γ-rays. This large value arises, of course, from the fact that neutron energy, by contrast with γ-ray energy, is absorbed to a very much greater extent in material rich in hydrogen than in air.

We can find no explanation for the large difference between the two experimental values of γ/N other than that the *shape* of the mitosis-dose curve is not the same for neutrons and γ-rays. This is evident from the figure, in which mitosis is plotted against dose for the individual slides. The full curve shows Canti and Spear's results for γ-radiation at comparable intensity, from which it is seen that if the neutron curve were of the same shape as the γ-ray curve, none of the doses delivered in Expt. 1 should have produced any diminution in mitosis, whereas in fact five out of six slides showed marked reduction in mitosis, the average reduction being 19 ± 6 per cent. So far as we are aware, this is the first occasion on which a difference between the mode of action of neutrons and γ-rays has been reported.

The neutron points appear to define an approximately exponential curve. If this is interpreted as implying that mitosis is inhibited by the passage of a single proton through a specially vulnerable region, the diameter of this region can be estimated at about 3 μ. Furthermore, because the number of ion pairs per unit volume required to reduce mitosis to 50 per cent is approximately the same for neutrons and for γ-rays, it follows that provided approximately 1,500 ions are produced within this volume, it is immaterial whether the ions are produced along a straight track or at random. That is, the biological effect is not the result of the direct ionization by the proton or by secondary electrons of a group of molecules which are indispensable for the performance of mitosis.

Obviously, many more measurements are necessary to establish the exact shape of the neutron mitosis-dose curve, but as we cannot continue the experiment for six months, owing to the absence of one member (F. G. S.), we wish to direct attention to the important conclusions which would follow if our provisional estimates are substantiated. The effect of neutrons on the mitosis of bean root cells is being investigated at the Mount Vernon Hospital, in collaboration with Dr. J. C. Mottram.

We gratefully acknowledge the financial assistance of the British Empire Cancer Campaign towards the construction of the neutron generator.

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Structure of the Crystals of Tomato Bushy Stunt Virus Preparations

WE have examined by X-ray methods crystals of the protein material prepared by F. C. Bawden and N. W. Pirie[1] from tomato plants suffering from bushy stunt disease. The crystals were in the form of isotropic rhombic dodecahedra of average diameter of only 0·01 mm. Consequently, no attempt was made to take single crystal photographs. Instead, powder photographs were taken of a suspension of the crystals in their mother liquor. With a monochromatic beam of copper $K\alpha$ radiation at 40 cm. plate distance and long exposure, two lines were observed of spacings 279 A. and 160 A. respectively. The ratio of these spacings is $\sqrt{3} : 1$, corresponding to the (110) and (112) spacings of a body-centred cubic lattice of side 394 A. This would correspond to a particle diameter of 340 A. or a radius of 17 mμ. Although the (200) reflection and higher order reflections are not observed, the attribution of a body-centred cell is probable as it accords with the dodecahedral habit by Fedorov's law.

The density of the crystals in solution was determined as 1·286; the wet molecular weight is therefore, assuming two particles per cell, 24,000,000. On drying and rewetting, the crystals can be observed to shrink and swell reversibly. The amount of shrinkage measured under the microscope was 80 per cent of the wet dimensions. An X-ray photograph of a specimen dried over phosphorus pentoxide showed a cell of side 318 A., giving almost exactly the same degree of shrinkage. This is, we believe, the first time that the shrinkage of a crystal on drying has been shown to be the same as the change in the lattice dimensions measured by X-rays. If the density of 1·35 computed by A. S. McFarlane and R. A. Kekwick[2] is assumed to be that of the dry crystals, this would give a molecular weight of 12,800,000. This is considerably higher than the value of 8,800,000 found by them by the centrifuge method. The discrepancy may be due to some of the water in the crystal being held zeolitically and lost without further shrinkage. To obtain their molecular weight the density of the dry crystals would have to be 1·12 and the wet crystals would contain 63 per cent of water.

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Transformation of α- and β-forms of 3:6-Anhydromethyl-Galactosides

THE transformation into α- and β-forms in equilibrium is the usual result of the digestion with methyl-alcoholic hydrogen chloride of either an α- or β-methylglycoside. This change is generally attributed to the initial hydrolysis to the free sugar followed by a mutarotation and the regeneration of the two forms of the methylglycoside.

We have recently encountered an example of a substance which does not appear to conform to this interpretation of the isomeric change. This substance is 2:4-dimethyl 3:6-anhydro-α-methyl-*d*-galactopyranoside, a liquid showing $[\alpha]_D + 73°$ in water and +99° in ether. It was prepared by methylation of 3:6-anhydro-α-methyl-*d*-galactopyranoside which was obtained by alkaline treatment of 6-tosyl α-methylgalactopyranoside. The anhydro compound is mentioned also by several other workers[1,2,3]. We