Fig. 2

When applied in a lanolin paste to the stem of bean plants a local swelling of the stems occurred, mainly caused by an increase in diameter of the parenchyma cells. The stems of sunflower and groundnut plants also showed a characteristic swelling. In plants like tobacco and *Salvia*, leaf growth is inhibited simultaneously with an increase in thickness of the leaf.

H 133 is very active in vapour form, in spite of the low vapour pressure (3×10^{-6} mm. mercury at $20^\circ \text{C}.$). A characteristic effect is illustrated in Fig. 2, where young oat plants were exposed to the vapour of *H 133* during 24 hr. by covering them with glass bells containing in the top a piece of filter-paper with a certain amount (0.01–0.07 mgm.) of *H 133*. The young leaves toppled over and all cells in the actively growing meristems collapsed (Fig. 2).

The same effect may be observed under appropriate conditions 10 min. after spraying the plants.

Sprouting of stored potato tubers is completely inhibited by exposure to *H 133* vapour.

In an *Avena* coleoptile section test an antiauxin effect was observed. Concentrations of 10^{-4} mgm. of *H 133* per 0.5 ml. buffer inhibited the growth stimulation of 10^{-3} mgm. of indole acetic acid per 0.5 ml. buffer solution.

Experiments in which respiration or photosynthesis was measured in a Warburg apparatus showed that neither respiration nor photosynthesis of tobacco leaves was inhibited, if the leaves were placed in a saturated solution. The solubility of *H 133* in water is 18 p.p.m.

A specific effect of *H 133*, for example, the toppling over of young oat plants, was not observed, if known herbicides, as phenoxyacetic, phenylacetic or benzoic acids, were used. On the other hand, leaf modifications as caused by phenoxyacetic and benzoic acids have never been shown.

The acute toxicity of *H 133* for warm-blooded animals is low. The acute oral *LD50* for mice is >6 gm./kgm. body-weight; the acute intraperitoneal *LD50* for mice is >3 gm./kgm. body-weight.

These effects of *H 133* indicate its possibilities as a herbicide. It is active against many weeds, for example, wild oat (*Avena fatua*), bracken (*Pteridium aquilinum*), chickweed (*Stellaria media*) and cleavers (*Galium aparine*), whereas some crops have proved resistant to it.

A full account of these investigations will be published elsewhere.

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Volvox Colonies and Snail 'Cytase'

HAVING seen the very striking way in which snail 'cytase' brings about the dissolution of cell walls in angiosperm roots (following the suggestion for its use in cytological techniques¹), I wondered what effect this substance might have on a colonial organism such as *Volvox*. Would it be possible to separate the cells of the colony into a swarm of *Chlamydomonas*-like creatures, or, better still, would it be possible to liberate the protoplasts as free-swimming naked individuals?

Small quantities of a culture of *Volvox aureus* Ehr. were placed in watch glasses and sufficient of the coffee-coloured 'enzyme' (obtained from the crop of the edible snail) was added to each to bring the strength of the enzyme up to about 20–25 per cent of the total bulk of the liquid.

The treated colonies were kept at room temperature and examined under the microscope from time to time for up to three days. At no time did any of them show any signs of separating into individual free cells. The only visible effects of the treatment were (a) the production of one or more large dimples in most of the colonies, presumably due to slight plasmolysis, and (b) a slight swelling of the outer region of each colony.

The ability of the colonies to resist dissolution was quite unexpected, especially since the 'enzyme' is known to contain at least twenty constituents capable of acting on a wide range of carbohydrates. As a check on the activity of the snail enzyme under the conditions and at the dilution described above, a little ground wheat endosperm was added to some of the watch glasses after 12–24 hr., and in each case both the starch grains and the cellulose endosperm walls were readily dissolved.

Thus although it is possible to obtain a positive cellulose reaction on *Volvox* by treatment with iodine and sulphuric acid, it seems that in the living condition the material forming the matrix of a colony must either be very different from that of the walls of higher plants, or it must be protected in some way by the incorporation of some substance (such as protein) which is not attacked by the snail enzyme.

I wish to thank Miss E. H. Evans for supplying the snail enzyme and the Cambridge Culture Collection for the culture of *Volvox aureus*.

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¹ Faberge, A. C., *Stain Tech.*, 20, 1 (1945).

RADIOBIOLOGY

Significance of Adrenals for Increased Oxygen Consumption in Rats during Irradiation

THE first minute of exposure to ionizing radiation produces in animals many changes which may be explained as stress reaction. In my previous communication I had shown a significant increase in oxygen consumption in rats during irradiation with a dose-rate of 50 r./min.¹ Since I believe that this increased oxygen consumption is a demonstration