blood clotting time in chicks when added to the basal diet, while the clotting time of chicks receiving no vitamin K supplement was in every case greater than 30 minutes.

Some vitamin still remained in solution. On the basis of comparative clotting times, the crystal fraction was approximately eight times as potent as the fraction not crystallized out by cooling with solid carbon dioxide.

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Effect of Hetero-auxin on the Growth of Broad Bean Plants in Water Culture

HITCHCOCK and Zimmerman[1] induced responses in the shoots of tomato and tobacco plants by applying a solution of hetero-auxin to the soil. These responses included bending, swelling, the production of adventitious roots on the stems, and epinasty of the leaves. This letter describes the relative effect of adding small amounts of hetero-auxin to the culture solution bathing the roots, and spraying approximately the same quantity on the shoots by the method described by Pearse[2]. *Vicia Faba* (Dobbie's Champion Long Pod) was used as the test plant, and

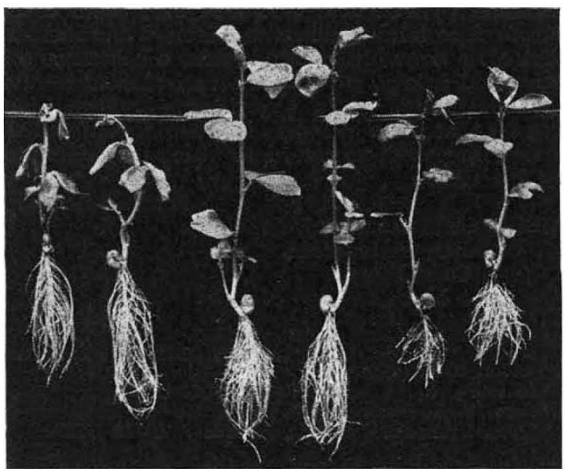

Fig. 1.

THE SHOOTS OF THE PLANTS ON THE LEFT HAVE BEEN SPRAYED WITH HETERO-AUXIN, THOSE IN THE CENTRE ARE THE CONTROLS, WHILE THOSE ON THE RIGHT HAVE BEEN SUPPLIED WITH HETERO-AUXIN IN THE CULTURE SOLUTION TO THE ROOTS.

the seedlings were three weeks old at the time of the first applications of hetero-auxin; the shoots were then about 10 cm. high. Fig. 1 shows the result of one week's treatment; the plants on the left were sprayed daily with 1 c.c. of a 0·01 per cent solution of hetero-auxin, those in the centre are the controls, while those on the right were supplied daily with 1 c.c. of a 0·01 per cent solution in 500 c.c. of culture solution.

In Table 1 the average total length of lateral root for three plants, and the average dry weights of root and shoot are given.

Fig. 1 and Table 1 show that supplying hetero-auxin to the solution has retarded the growth in length of the roots, although the total root weight is practically unaltered, while spraying the shoots with hetero-auxin has slightly decreased the weight of root growth without altering its form. The shoot growth was retarded by both treatments, but whereas spraying induced swelling of the stem and epinasty of the leaves, the plants receiving hetero-auxin in the culture solution did not exhibit any such symptoms. The immediate effects of the treatments therefore appeared to be strictly local in each case, and the subsequent retardation of the growth of the parts of the plants other than those receiving the hetero-auxin would seem to be due to an alteration in the dynamic equilibrium of the plant, rather than to its movement within the plant body. The movement of hetero-auxin from the soil into the shoots of tomato plants noted by Hitchcock and Zimmerman[1] may have been due to the much greater amount of hetero-auxin applied.

TABLE 1.

Series	Total length of lateral root (cm.)	Root dry weight (mgm.)	Shoot dry weight (mgm.)
Control	385·4	356	917
Shoots sprayed daily with 1 c.c. of a 0·1 per cent solution of hetero-auxin	356·3	335	680
1 c.c. of a 0·1 per cent solution of hetero-auxin added daily to culture solution	180·6	352	642

The terminal bud was inhibited by spraying, an effect previously noted by Pearse[3] when spraying tomato plants with phenylacetic acid, and with indolebutyric acid. Thimann and Skoog[4] caused inhibition of the lateral buds of plants of *Vicia Faba* by applying hetero-auxin to the cut-off stump of the terminal bud; but here it has inhibited the growth of the terminal bud itself.

A full account of this work is being prepared for publication.

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May 11.

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Skatole as a Root Forming Substance

THE activity of skatole as a growth-promoting substance has been noted by Glover[1]. We have carried out experiments which show that skatole accelerates root formation in cuttings. Cuttings of *Leptospermum scoparium* and of *Ficus repens* were treated with an aqueous solution of skatole in the manner described by Hitchcock and Zimmerman[2], and the cuttings planted in a mixture of coco-nut fibre and sand in a propagator. The treatment accelerated root production. With *Leptospermum scoparium* cuttings, treatment for six hours with skatole solution of a concentration of 20 mgm. per 100 c.c. on March 19 gave 60 per cent of the cuttings well rooted in 20 days. A control set showed 30 per cent only of the cuttings to be slightly rooted. With