inco-ordination. It therefore appears that the splenic relaxation in sheep after chlorpromazine may be due mainly to central effects, and predominantly to its ataractic properties, causing emotional indifference to otherwise alarming environmental stimuli, rather than to direct adrenergic-blocking effects within the spleen.

Fall in hæmatocrit (18 per cent decrease) and its virtual abolition by splenectomy was also demonstrated in sheep after intramuscular injection of mepazine (2·3 mgm./kgm.). The hæmatocrit fall after chlorpromazine injection reported in dogs[5] is doubtless also due to increased retention of red cells in the dilated spleen. This effect of chlorpromazine and mepazine, and probably of many other tranquillizing drugs, may be expected in many animals in which the red-cell storage function of the spleen is important.

A. W. Turner
V. Elizabeth Hodgetts

Division of Animal Health and Production,
Commonwealth Scientific and Industrial
Research Organization,
Animal Health Research Laboratory,
Parkville, Victoria.

[1] Turner, A. W., and Hodgetts, V. E., *Aust. J. Exp. Biol. Med. Sci.*, **37** (in the press).
[2] Nickerson, M., *Pharmacol. Rev.*, **1**, 27 (1949).
[3] Rosenblueth, A., and Cannon, B., *Amer. J. Physiol.*, **105**, 373 (1933).
[4] Nickerson, M., *Pharmacol. Rev.*, **11**, 443 (1959).
[5] Hoe, C. M., and Wilkinson, J. S., *Vet. Rec.*, **69**, 734 (1957).

PLANT PHYSIOLOGY

Auxin-induced Methylation in Maize

The transfer of methyl groups from methionine to the hot-water-soluble fraction of *Avena* coleoptile cell walls is increased by indoleacetic acid (IAA)[1]. Unlike most effects of indoleacetic acid, this increase occurs even when all expansion is osmotically prevented. Thus this process appears to be directly controlled by auxin and may constitute a portion of the mechanism whereby auxin induces elongation. If this were so, it would be expected that auxin would influence this transfer in all tissues which show an auxin-growth response. Maize coleoptile and mesocotyl tissues have now been examined for the presence of auxin-induced methylation.

Avena coleoptile sections for use as controls were obtained in the manner of Ordin *et al.*[1]. Sections of maize coleoptile and mesocotyl were obtained as follows. Maize seedlings were germinated in moist sand and allowed to grow in the dark for about 90 hr. Mesocotyls of 2·5–3·5 cm. in length were then selected and one 5-mm. section was excised from each mesocotyl using a double-bladed cutter. The apical incision was 1 mm. below the node. Coleoptiles of 1·5–2·0 cm. in length were selected at the same time and a 5-mm. section was excised after removal of the apical 3 mm. The central leaves were removed from the coleoptile sections of *Avena* and maize. Each experimental treatment contained sufficient material to give about 10 mgm. dry cell wall. All manipulations were carried out under a weak red light.

Sections were incubated in 0·0025 *M* potassium maleate solutions (*p*H 4·8), ± 5 p.p.m. indoleacetic acid. The methyl donor used was methionine-methyl labelled with carbon-14 (Amersham, 0·145 mc./mgm.) in a concentration of 2–3 × 10^{-5} *M*. At the end of the incubation period, the amount of saponifiable methyl groups in the hot-water-soluble pectin was determined using the methods of Ordin *et al.*[1].

Table 1. The Effect of Auxin on the Transfer of Methyl Groups from Methionine-^{14}C to Wall Pectin of Various Tissues

Material	Methionine administered (c.p.m.)	Time (hr.)	Growth-rate IAA/control	5 p.p.m. IAA	MeOH-^{14}C/10 mgm. cell wall (c.p.m.)
Avena coleoptile	3·5 × 10^5	5	2·5	±	1,145 620
Maize coleoptile	2·9 × 10^5	4	2·1	±	3,210 2,010
Maize mesocotyl	3·85 × 10^5	20	2·0	±	1,930 1,945

The results are shown in Table 1. An auxin treatment causes an increase in the transfer of methyl groups from methionine to wall pectin in maize coleoptiles as well as in *Avena* coleoptiles. No such increase occurs in maize mesocotyls even though growth is doubled by auxin. The lack of auxin-effect may mean that transfer of methyl groups to hot-water-soluble pectin is not a necessary part of the mechanism of auxin-induced growth. Alternatively, since it is known that other substrates such as formaldehyde can furnish the methyl groups to pectin (Sato, C., unpublished work), this result may only be a reflexion of a marked preference of maize mesocotyls for some substrate other than methionine as the source of pectin methyl groups.

This work has been carried out in the laboratory of Prof. T. A. Bennet-Clark at the Botany Department, King's College, London, and has been supported by post-doctoral fellowship *CF*-7341-*C* from the National Cancer Institute, United States Public Health Service. I wish to express my appreciation to Prof. Bennet-Clark for his help and encouragement and to Mrs. M. W. Ware for advice on methods of obtaining maize coleoptile and mesocotyl sections.

Robert Cleland

Department of Botany,
University of California,
Berkeley.

[1] Ordin, L., Cleland, R., and Bonner, J., *Proc. U.S. Nat. Acad. Sci.*, **41**, 1023 (1955).

Certain Mitotic Effects of Kinetin, Gibberellic Acid, Indoleacetic Acid, and Maleic Hydrazide on the Root of *Allium cepa*

Treatment of intact roots of *Allium cepa* with kinetin (6-furfurylaminopurine) has been reported by Guttman[1] to cause an increase in the rate of division of the cells of the root tip. She found a similar stimulatory activity of kinetin in promoting division of *Paramecium caudatum*[2].

Guttman made her studies of *Allium cepa* roots on random fields of squash preparations. The following is a report of similar studies in which the counts of mitotic figures were made on serial longitudinal sections of the root tips. The results indicate a markedly inhibitory effect on mitosis when kinetin is applied to intact roots in the same manner and in similar concentrations.

Table 1 shows the mean number of mitotic figures present in all tissues of the distal 5 mm. of the root tip, in 10-μ sections from the centre of five roots which had been treated with 1 p.p.m. and with