and had formed a dark out-curling lip around the edge of the crater's opening; this lip was composed of a chitinous material similar to that which is laid down by the mantle at the inner rim of each valve.

Prof. G. E. MacGinitie, at the Kerckhoff Marine Biological Laboratories of the California Institute of Technology, writes (personal communication) that he has encountered such craters as described above in certain other lamellibranchs, notably *Schizothœrus*, but that the condition is rather rare. He states that such pockets, built up by the animals in response to the presence of insoluble detritus which may lodge between the mantle and the shell, will soon become inhabited by other forms which invade it in larval stages, and that it is a matter of relative chance what forms adapted to such a locality first secure residence. The laws governing survival then determine which members of such a group may retain their places and which must be crowded out or devoured.

The subject of commensal organisms encountered within lamellibranch shells is rather extensive, and has no place in this note. It seemed of interest, however, to report this particular case, since a fair search through the literature and discussions with various ecologists failed to reveal previous reports of commensalism between a normal anemone and a healthy, plankton-feeding lamellibranch.

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Water and Fat Content of Tsetse Flies

IN recent letters Mr. R. W. Jack[1] and Dr. C. H. N. Jackson[2] state that, when considering the effects of climate on tsetse metabolism, it is valuable to express the percentage of water present in the insects at different times as a function of the "fat-free" dry weight. This is because the amounts of this food-reserve vary greatly; it occurs concentrated in the fat-body and not in large amounts in the individual cells of the vital tissues. Jack and Jackson imply that their methods show the conditions in the tissues of the tsetse more accurately than do gross percentages of water and dry matter present in the bodies of the insects.

I am doubtful whether this manipulation of the results is really useful. If we wish to know what conditions obtain in the tissues, it will be necessary to study individual tissues by microanalytical methods. There are many constituents of an insect's body which vary greatly, such as skeletal structures, gut-contents or fæcal materials, and they, as well as fat, should be subtracted to obtain the sort of results which Jack and Jackson desire. There is one other substance which they do not consider, but which should be studied in investigations of the water-balance of insects, and that is the circulating fluid or hæmolymph. Dissections of bedbugs, *Rhodnius*, tsetse flies and other insects show that sometimes the tissues are amply bathed with fluid, while at other times they appear almost dry. The hæmolymph acts as a sort of 'buffer' against desiccation. The tissues themselves do not usually appear to vary greatly in water-content, for so long as there is a sufficient supply of hæmolymph to circulate, the cells of the various organs reached by it are not themselves desiccated unduly. This has been shown experimentally by analyses, by microscopic examination of the living tissues themselves, and the same conclusion is supported by Wigglesworth's observations[4] on the extent of the fluid in the tracheoles of desiccated insects. These changes in volume of the circulating fluid will affect the gross analyses enormously, whether or not the fat is subtracted.

These comments are made because I feel that if other workers adopt Jack's and Jackson's suggestions, they may be diverted from more significant studies of the effects of climatic conditions on vital structures. Laboratory studies[3] show that the gross percentage of water in a tsetse fly may vary more widely than Jack's and Jackson's field observations indicate, without the insect being harmed or its metabolic rate being affected. The insects have to lose a great deal of water, probably equivalent to the whole of their hæmolymph, before they suffer from desiccation. Normally, even under dry conditions, they appear to exhaust their reserves of fat before this happens; or they obtain a meal of blood which contains sufficient excess of water to allow the body to return to normal.

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Histology of *Derris* Roots

WE have recently investigated the histology of *Derris elliptica* roots, with respect to their contents of rotenone and related toxic substances. Cells which apparently contain resins are distinguishable in unstained sections. We have applied Durham's test to sections, and have shown that the resin cells, and these only, respond to the test.

Rotenone cells first appear in young roots just as suberization is beginning, but never before, as isolated groups in the secondary cortex. These are invariably arranged opposite to the protoxylem elements, and correspond in number to them. Rotenone afterwards appears in cells scattered through the xylem parenchyma and the cortex. These increase in number with the age of the root, and are especially numerous in the medullary rays. They appear to be structurally non-specialized, and are indistinguishable from normal xylem parenchyma.

Starch also occurs in *Derris* roots. It is mainly confined to the semi-lignified cells forming a sheath to the vessels, but it also occurs in scattered irregular groups in the non-lignified xylem parenchyma and in the cortex. We have never observed starch and rotenone in the same cell: in fact, we are satisfied that, in the xylem parenchyma, starch cells and rotenone cells form mutually exclusive groups.

A paper giving the full results of this investigation is being prepared for publication.

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