ined 2 hr. after injection of phosphate-32. The deoxyribonucleic acid phosphorus from the spleen was isolated by Schmidt and Tannhauser's method.

Both deoxyribonucleotides in the given amount stimulated the regeneration of bone marrow in irradiated animals. The results were statistically significant on the fourth and seventh days after irradiation. On the tenth day and after injection of nucleosides, the differences were no longer significant. In Fig. 1 the effect of thymidine and thymidylic acid is shown, the mean value before irradiation being taken as 100 per cent. This corresponds to 11.3 mitoses/1,000 nucleated cells.

Fig. 1. The mitotic index in mice bone-marrow on the fourth, seventh and tenth day after irradiation and injection of saline (white); 2 mgm. calcium thymidylate (black); and 1.25 mgm. thymidine (shaded).

The number of chromosomal aberrations was somewhat higher in animals treated with deoxyribonucleotides than in the control group (on the fourth day 12 per cent compared with 11 per cent, on the seventh day 10 per cent and 5 per cent) but the differences were not statistically significant. In similar experiments with unirradiated mice the mitotic index was not influenced.

The changes in deoxyribonucleic acid synthesis were in the same sense as the changes in the mitotic index in bone-marrow. Results obtained on the seventh day after irradiation in mice injected with deoxycytidylic acid and deoxycytidine are given in Fig. 2.

Fig. 2. The mitotic index in bone-marrow (B) and the rate of deoxyribonucleic acid synthesis in spleen (A) on the seventh day after irradiation and injection of saline (white); 0.1 mgm. deoxycytidylic acid (black); or 0.075 mgm. deoxycytidine (shaded).

The results thus agree with those arrived at in previous studies of the peripheral blood count. They show that pyrimidine deoxyribonucleotides hasten the regeneration of haematopoietic tissue after irradiation.

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Mixed Pigments in Colour Vision

RUSHTON¹ has recently suggested that the 'red' mechanism of the normal eye depends upon a mixture of two light-sensitive pigments, one of which is the same as that used for the 'green' mechanism. Marriage² has pointed out that addition of 'green' sensitivity to the red mechanism in this way will not affect the position on the chromaticity diagram of the red fundamental stimulus, but will affect that of the green fundamental stimulus, and will move it towards or away from the red fundamental point.

It is interesting to observe, therefore, that while the red and blue fundamental points have been determined by a number of different workers to a fair degree of consistency, efforts to locate the green point have always shown considerable scatter in the red-green direction; indeed, while some locations are at the green end of the diagram³ others are in the opposite direction in the region well beyond the red end of the diagram⁴; and, while this abrupt difference is an artefact of the diagram itself, there is none the less a very considerable scatter.

It seems possible, then, that this scatter, which has for so long confounded efforts to locate the green fundamental point, may be caused in large part by variations in the relative amounts of the two pigments present in the red mechanism of the eye, the proportions of which could depend in various ways on the viewing conditions.

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² Marriage, A., *Nature*, **160**, 197 (1947).

³ Wright, W. D., "Researches on Normal and Defective Colour Vision", 272 (Kimpton, 1946).

⁴ Wasseff, E. G. T., *Optica Acta*, **5**, 101 (1958).

BIOCHEMISTRY

Native Tobacco Mosaic Virus Protein of Molecular Weight 18,000

X-RAY diffraction data on tobacco mosaic virus have been interpreted in terms of protein repeat units with a molecular weight of about 18,000 arranged in a helix¹. Amino-acid analyses and end-group titrations² yield a similar minimal value but do not answer the question whether the ultimate molecular weight is 18,000 or some integral multiple of it. Thus far, the smallest native protein particles obtained by degradation of tobacco mosaic virus³⁻⁵ have shown molecular weights of about 100,000. We have now been able to dissociate tobacco mosaic virus protein into undenatured particles with a sedimentation coefficient consistent with a molecular weight of 18,000.

Sedimentation studies were carried out in the synthetic boundary cell in a 'Spinco' ultracentrifuge at temperatures of 0–6°C. on protein prepared by treatment of tobacco mosaic virus at pH 10.3 and afterwards diluted to concentrations as low as 0.01 per cent with 0.05M phosphate buffer at pH 7, with 0.1M phosphate buffer at pH 6.5 or with 0.1M borate buffer at pH 9. The centrifuge was operated at 59,780 r.p.m. and the boundary migration was followed by schlieren optics. As can be seen in Fig. 1, when the protein is diluted, the sedimentation-rate decreases from the value of about 4 Svedbergs frequently observed. The minimum value was 1.9