tone-dried tissue and becomes dialyzable only after hydrolysis.

Since tartronate facilitates oxalosuccinic decarboxylation, and since it is a constituent of animal tissues, it may reasonably be considered a significant factor in the citric acid cycle. A tissue deficiency of tartronate (a plant, but not an animal product, *5*), which might be caused by an insufficient intake because of dietary habits, loss in the preparation of food (volatility with steam, *6*, and also *7*, discarding of water extracts), faulty assimilation or retention, and so forth, could bring about a disturbance of the cycle. The resultant accumulation of pyruvate and acetate would lead to an abnormal amount of fat formation (*6*) and thus an excessive requirement for insulin (*8*). If this state were sufficiently prolonged, disorders of the endocrine control of carbohydrate metabolism might be induced. Hindrance in the formation of succinyl coenzyme-A, which makes possible the degradation of the fatty acids (*9*) and entrance into the cycle of acetoacetyl coenzyme-A (*10*) from both fatty acid and carbohydrate catabolism might also be caused by tartronate deficiency.

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Occurrence of Diffusible Auxin in Psilotum

Auxin first became known as a growth hormone of flowering plants, of the oat coleoptile in particular (*1*). Since its discovery in the Pteropsida, Seidl (*2*) has reported auxin from the Lycopsida, Wetmore and Morel (*3*) from the Sphenopsida, von Witsch (*4*) from Bryophyta, Nielsen (*5*) from Fungi, and van der Weij (*6*) from Algae. Thus auxin has been reported to occur in at least some member of every major group of plants, with the sole exception of Psilopsida. From the standpoint of comparative biochemistry and because the Psilopsida is an extremely primitive, rootless, leafless, and mostly extinct group of vascular plants, it is of interest to see whether living members of this group also produce auxin.

Stem tips 5 millimeters long were cut from aerial stems of *Psilotum nudum*, placed basal cut surface down on 1.5-percent agar blocks, and allowed to stand for 3 hours in normal diffuse room light. During the diffusion the agar blocks were placed on glass slides in a petri dish containing wet filter paper, to prevent desiccation of the agar. The standard *Avena* bioassay for auxin was used (*7*).

When thick, fast-growing stems were used for diffusion tests, substantial curvatures were obtained in the *Avena* bioassay—for example, two thick tips diffused onto 12 blocklets gave mean curvature per blocklet of 12.5°. When slower-growing stem tips were tested, no detectable auxin was found.

The absence of roots in Psilopsida is of particular interest to a student of auxin physiology, because a stimulating effect of added auxin on the number of roots or rhizoids developed has been observed in many plant groups, particularly in the Angiospermae. Although this rhizogenic activity has not been confirmed from as many major plant groups as has the occurrence of auxin, yet pure auxin has been shown to have a rhizogenic stimulation per se in Pteropsida by Thimann and Koepfli (*8*), in Lycopsida by Williams (*9*), in Bryophyta by Fitting (*10*), and in Algae by Jacobs (*11*). Accordingly, cuttings from both aerial and underground stems were treated with various concentrations of synthetic auxins (indole-acetic acid, naphthalene acetic acid, indole butyric acid), alone and in combination, with a medium containing substances known to limit the growth of excised angiospermous roots—that is, thiamine, nicotinic acid, sucrose, and mineral salts. Cuttings were checked macroscopically, under a binocular dissecting microscope, and finally under a compound microscope, after they had been paraffin imbedded, serially sectioned, and double stained. In no case were roots or root primordia detected.

Both the normal presence of auxin in *Psilotum* stems and the absence of root initiation in the auxin-treated cuttings support the interpretation that auxin is not the limiting factor for root initiation in *Psilotum*. However, since the reports for other plant groups show that auxin stimulates root formation only in groups where roots are normally formed, while it stimulates rhizoids in the groups which normally form rhizoids, it may well be that auxin does have a rhizogenic effect in *Psilotum*, but acts on the initiation of rhizoids rather than on the initiation of roots.

Attempts to induce rooting in *Psilotum* are continuing.

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Isomeric Substituted-Vinyl Phosphates as Systemic Insecticides

Substituted-vinyl phosphates have been frequently noted for their high insecticidal activity (*1, 2*). Their pharmacological action on mammals has also been investigated (*3*). One of these materials, designated as compound 2046 or 0,0-dimethyl 2-carbomethoxy-1-methylvinyl phosphate, is a very efficient short-residual systemic insecticide (*4*). This carbomethoxy material was studied along with its carbethoxy analog, 0,0-diethyl 2-carbethoxy-1-methylvinyl phosphate and its chloro analog, 0,0-diethyl 2-chlorovinyl phosphate (*3*).

Different preparations of the carbethoxy analog were found to vary greatly in systemic insecticidal activity, even though all were colorless liquids with identical sharp boiling points. Fractionation of several samples of the three analogs by partition chromatography on silica gel columns yielded two fractions from the carbomethoxy and carbethoxy materials and three components from the chlorovinyl phosphate. The first material eluted with organic solvents (α) was 5 to 100 times more toxic to insects than the more water-soluble fractions next eluted (β and γ).

Two geometric isomerides are possible with substituted-vinyl phosphates. *Trans* isomers are known to be generally more stable than *cis* isomers, because of the greater strain at the double bond in the *cis* materials. With the carbomethoxy, carbethoxy, and chlorovinyl phosphates, the α fractions were always the most active antiesterases, the least stable to