

interest attaches to isoprene, the unit hydrocarbon of rubber. Egloff has been at pains to collect the information relating to the thermal decomposition and polymerization of this group.

The magnitude of the work is evidenced by the fact that the subject and author index occupy 44

pages in double column. Its utility is unquestionable, it is veritably a master work, and future workers all over the world will be obligated to its author; indeed it will undoubtedly accelerate the development of the subject experimentally.

E. F. ARMSTRONG.

## Agents affecting Plant Growth and Movement

### Der Einfluss einer Pflanze auf die Andere, Allelopathie

By Prof. Hans Molisch. Pp. viii + 106. (Jena: Gustav Fischer.) 4.50 gold marks.

IN this book, Prof. Molisch published shortly before his death an interesting account of a number of experiments he carried out to examine the effect exerted by one living plant upon another. His investigations do not deal with the so-called autogenetic radiations of Gurwitsch, of which he is a little sceptical, but have their starting-point in the known fact that, if early and late maturing apples are stored in close proximity, the latter arrive at maturity earlier than if they are stored separately. The same effect has also been observed in the case of pears. As it is known that ethylene is produced in the process of respiration of ripening fruits, it is probable that ethylene vapours are responsible for this phenomenon. Indeed Elmer, Huelin, Gane and other workers of the Food Investigation Board have not only proved the ripening effect of these ethylene-containing vapours of apples and other fruits, but have also shown that they inhibit the sprouting of potatoes and the growth of pea seedlings (see Gane, NATURE, 134, 1008; 1934). Experiments by Crocker in the United States have shown that epinasty of leaves can be induced by ethylene, and E. M. Harvey has determined the effect of ethylene on plant metabolism.

Molisch's experiments were concerned with the growth of seedlings exposed to the natural emanations from maturing apples, pears, oranges, lemons and bananas. Using the seeds of peas and vetches he found that, by placing a few apples in the closed vessel containing the germinating seeds, the growth of the seedlings was considerably retarded. Instead of attaining a height of 12-16 cm. in five days in a water culture, the peas seedlings had only grown 3-4 cm. in height. Grown in sand, the difference was even more striking. A further experiment showed that if the seedlings were exposed to the effect of maturing apples for only 1-5 hours their growth was actually stimulated, their height being 10 cm. when exposed for 1 hour and 9.5 cm. when exposed for 5 hours as compared with 7 cm. in pure air. The gas in dilute concentration evidently acts as a stimulant, agreeing in this

respect with certain other organic poisons like morphine and amygdalin. The effect of other maturing fruits was of a similar retarding nature and in addition, as in the case of apples, they produced curious curvatures of the stem.

Epinastic curvatures of the leaves of growing plants, for example, *Solanum* and *Bœhmeria*, were also observed, and in other cases (privet and *Mimosa*) the proximity of apples produced leaf-fall.

The book contains further interesting records of the effect of ripening apples on the growth of roots, on the formation of callus, the development of lenticels, on the growth of pollen tubes and of fungi.

As it is known that roots excrete certain organic acids and also carbon dioxide, Molisch carried out some experiments with the roots of horse radish, carrot and beet and found that they had a slight stimulating effect on the growth of seedlings, but if the roots were cut longitudinally into four pieces they retarded growth. A considerable stimulus to growth was exerted by the root system of *Melaleuca squamea* and *Acacia verticillata*.

The effect of the proximity of vegetative shoots on the growth of vetch seedlings was to retard their elongation to a greater or less extent, while flowering shoots and particularly the flowers themselves inhibited growth in length very markedly. The inflorescences of the lilac had a deleterious effect on the growth of tomato seedlings.

At the end of the book, Molisch discusses the possible importance to the plant of the production of ethylene. Since he had shown that it retards the development of the mycelium and sporangia of *Phycomyces*, he concludes that it may prevent or at any rate delay the rotting of the fruits. On the other hand he is inclined to accept the view of Crocker that it may act as a fruit-ripening hormone. He points out that its action has much in common with such a growth-promoting substance as hetero-auxin. It causes similar epinastic curvatures, it delays the opening of buds and promotes the development of callus in poplar and the production of roots in cuttings of willow.

These undoubted resemblances between ethylene and some of the plant hormones are certainly very suggestive, and it is to be hoped that Molisch's book may lead to further researches in their elucidation.