

of the chloride and sodium being contained within the fibre. The fact that practically all the sodium and chloride diffuse out with less than half the potassium shows that a considerable proportion of this exists in some region free from sodium and chloride or with a mere trace of chloride. This region we may identify with the myofibril, and regard sodium as being present only in the sarcoplasm.

The presence of a second membrane with somewhat different permeabilities is shown by the fact that in Ringer at 2-3 C. potassium has diffused out to one half or so of its full amount, and sodium has entered in corresponding quantity, but within the next three days there is almost no change in the potassium or sodium content. After four or five days there is a sudden emergence of the remaining potassium and corresponding entrance of sodium accompanied by considerable swelling.

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¹ Conway, E. J., and Cruess-Callaghan, G., *Biochem. J.*, 31, 828 (1937)

² Conway, E. J., and Fitzgerald, O. (unpublished observations).

Source of the Moulting Hormone in *Rhodnius* (Hemiptera)

Two known factors are concerned in the control of growth in *Rhodnius*: a 'moulting hormone' which initiates cell division and subsequent ecdysis, and an inhibitory hormone', secreted in the first four nymphal stages, which prevents the development of imaginal characters. The inhibitory hormone is secreted by the corpus allatum².

I originally suggested that the moulting hormone might come from the same gland¹, but I have been unable to produce satisfactory proof of this. Recently I have re-investigated the question by transplanting isolated corpora allata, brains and parts of brains from 5th stage nymphs shortly after the 'critical period' into 4th stage nymphs decapitated at twenty-four hours after feeding.

In no case (11 experiments) did implantation of the corpus allatum and the associated sympathetic ganglion induce moulting; in 15 out of 17 experiments, moulting was induced by implantation of the brain. When different parts of the brain were tried, negative results were obtained with the suboesophageal ganglion, the optic lobes and the ventral half of the central mass of the brain; large pieces of fat body also gave negative results.

Positive results were obtained only with the dorsal half of the central mass of the brain. This is the region in which Hanström has recently demonstrated in *Rhodnius* the presence of peculiar large nerve cells which may have a secretory function³. I have confirmed the presence of these cells but have been unable to satisfy myself that they show histological signs of increased secretory activity during moulting.

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¹ *Quart. J. Micro. Sci.*, 77 (1934).

² *Quart. J. Micro. Sci.*, 79 (1936).

³ *Lunds Univ. Areskrift, N.F.*, 34, No. 16 (1938).

A Peculiar Phenomenon Observed in Larval Populations of the Flour Beetle *Tribolium confusum* Duv.

I HAVE observed that if small masses of coarsely sifted whole-wheat flour (64 gm. in a 150 c.c. beaker) are seeded with more than 800 eggs of the flour beetle *Tribolium confusum* Duv., and maintained at a suitable temperature and relative humidity (27° C., and 75 per cent r.h.), a peculiar distortion of the originally flat, level, upper surface of the flour mass occurs. There is a slight initial bulging upward commencing on the sixth day when the eggs hatch, no doubt due to the loosening of the flour by larval movement. This bulging increases up to about the twenty-first day, as shown in Fig. 1. There then takes place a more or less rapid moulding of the surface into the rather graceful form seen at the bottom of Fig. 1, and in Fig. 2, which is a photograph of a median vertical section of a culture on the twenty-eighth day.

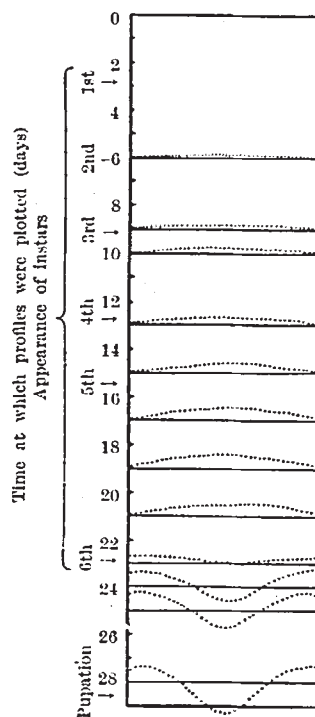


Fig. 1.

THE HORIZONTAL LINES ARE THE ORIGINAL FLOUR SURFACE.

It will be noted from Fig. 1 that the distortion is not due to a mere sinkage of the central parts, but to a radial translocation of the flour, the circumferential drop being due, it is believed, to peripheral migration of the larvæ. The degree of distortion of the original flat surface depends on the number of larvæ present, being almost imperceptible with 600, marked with 800, and extreme with 1,600, there being almost 0.75 inches between the highest and lowest parts at this last concentration. With more than 1,600, interference between the moving larvæ occurs, and the figure is less marked.

The effect is dependent also on the diameter of the vessel, the optimum diameter appearing to be about 2 in., which is that of a 150 c.c. beaker. The effect does not occur if the flour is very fine, probably due to higher internal friction in such flour. Vertical