

jaundice, ascites, enlargement of the abdominal viscera, urinary diseases and rheumatism, etc. They are also supposed to have a drastic purgative action.

2 kilograms of the powdered roots were exhaustively extracted with boiling alcohol. The concentrated extract on standing deposited a white crystalline stuff, which on recrystallisation from alcohol melted at 230° C. The mother liquor was then evaporated to dryness and extracted with petroleum ether. This petroleum ether extract on concentration gave a small amount of a white sediment, which on purification melted at 68° C. From its properties and reactions it was identified as hentriacontane  $C_{31}H_{64}$ .

The resinous mass left after the treatment with petroleum ether, was then extracted with ethyl acetate. The ethyl acetate extract on evaporation of the solvent under reduced pressure yielded a white deposit which was filtered. On recrystallisation from ethyl alcohol it melted at 230° C. From its properties, reactions and elementary analysis it was identified as  $\alpha$ -elaterin. This was the same stuff as that obtained from the alcoholic extract in the beginning. The percentage was 0.2 per cent. of the dried weight of the roots. (Found C=69.0, H=7.5;  $C_{28}H_{38}O_7$  requires C=69.1, H=7.8 per cent.). The diacetyl  $\alpha$ -elaterin  $C_{32}H_{42}O_7$  was prepared in the usual way and crystallised from acetic acid. It melted sharp at 123-124°.

The brown stuff of the dried alcoholic extract, left after the removal of the  $\alpha$ -elaterin by ethyl-acetate was then dissolved in boiling water and treated with basic lead acetate when a yellow precipitate was obtained. It was filtered, washed, suspended in water and decomposed by  $H_2S$ . The resultant filtrate, after the decomposition of the lead salt, on concentration, *in vacuo* gave all the reactions of the saponins. All attempts to isolate this in a pure form have failed upto now.

The physiological properties of the drug appear mainly due to the presence of  $\alpha$ -elaterin. A detailed account of the work will be published elsewhere.

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### Mannose Dehydrogenase and Ascorbic Acid (Vitamin C).

WE have for some months been carrying out an investigation on the nature of the precursor and mechanism involved in the synthesis of ascorbic acid by the rat, which is known to be independent of an external supply of the vitamins. It has been found from incubation experiments with the isolated liver, spleen and kidney tissues of the rat at 37° in a medium of Ringer-Locke solution and phosphate buffer at pH 7.4 that these tissues are able to convert mannose but not glucose, fructose, galactose, xylose and arabinose, into ascorbic acid, as determined titrimetrically.<sup>1</sup> Amounts of the order of 0.30—0.35 mg. of ascorbic acid have been formed from mannose per gramme of each of these tissues after 3 hours' incubation. It has been possible, further, to separate to some extent the mannose dehydrogenase system, responsible for the dehydrogenation of mannose into ascorbic acid, by extracting the acetone-dried tissues (liver, spleen and kidney) with water. The cell-free extract from liver is able to produce 0.07 mg. ascorbic acid from mannose per gramme of the tissue under the aforesaid conditions. The tissues, after being washed once with Ringer-Locke solution in order to remove the normal substrates present, are also able to synthesise ascorbic acid from mannose. The apparently specific behaviour of mannose, among the sugars studied, in this respect is under further investigation.

In contradistinction to the rat, the corresponding tissues of the guinea-pig (which is dependent on an outside source of vitamin C), both normal and scorbutic, have been found to be unable to convert mannose (or any of the other sugars mentioned above) into ascorbic acid.

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### Haustorial Regeneration of Sandal (*Santalum album*, Linn) and Its Significance.

THE regenerative ability of plant tissues varies with different species of plants. While some plants can be propagated only through

<sup>1</sup> Guha and Ghosh, *Cur. Sci.*, 1934, 2, 390.

seeds, there are others where asexual or vegetative modes of propagation are possible and offer quicker methods of establishing stocks in plantation or silvicultural practice. They are particularly welcome in the case of slow growing species like sandal which have great economical value. Sandal lends itself to stump planting and if carried out in the monsoon season, a fifty per cent. success can be obtained.

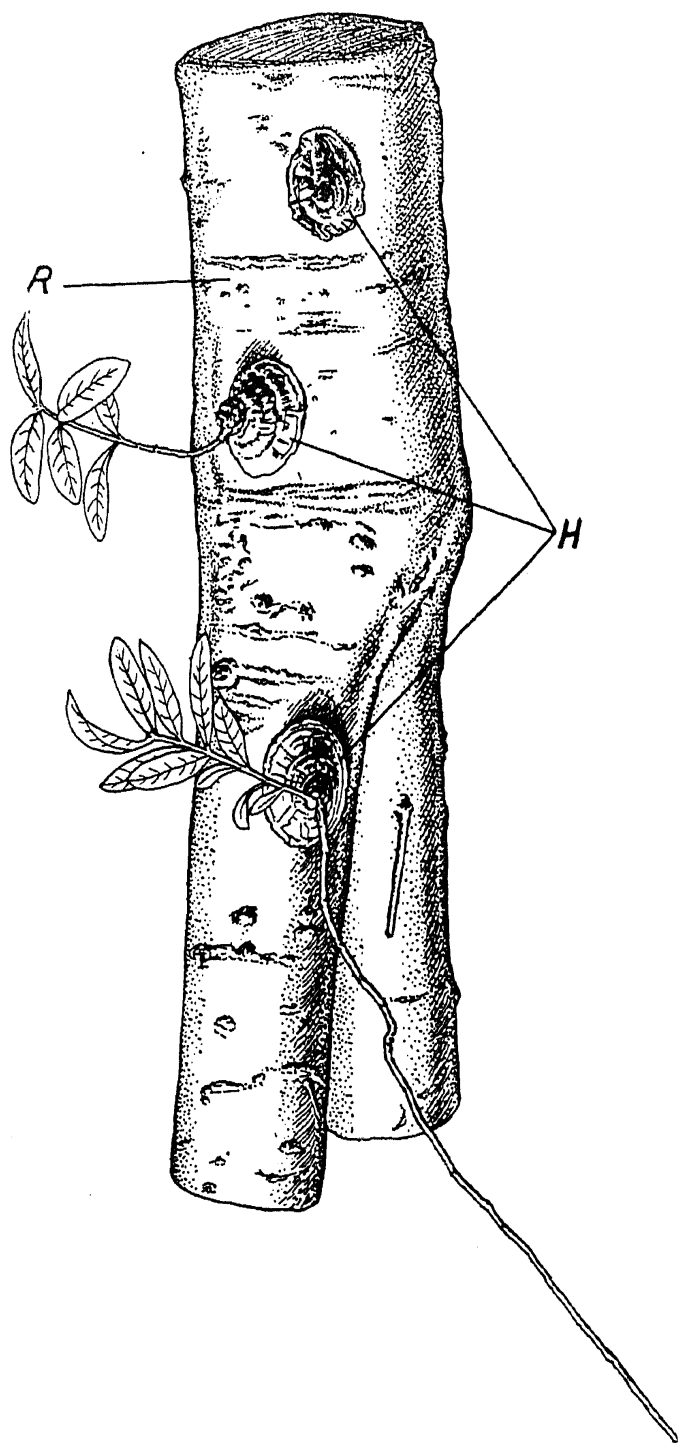


Fig. 1.

Sandal can also be propagated through root suckers; when a sandal tree is trenched at a distance of about 5 to 6 ft., it is common to find root suckers sprouting up from both faces of the trench. A larger

number of them come out of the outer surface thereby indicating that a root disconnected with the parent tree is capable of regeneration. Experiments in the nursery under controlled conditions showed that one of the essential conditions that appears to be necessary for the success of such a type of regeneration, is that the decapitated root should maintain its haustorial connection with its host plant. The regenerative ability of root suckers is therefore closely associated with the haustorial connection, a fact convincingly brought out by Fig. 1, emphasising the physiological independence and parasitic character of the haustorial connection. The illustration is the drawing of a specimen of *Pongamia* root R exposed by soil erosion on the bank of a water-way near Uttarhalli. At the time of observation, the root was not in connection with any sandal plant but the haustorial connections H were intact. A few weeks later, the haustorial connections sprouted giving rise to sandal shoots.

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#### Relative Parasitism of the Cotton Root-Rot Organisms from Gujrat Soils.

AMONGST the organisms isolated from affected roots of cotton, the principal ones are: (1) *Fusarium vasinfectum* form, (2) *Macrophomina* sp. (*Rhizoctonia bataticola*), (3) a species of *Cephalosporium*, and lastly, (4) a *Cephalobus* species of nematodes. Of these the *Cephalosporium* occurs rarely and there is no evidence to show that it is a parasite. The *Fusarium vasinfectum* form has been shown to be non-pathogenic. Under any circumstances this form of *Fusarium* has not given any infection and this observation has been confirmed by another worker from a wilt research laboratory to whom this form was sent. *Fusarium* obtained from Jalgaon and Broach as also the one from Desan, a village in Baroda territory, where wilt exists, gave a high percentage of infection.

It may be noted from Fig. 1 that the Desan fungus was a fresh culture (pot Nos. 3-4), whereas the fungus used in pots 1-2, 5-6 was from Jalgaon and Broach wilt areas respectively and isolated from the *gorat* soils from Baroda infected for the third time.