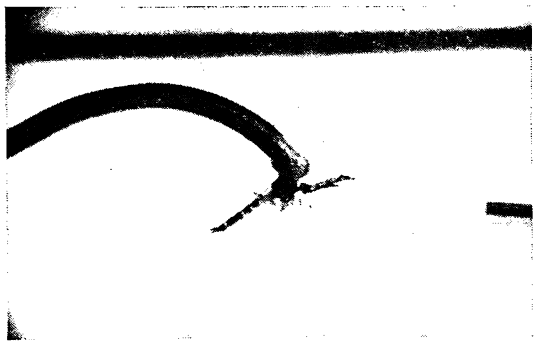

FIG. 1. *Aëdes notoscriptus* in flying attitude, while attached to mount.

the insect's mesonotum. By the time the mosquito had fully recovered and regained its ability to fly, the glue had set, fixing it firmly to the mount.

At the conclusion of a series of flight observations, an insect so mounted can be freed by sharply tapping the wire support. Ten mosquitoes, all 14 days old when attached to mounts, lived for periods ranging from 24 to 65 days after being returned to their feeding tubes. Their ages at death averaged 65 days. As the average life of 10 control insects was 71 days, no significant reduction of life-span resulted from the use of the mounting technique.

Reference

1. WILLIAMS, C. M., and CHADWICK, L. E. *Science,* 1943, 98, 522–524.