funde konnten nun auch für *Drosophila melanogaster* erhoben werden. Wenn die Fußstummel-Sinnesorgane mit Vaseline überdeckt werden, kann die Larve keine Feuchtigkeitsdifferenzen von weniger als 50% wahrnehmen. Hingegen nimmt die Larve noch sehr grosse Unterschiede wie 100% zu 33, bzw. 18% wahr. Wird das Hinterende von Drosophilalarven auch noch mit Vaseline überstrichen, so nimmt die Larve keine Feuchtigkeitsunterschiede mehr wahr. Für die Wahrnehmung von extremer Trockenheit, bei abgedeckten Fußstummel-Sinnesorganen scheinen die sogenannten Fleischzapfenorgane am Hinterende der Tiere (HEEGER[4]) verantwortlich zu sein. Aus den oben angeführten Gründen möchten wir bei den Fußstummel-Sinnesorganen von Trokkenheitsrezeptoren sprechen.

G. BENZ

Zoologisches vergleichend-anatomisches Institut der Universität Zürich, den 25. April 1956.

Summary

Larvae of *Drosophila melanogaster* perceive very small differences of relative humidity if the humidity is high, whereas the perceptible differences are relatively large in dry air. The sense organs for these perceptions are the so-called tufted organs on the ventral side of the thoracic segments. From the fact that the threshold of sensation is high in dry air, we conclude that the absence of humidity irritates the sense organs. We think, therefore, that they are aridity receptors.

[4] E. HEEGER, Sitz.-Ber. Kais. Akad. Wiss. math.-nat. Kl. *31* (1858).

Advantages Given by P^{33}–or Aged P^{32}–in Autoradiography

In earlier experiments[1], we have seen that P^{33} gives a higher yield than P^{32} if exposed to nuclear emulsions whose thickness contains entirely the terminals of the beta tracks of P^{33} and not all those of P^{32}.

It appeared interesting to see whether P^{33} could present advantages in autoradiography, although the X-ray films are far from being thick enough to contain entirely the tracks of P^{33}. Experiments were therefore made to see whether, in the case of diffused incidence, samples of aged P^{32} containing 50% P^{33} could give a satisfactory response in comparison with the samples of freshly prepared P^{32}.

22 couples of specimens were prepared using material from Harwell. The solutions were diffused in discs of gelatine from Kodak Scientific plates fixed, about 15μ thick, which could fairly simulate soft tissues; 18 of these couples were applied to a glass support and 4 at bottom of a very low aluminum dish.

Care was taken to avoid errors owing to different self-absorption conditions; therefore the much more active P^{32} solution was diluted with an inactive solution of sodium phosphate in order to use, for the samples to be compared in each experiment, not only equal activities in identical geometrical conditions, but also equal amounts of solution of equal concentration.

[1] JANE MAYR, Experientia *11*, 21 (1955).

The activities, which varied from 0·19 to 0·48 mμc were measured with a gas-flowing counter: the precision degree – depending upon the activity over background – was of 2–3%.

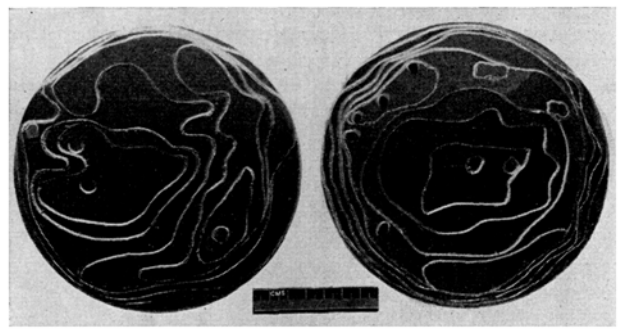


Fig. 1.

Each couple of tests was then exposed for the same time to a "Ilford X-ray" film, 11 μ thick (16 couples to a simple coated and 6 to a double coated).

After development, a first rough comparison of the dark images was made by means of a densitometer, considering only the couples showing sufficient uniform dark images: in these cases about 30–50 regions of each image were examined. They showed approximately the same values of "*D*" (with a deviation not exceeding 8%). The behaviour of double coated films was like that of the simple coated ones.

In order to give precise data and a visible demonstration, we have chosen a couple of film dark regions (corresponding respectively to tests of P^{32} and of mixture P^{32}–P^{33}), have determined with a microdensitometer the densities along lines 1 mm distant from each other, and have calibrated the instrumental data with an "Ilford wedge" so that precise values of density could be known. On the basis of these data, we have been able to draw isodensity curves on discs having a diameter 10 times greater (Fig. 1), to prepare the plastics considering that each value of $D=0{\cdot}05$ should be represented by the thickness of a card board foil (Fig. 2) and to weigh the two plastics.

Fig. 2.

The weight of these two plastics was 411 g (for the one corresponding to the mixture test) and 420 g (for the one corresponding to the P^{32} test); thus, since the background is in each case 300 g, it appears that the difference between the two samples was about 8%.

Furthermore, a grain count was made using a microscope with a magnification of 100 × 8·5 and considering for each image 50–70 reticle fields of 144 μ^2. The grain yield was respectively for the mixture and for the P^{32} of 1·1 $\pm$ 0·3 and of 1·2 $\pm$ 0·3 grains developed per incident electron; probably backscattering and cross fire diminish the difference between the two samples.

At any rate it can be stated that the aged phosphorus containing 50% P^{33} gives quite a satisfactory response in comparison with P^{32} alone, and that, for autoradiography – as long as the experiments refer to the usual radiographic procedure in which the specimen is transparent and presents very little self-absorption – P^{33} (or also aged P^{32}) is preferable to pure P^{32} because the "reps" delivered are considerably less that for P^{32}.

This conclusion may be useful in all those types of investigation in which the dosage rate from the same activity of P^{32} would produce radiation damage[2].

I wish to thank Prof. J. S. MITCHELL for having suggested the consideration of P^{33}, for his valuable advice and for having given me hospitality in the Department of Radiotherapeutics of the University of Cambridge, where this research was carried on.

JANE MAYR

Department of Radiotherapeutics, University of Cambridge, March 26, 1956.

Riassunto

Si è sperimentalmente dimostrato che il vecchio radiofosforo contenente il 50% di P^{33} è preferibile al comune radiofosforo P^{32} perchè, a pari attività, presenta effetto fotografico pressocchè eguale e dosaggio meno dannoso.

[2] L. F. LAMERTON and E. HARRIS, J. photogr. Sci. *2*, 135 (1954).

Changes in Muscle Circulation Elicited by Local Heating of Hypothalamus

BARCROFT *et al.*[1] recently demonstrated vaso-motor changes in the muscle of man from changes in environmental temperature. A decrease in muscle blood-flow of about 55% was obtained by warming the subjects. The results of REIN and SCHNEIDER[2], formerly criticized by many authors[1], have thus been confirmed. No evidence is, however, given as to whether the effects are elicited from skin receptors, from hypothalamic thermosensitive structures, from baroceptive influences compensating the vaso-motor reactions in the skin, or from changes in skeletal muscle tone, which is well known to be important for heat production. Recently VON EULER and SÖDERBERG[3] found that local heating of hypothalamus caused a marked decrease in gamma motor activity (tested on muscle spindle afferents by the usual method[4] even without measurable changes in muscle tension. The aim of the present investigation therefore was to see whether hypothalamic heating would influence muscle blood-flow without any changes in muscular tone. The importance of muscle tension was also studied since it is reasonable to assume from DENNY-BROWN's work[5], that vaso-motor effects may be reflexly elicited by stretch.

In nembutalized cats, local heating of hypothalamus was produced by high frequency alternating current (1 megacycle per s). At the tip of one of the heating electrodes, a thin enamelled advance wire was soldered to form one part of a thermocouple by which the maximal temperature induced by the current could be recorded[2].

The femur was immobilized, the gastrocnemius muscle dissected free from surrounding tissues and covered with warm paraffin. The Achilles tendon was cut and attached to a sensitive strain gauge. Heparin was given and the popliteal vein cannulated. Ligations were made so that the blood from the canula came from the gastrocnemius muscle only. The blood drops from the free end of the canula were counted electrically, the

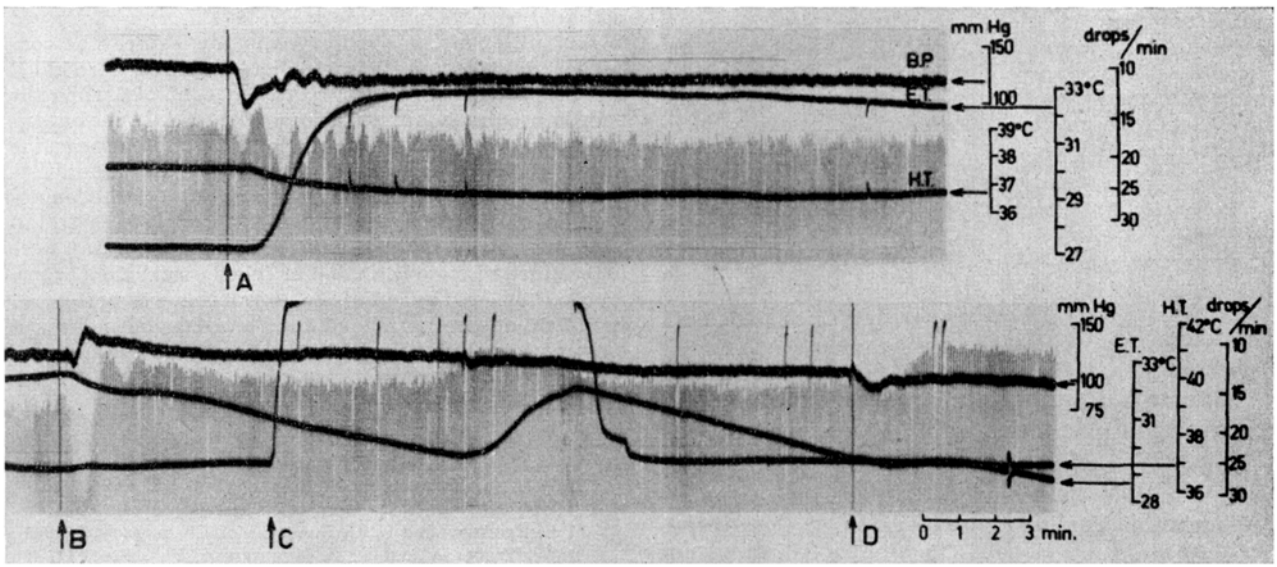
[1] H. BARCROFT, K. D. BOCK, H. HENSEL, and A. H. KITCHIN, Pflüger's Arch. ges. Physiol. *261*, 199 (1955).

[2] H. REIN and D. SCHNEIDER, Z. Biol. *91*, 13 (1930).

[3] C. VON EULER and U. SÖDERBERG, Exper. *12*, 278 (1956).

[4] R. GRANIT and B. R. KAADA, Acta physiol. scand. *27*, 130 (1952).

[5] D. DENNY-BROWN, Proc. roy. Soc. [B] *104*, 252 (1929).



Cat, 2·5 kg. "Nembutal" (40 mg/kg). *BP* Blood pressure from femoral artery. *ET* Ear skin temperature (thermo-couple on right ear). *HT* Hypothalamic temperature as described in the text. *Vertical lines*: Blood-flow from the gastrocnemius muscle. Each drop of blood from the muscle vein rapidly carries spot of mirror galvanometer to base of Figure, from which it returns at slower speed so that a steeply rising line is recorded. The length of these lines is directly proportional to time-interval between drops. By joining the upper end of the lines, one obtains inverted tracings of blood-flow, *cf.* calibration on the right. *A* 25 mg "Nembutal" intravenously. *B* 5 µg adrenaline intravenously. *C* Hypothalamic heating. *D* 2·5 mg chlorpromazine intravenously. Note slight decrease in muscle flow 2 min after the beginning of hypothalamic heating, coincident with vasodilatation in the skin (increased ear skin temperature).