

The use of statistics is scarcely likely to reveal one skull which exactly reproduces the dimensional characteristics of another.

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<sup>1</sup> Clark, W. E. Le Gros, *Nature*, **166**, 791 (1950).

<sup>2</sup> Zuckerman, S., *Nature*, **166**, 158 (1950).

<sup>3</sup> Ashton, E. H., and Zuckerman, S., *Phil. Trans. Roy. Soc., B*, **234**, 471 (1950).

<sup>4</sup> Clark, W. E. Le Gros, *Nature*, **166**, 758 (1950).

<sup>5</sup> Broom, R., Robinson, J. T., and Schepers, G. W. H., *Transv. Mus. Mem. No. 4* (1950).

### Isopropyl Alcohol in Cows Suffering from Acetonæmia

WE wish to record the finding of considerable amounts of isopropyl alcohol in the blood, milk and rumen contents of cows suffering from acetonæmia, whereas there appears to be none present in normal animals. This means that the figures given hitherto for  $\beta$ -hydroxybutyric acid in the literature on that condition are probably misleading, as by most of the usual methods of analysis isopropyl alcohol would be estimated with that fraction. Moreover, in view of its close relationship to acetone, isopropyl alcohol might be either a precursor or a metabolic product of that substance. If the former is the case, it would necessitate an entirely new approach to the problem of the development of ketone bodies in this disease.

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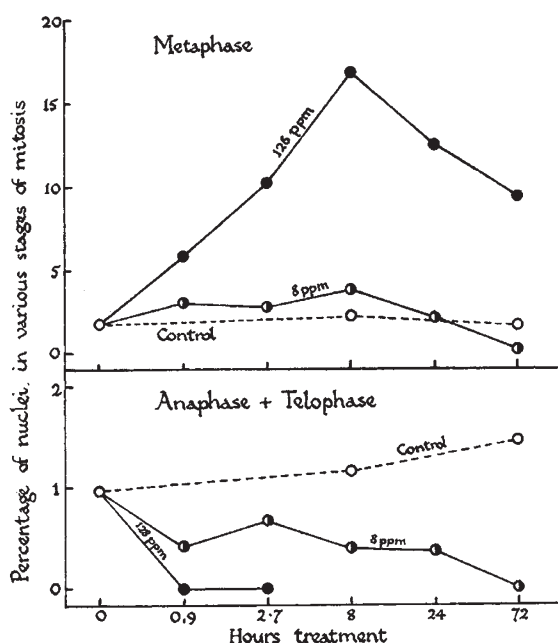
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### Inhibition of Growth of Apical Meristems by Ethyl Phenylcarbamate

Templeman and Sexton<sup>1</sup> were the first to show that ethyl and isopropyl phenylcarbamates were selectively toxic to higher plants and therefore potentially valuable as herbicides. Since then, Ennis<sup>2</sup>, Ivens and Blackman<sup>3</sup> and Doxey<sup>4</sup> have reported on the mitotic effects induced by these compounds. It has generally been assumed that their action is primarily on the spindle of dividing cells; but a continuation of the work at Oxford suggests that other factors may be involved.

In an examination of the effects of ethyl phenylcarbamate on the growth and mitosis of the root apices of various species, results have been obtained which indicate that in a relatively susceptible plant, such as barley, the primary action may not be on the spindle but on some other function of the cell, so that cell division and growth may be inhibited by concentrations which do not interfere with the spindle.

The type of result which has led to this interpretation is illustrated in the accompanying figure, where the proportion of nuclei visible in longitudinal sections of the root tips of barley in (a) 'metaphase' and (b) 'anaphase plus telophase' are given for different



The effects of various periods of treatment with two concentrations of ethyl phenylcarbamate on the proportions of nuclei in 'metaphase' and in 'anaphase + telophase', visible in sections of barley root tips

treatments with ethyl phenylcarbamate. 'Metaphase' represents the sum of the normal metaphases plus the blocked metaphases which are a consequence of the delay in chromatid separation due to the failure of the spindle mechanism. The anaphase and telophase figures are related to the extension growth of the root tips and represent normal mitoses. The arrest of normal division is reflected in the reduction of the anaphase plus telophase figures; with the highest concentration of 128 p.p.m. this number falls to zero within an hour of treatment, whereas with 8 p.p.m. a comparable reduction does not take place for more than twenty-four hours.

Since the blocked metaphase condition persists longer than the normal metaphase, it would be expected that, at concentrations affecting the spindle, the number of metaphases would increase. Thus, if the interruption of normal cell division were dependent solely upon spindle failure, the reduction in the total number of anaphases and telophases should be accompanied by a rise in the number of metaphases. While this expected rise occurs at the higher concentration, yet with the lower concentration the number of metaphases does not rise; instead the number falls to zero after seventy-two hours, although by then normal division and growth have been irreversibly stopped.

Following prolonged treatment, there is also a fall in metaphase numbers with the higher concentration, and the tissues finally die. It is probable that the primary toxic action which reduces the number of metaphases as well as of anaphases and telophases comes into play earlier at higher concentrations, but that these toxic effects are masked to some extent by the effects on the spindle.

The less extensive investigations so far carried out with the pea, a relatively resistant species, show that similar cytological aberrations occur but that much higher concentrations are required than for barley,