

to the role of various components of the diet, that is, protein, fat, carbohydrate, various lipotropic substances, vitamins and electrolytes, in altering water absorption. The implication, of course, is that the products of gastro-intestinal absorption may be altered in such a way as to present an abnormal circulating medium to the liver cells.

The present experiments provide a rapid method for the production of liver damage which may be of value in the evaluation of the relative significance of various dietary components, lipotropic, carcinogenic, cirrhotogenic and hormonal agents, as related to the prevention and treatment of liver injury.

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Reducing Substances in *Zostera*

DURING a study of the reduction of sulphates in *Zostera* mud flats, it was found that when autoclaved *Zostera* was added to autoclaved sand and sea water, ferrous sulphide was rapidly produced. At first it was thought that this reduction was microbiological, but later it was found that living *Zostera* could bring about the reduction. A study of *Zostera* showed that a lead mirror could be produced from lead acetate by heating this substance with *Zostera* leaves and that this mirror was intracellular in the leaf parenchyma. When washed *Zostera* leaves are heated with distilled water, cadmium acetate papers show yellow cadmium sulphide, and, at times, metallic cadmium. If the distillation is carried out under nitrogen, the steam distillate condensed into 100 ml. of N/1,000 hydrochloric acid at pH 3.35 yields a nitrogenous solution containing up to 6.75 mgm. nitrogen per litre, and the pH rises to 7.0 with a volume increase to 450 ml. In addition, there is a volatile sulphur-containing substance which is soluble in alcohol and produces lead sulphide from lead acetate. This sulphur compound gives no precipitate with mercuric chloride and a white precipitate with alcoholic lead acetate, suggesting a thioether. It has an unpleasant odour. The production of lead sulphide from lead acetate seems to depend on a partial volatilization of the nitrogenous base. *Posidonia* appears to contain a different sulphur derivative with a more pungent odour.

Both these substances are present in small amounts and their relative proportions in the plant seem to vary considerably. During October–November, little of the sulphur compound was present in *Zostera*; but after flowering in January, the sulphur compound increased while the nitrogenous base disappeared. The latter was still present, however, in

Zostera from a bed that was not flowering. These substances are possibly united in the plant with a redox pigment, probably of a dapside glucoside nature.

The existence of these two substances may be of great importance in *Zostera* muds in two ways: they may produce ferrous sulphide directly, and may also bring about reducing conditions that greatly accelerate sulphate reduction by *Microspira*.

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Action of Insecticides on a Stem Borer of Oats: the Frit Fly

IN an attempt to assess the possibility of controlling gramineaceous stem borers by systemic and seed-dressing insecticides, the following results were obtained in laboratory and field experiments with larvæ of flies of the 'frit' complex, *Oscinella frit*.

Initial tests of the toxicity of 'Pestox 14' or *bis* dimethylamino-fluorophosphine oxide (Pest Control, Ltd.) to larvæ immersed in aqueous solutions of different strengths showed 71 per cent mortality with 0.0005 per cent and 100 per cent with 0.005 per cent after three days. There was apparently no difference in toxicity to different instars.

PERCENTAGE MORTALITY TO MIXED INSTAR LARVÆ OF SOLUTIONS OF 'PESTOX 14'

Strength of solution (per cent)	Time of immersion		
	6 hr. (per cent)	24 hr. (per cent)	3 days (per cent)
0.0005	0	14	71
0.005	0	100	100
0.05	59	100	100
0.5	100	100	100
Water	0	0	0

'Pestox 14' caused shrivelling of the larvæ proportional to the concentration and probably due to osmotic dehydration. This effect differs from the turgidity observed in death from parathion.

That translocation of systemic insecticides can occur in members of the Gramineæ is supported by work on the wheat bulb fly (*Hylemyia coarctata*) by Pest Control, Ltd., by the Overseas Food Corporation on sorghum central shoot borer (*Atherigona indica fuscata*), by Questell and Conin¹ on the toxicity of maize tissue to European corn borer (*Pyrausta nubilalis*), and by death of aphids on young oats grown in pots and watered with 0.05 per cent 'Pestox 3' (octamethylpyrophosphoramidate or 'Schradan') after twenty-four hours during the present experiments.

Individual oat seedlings grown in Pfeffer's solution and infected with larvæ in the laboratory were used to demonstrate that 0.1 per cent 'Pestox 3' and 0.1 per cent 'Pestox 14' killed all larval stages in the stems in two to three days after the insecticides were introduced into the culture solutions. With potted seedlings grown in soil, however, watered with 'Pestox 3' at rates to give 50, 180 and 300 parts per million of soil, no dead larvæ could be found and progressively fewer live larvæ remained in the plants down to none at the 180 p.p.m. level, suggesting a specific repellent action on the larvæ.