lowered threshold) and this may be an example of what Kennedy and Booth[2] have called "antagonistic induction". It is possible to interpret in this way a great deal of the information given by Busnel *et al.*[3] on the behaviour of *Ephippiger* males.

I thank Mr. W. B. Broughton for his advice.

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Some Effects of Decapitation on Metabolism in *Rhodnius prolixus* Stål.

The failure of oocytes to develop in decapitated female *Rhodnius* has been attributed to the failure of protein synthesis[1], and Vanderberg[2] has shown reduction of incorporation of radioactive leucine by several tissues after decapitation. Further experiments have been performed on the fat body and hæmolymph to investigate this.

In the normal insect there are two main adult-specific hæmolymph proteins, formed in the fat body, which are absorbed by the oocytes and form the bulk of the soluble oocyte protein. Absorption has been demonstrated by oocyte uptake of hæmolymph proteins labelled with fluorescein, and the proteins examined by immuno-electrophoresis. Decapitation results in the failure of yolk deposition[3], and also results in the presence of only small quantities of the 'yolk' proteins in the hæmolymph, whereas after ovariectomy large accumulations of these proteins occur. No 'yolk' proteins are found in the fat body after decapitation, even though the protein content of this tissue is increasing and is higher than normal. Other hæmolymph proteins are formed; it appears, therefore, that the action of the corpus allatum hormone is on the specific synthesis of 'yolk' proteins by the fat body. This does not exclude the possibility that the hormone may also affect the uptake of protein by the ovary. Digestion is not a limiting factor, since high concentrations of amino-acids are found in the hæmolymph.

This makes the finding of Vanderberg[2], that synthesis of DNA occurs normally in the decapitated insect, but that synthesis of RNA is inhibited, very relevant, and implies that the gonadotrophic hormone acts at the level of RNA synthesis. This would fit in with the theory of Karlson[4], who thinks that the moulting hormone acts on the chromosome to produce puffs, and that these puffs are the site of synthesis of RNA. It is relevant to note here that Wigglesworth[5] suggested that the juvenile hormone, which appears to be identical with the gonadotrophic hormone[6], must act in the larval instars on the gene-controlled system of the epidermal cell.

The demonstration of the possible action of the gonadotrophic hormone helps in the understanding of the control of metabolism in the fat body of the fifth instar. Wigglesworth had noted that the fat body grows more slowly in the decapitated larval insect than in the normal one[5], but that this is not due to the moulting hormone[7]. Investigations of concentration of amino-acid in the hæmolymph suggest that, on decapitation in the fifth instar, digestion is not limiting. Changes were followed over the first nine days after decapitation, and it was found that, on decapitation at 0–1 h after feeding, net protein release into the hæmolymph (mostly from the fat body) is normal. However, the relative amounts of the two main hæmolymph proteins, as separated by cellulose acetate electrophoresis nine days after feeding, depend on the time of decapitation. Accumulation of protein in the fat body occurs, but more slowly than normal. Glycogen is also stored in the fat body, in small quantities after decapitation 0–1 h after feeding, but in larger quantities 24 h after decapitation. On the other hand, the fat content of the fat body remains low after decapitation at either 0 or 1 day after feeding. It is suggested that the most economical hypothesis to explain these results is that the brain hormone is acting on the chromosomes of the fat body, and that different genes are responding to different concentrations of the hormone.

This work was supported by the Agricultural Research Council.

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Effects of Low-temperature Storage on the Eggs of *Spodoptera littoralis* (Boisd.)

In September 1963 a number of growers reported severe damage to the flowers and foliage of all-year-round chrysanthemums by a new caterpillar which, when more than half-grown, was apparently resistant to DDT. The larvæ were later determined as *Spodoptera littoralis* (Boisd.) (*Prodenia litura F.*) (Lepidoptera: Noctuidae), an important pest of cotton and many other crops in African and Mediterranean countries. Experiments showed that dichlorvos at 24 c.c. of 50 per cent emulsifiable concentrate per gallon per 600 sq. ft. of bed could kill larvæ up to the third instar. The older larvæ were susceptible to 0·04 per cent dieldrin as a stomach poison. The pest was afterwards eliminated from the nurseries on which it had appeared by the combined use of these two materials.

When the history of the individual outbreaks was examined they could all be traced back to cuttings which had been taken in the Canary Islands. *S. littoralis* is a serious pest of tomatoes in the Canaries after being introduced there many years ago following an abortive attempt to cultivate cotton. The production of cuttings in the Mediterranean area to take advantage of high winter light intensity is becoming an important feature of chrysanthemum production in north-west Europe. Some quarantine method to ensure that *S. littoralis* is not spread by the trade in cuttings is therefore highly desirable. As cuttings are frequently cold-stored for several days to facilitate handling procedures it seemed that the survival of *S. littoralis* under these conditions should be investigated.

In the laboratory egg-masses obtained from cultures of *S. littoralis* reared on chrysanthemum were divided into two so that every replicate had its own control. The eggs were placed on plastic gauze suspended over wet filter-paper within plastic pill-boxes with tightly fitting lids. The controls were kept at 75° F but the boxes to be treated were placed in a laboratory refrigerator maintained accurately at 35° F. After the requisite periods of treatment the boxes were returned to 75° F for at least one week to test viability.

Other tests were made in commercial cold-stores with eggs, which were obtained directly from the Canary Islands. Within a few hours of landing each egg-mass was divided at the Glasshouse Crops Research Institute and placed in pill-boxes as before. The controls were incubated at 75° F while the boxes due for treatment