COLOUR VISION OF TWO ALBINOS*†

BY

R. W. PICKFORD‡ AND W. O. G. TAYLOR§

Glasgow

PICKFORD (1951, 1958) reported the result of colour vision tests in three albinos, each of whom showed minor red vision deficiencies in the red/green anomaloscope equation. Since this is of interest to ophthalmologists in general, two further cases are reported below. Each subject was tested with the Ishihara test and the red/green equations of both the Nagel and the Pickford anomaloscopes.

Case Reports

Case 1. A young man aged 20 years. Albinism was not manifest in his immediate relatives (father, mother, sister), but his maternal grandmother and some of her brothers and sisters were reported to have had "very fair hair". The patient made five errors on the 25-plate Ishihara test, one of which on Plate 25 (95 for 96) accorded with protanomaly. On the Nagel anomaloscope he had an extended matching range of 7 units (in a total of 72 units from green to red), with a mid-matching point deviation of one unit to the red side. On the Pickford anomaloscope he had an enlarged matching range of 4 units (in a total of 82 units from red to green), with a red deviation of 2.5 units.

Case 2. A young man now aged 23 years. He is working as an executive officer in the civil service and is a complete albino, with nystagmus in all positions, slight photophobia in bright light, a right convergent squint, and no fundus abnormality apart from albinism. No albinism is manifest in his immediate relatives (father, mother). He attended an oculist at an early age while living in Glasgow and was given tinted glasses to correct a moderate degree of hypermetropic astigmatism.

In December, 1965, at the age of 21, he was referred to the Colour Vision Laboratory in the Department of Psychology at the University of Glasgow and the following results were obtained:

On the Ishihara 25-plate test he made eight errors, one of which, on Plate 22 (25 for 26) accorded with protanomaly. On the Nagel anomaloscope he had an extended matching range of 5 units, and a mid-matching point deviation of 5 units to the red side. On the Pickford anomaloscope he had a matching range of 2 units (almost normal), with a red deviation of 2 units.

At the time of the test the visual acuity was rather better than 6/60 with + 3.5 D sph., + 3.5 D cyl., axis 90° in the right eye, and + 4 D sph., + 3.5 D cyl., axis 90° in the left. The lenses were tinted "Solbar No. 2", of which the integrated visible transmission is reported by the suppliers (M. Wiseman & Co. Ltd.) to be 80 per cent. under Standard Illuminant 'A' of the *Commission Internationale de l'Éclairage* (CIE) for a lens of 2 mm. thickness. With this illuminant the absorption is almost level throughout the spectrum. It is greatest in the blue region with a transmission of approximately 75 per cent. In the green/yellow portion transmission is about 80 per cent. and in the red portion 95 per cent. The lenses used had a probable axial thickness of 4.5 mm. for

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† Address for reprints: Department of Psychology, Adam Smith Building, University of Glasgow.

‡ Professor of Psychology, The University of Glasgow.

§ Senior Consultant Ophthalmologist, Ayrshire.

“normal” viewing and the absorption is logarithmically related to the thickness. The effect of ageing on the absorption can be ignored, since artificial solarization resulted in less than 4 per cent. increase in absorption, the increase being substantially non-selective in character.

This tint is therefore very nearly neutral and its effect on colour vision should be negligible: if anything it will increase the warm, or orange-pink, appearance of all objects, and hence tend to counteract the subject's slight loss of red sensitivity.

Since this test was performed the patient has been fitted with bluish-tinted contact lenses at Moorfields Eye Hospital, and this has improved the visual acuity to 6/24 in the right eye and 6/36 in the left, and has reduced the nystagmus, particularly when reading.

A review of these two cases shows that, with the exception of one plate each, both read correctly all the “Qualitative Plates” in the Ishihara Test which are designed to distinguish protans from deutans. Four errors overall in the 25-plate test is accepted as indicating abnormality in this test (Belcher, Greenshields, and Wright, 1958). The first patient made five errors and the second eight errors overall. These results accord with previous findings (Pickford, 1951, 1958). All albinos tested have had minor red colour vision defects similar to mild forms of protanomaly.

ADDENDUM

The second subject, who was tested while wearing tinted lenses, now resides in London, and was seen again on a temporary visit to Scotland after the submission of the above paper. Tests on the Pickford Anomaloscope by the second author showed deviation to the red side to be one unit greater when wearing plain lenses in trial frames as compared with the deviation when wearing the tinted lenses. Thus the theoretical effect of the tinted lenses has been confirmed in practice.

REFERENCES

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