nitrogen was assessed. In future work of that type it is probable that an organic compound such as asparagine could with advantage be provided as the source of nitrogen for the standard plants.

The above experimental work was carried out while one of us (J. T. V.) was holding a British Council scholarship.

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Body-Temperature of Small Insect Larvæ

LABORATORY experiments carried out in the autumn of 1950 appear to support remarks made by Dr. D. A. Parry[1], to the effect that on general grounds he considers that various physical factors play a greater part than biological ones in determining the body-temperatures of small poikilothermal animals.

Using apparatus in which air temperature and rate of flow could be held constant, the variation of the air saturation deficiency (in the absence of radiant heat) produced considerable fluctuations in the internal body-temperatures of lepidopterous and hymenopterous larvæ. In the case of smooth-skinned larvæ of *Tenthredopsis litterata* Geoffr. (Hymen. Tenthredinoidea), the divergence of body-temperature with respect to air-temperature at the time of humidity change (graph 1) will be noted to resemble closely the fluctuation in the internal temperature of a piece of clay of similar size and shape when the latter is submitted to comparable environmental changes (graph 2). The divergence is therefore ascribed largely to evaporation and condensation at the outer surface
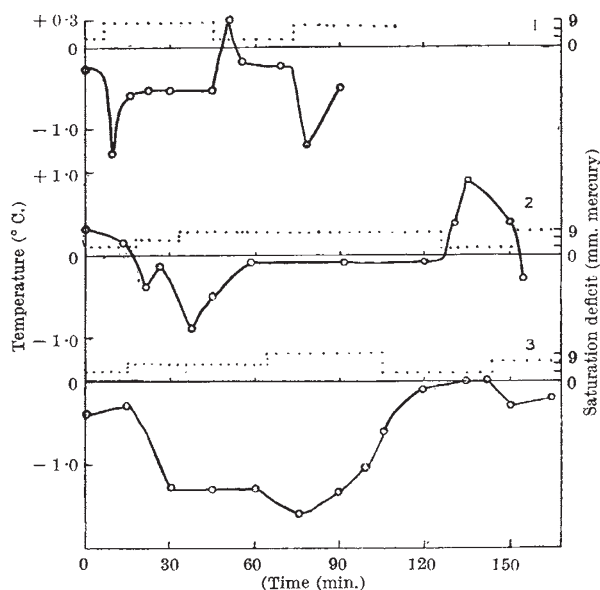
Graph 1. Internal body-temperature variation of *T. litterata* Geoffr. (weight 0·06 gm.)
Graph 2. Internal temperature of a piece of clay
Graph 3. Internal body-temperature of *M. rubi* (weight 2·5 gm.)
Solid curves : internal temperature-difference of larva or clay with respect to an air temperature of 20° C. Dotted lines : saturation deficiency of air in mm. of mercury

of the larval integument, rather than to a mechanism involving gain or loss of internal fluids. This latter process can scarcely be the means in the case of the clay model ; nor is it clear, in the case of the larva, that gain of internal water can occur quickly enough to produce the abrupt rise in temperature. This interpretation is emphasized by a comparison of the curves at such times as the environmental conditions were steady, when the clay is seen to return almost to air-temperature, whereas the larval temperature is depressed slightly below this level, presumably due to the thermal effects resulting from the loss of internal body-fluids not present in the model.

Thus while the depression of larval body-temperature below that of the surrounding atmosphere may be at all times in part due to the loss of internal fluids, the major portion of the effect at moments of humidity change is the result of surface phenomena.

Further information with regard to surface evaporation and condensation is provided by an experiment with a 2·5-gm. caterpillar of the fox moth (*Macrothylacia rubi*). The integument of this larva is densely setose and presumably capable of harbouring more moisture than that of a smooth-skinned form. For this reason an extended period of body-temperature depression due to the evaporation of surface moisture might be expected to follow atmospheric humidity change. Reference to graph 3 shows such a state of affairs to exist and a considerable depression to be maintained for some time, after which a slow return to a temperature approaching that of the air might be interpreted as due to the conductive heating effects of the surrounding atmosphere. Had this extended depression been due solely to a loss of internal fluid, which was finally almost completely exhausted, this animal might have been expected to show signs of desiccation ; this was not the case. Furthermore, a return to conditions of evaporation, after a period in a moist atmosphere, resulted in a small but steady depression of body-temperature, denoting a continuous loss of fluid, which might be expected if now only internal fluid were being evaporated via some restricted aperture or region. This reinforces the suggestion that the initial extended depression was due mostly to loss of external surface moisture, which was finally almost completely exhausted, so that a short intervening period in a humid atmosphere was insufficient to restore its abundance.

Further details of this work and the methods involved, together with evidence of the importance of considering (*a*) the previous history of insects with regard to surface moisture, and (*b*) the nature and proximity of surfaces on which they may be supported, when making body-temperature observations, will be published elsewhere.

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Structure of Synthetic Polypeptides and Proteins

IN a recent series of papers, Pauling, Corey and Branson[1] and Pauling and Corey[2a-g] have proposed structures for synthetic polypeptides and proteins based on helical configurations of the molecules, and have claimed that these account for the X-ray results of Bamford, Hanby and Happey[3] on the polypeptides,