

before being mixed in an integrator, and any required colour is obtained by combining the appropriate amounts of the three nearest primary beams. The range of colours covers the spectrum from extreme red to emerald green (550 mm.) and the area enclosed by this spectrum, and turquoise, royal blue, and purple with provision for particular consideration of white and yellow. The calibration was done with great care with a view of eliminating relative error between similar colours and to allow of statistical examination of results.

The test colours were obtained by the use of stencils selecting the primary beams, which gave 256 points on the colour chart, all being of the same luminous intensity and brightness, and each having a closely similar energy distribution to that which would be given by the corresponding colour filter, and would be used in practice.

The method of experiment was to show the 256 colours in random succession to an observer who was asked to give one of the simple names, red, yellow, green, blue, purple or white—to each test colour. This experiment was repeated for fifty observers, all of normal colour vision, and thus the number of times that any particular colour was given a particular name was found. Contours were then drawn on the colour chart showing the percentage frequency with which those simple names occurred over the whole area covered by the apparatus. A diagram is given showing the distribution of the names 'red' and 'green' for an illumination of 10 sea-mile candles at the observer. The experiment was further repeated with six observers selected to give average results, each making three observations at four different illumination levels, and with several different choices of names such as red, green, or white, and red, yellow, green or white and so on, and contours were drawn for each set of conditions. Experiments were carried out on the effect of a comparison light, light adaptation, and presbyopic vision, and altogether some 43,000 observations have been analysed and are represented in the diagrams.

The results are difficult to summarize, as the experiments were intended as a contribution to knowledge of colour recognition rather than a complete statement of the distribution of colour names. Red is the ideal signalling colour, being easily produced and yet recognized down to the lowest illuminations, even when not fully saturated. Green is satisfactory under usual conditions, but must be considerably restricted if blue is also used for signalling. Blue and purple cannot be regarded as satisfactory, the former requiring very high intensity and the latter depending on the dichromatic aberrations in the eye. Yellow and white are satisfactory if used separately, but they cannot be used together unless the white approximates to daylight.

It may be noted that whereas yellow has often been thought unsatisfactory, because of the confusion with white, the case is really that many whites are unsatisfactory because they are themselves too yellow. No significant difference was found between monochromatic sodium light and the equivalent lamp and filter combination. Presbyopic vision and light adaptation both assisted the recognition of blue and purple signals.

The paper concludes with a calculation of the optimum transmission factor for green colour filters based on the results obtained, and gives results which are reasonably consistent with those adopted in practice.

FORTHCOMING EVENTS

(Meeting marked with an asterisk is open to the public.)

Monday, April 7

ROYAL GEOGRAPHICAL SOCIETY (at Kensington Gore, London, S.W.7), at 5 p.m.—Mr. W. E. Doran: "The Ouse Drainage Problem".

Tuesday, April 8

CHADWICK PUBLIC LECTURE (at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1), at 2.30 p.m.—"Air Raid Shelters—Design and Construction, with special reference to Hygienic Considerations" (Dr. S. L. Wright: "Hygienic Considerations"; Mr. Phillip O. Reece: "Design and Construction").*

ILLUMINATING ENGINEERING SOCIETY (at the E.L.M.A. Lighting Service Bureau, 2 Savoy Hill, London, W.C.2), at 2.30 p.m.—Dr. J. W. T. Walsh: "The Measurement or Gauging of Low Values of Illumination and Brightness"; Mr. J. S. Dow: "Visibility by White and Coloured Light".

Wednesday, April 9

SOCIETY OF CHEMICAL INDUSTRY (at British Medical Association House, Tavistock Square, London, W.C.1), at 11 a.m.—Discussion on "Vegetables as Food".

APPOINTMENTS VACANT

APPLICATIONS are invited for the following appointments on or before the dates mentioned:

WOMAN GRADUATE IN PHYSICS—The Clerk to the Governors, South-East Essex Technical College, Longbridge Road, Dagenham (April 9).

PRINCIPAL OF THE CHISWICK POLYTECHNIC—The Secretary (T), Middlesex Education Committee, Acton County School, Gunnersbury Lane, London, W.3 (April 16).

PRINCIPAL OF THE ENFIELD TECHNICAL COLLEGE—The Secretary (T), Middlesex Education Committee, Acton County School, Gunnersbury Lane, London, W.3 (April 16).

PRINCIPAL OF THE TOTTENHAM TECHNICAL COLLEGE—The Secretary (T), Middlesex Education Committee, Acton County School, Gunnersbury Lane, London, W.3 (April 16).

PRINCIPAL OF LURGAN TECHNICAL INSTITUTE—Mr. H. O. Armstrong, Technical Institute, Lurgan, Co. Armagh (April 21).

TEACHER (MAN) OF ENGINEERING AND MATHEMATICS at the Grimsby Technical College—The Director of Education, Education Offices, Eleanor Street, Grimsby (April 30).

TEACHER OF MINING AND ENGINEERING SUBJECTS—The Principal, Technical Institute, Canterbury.

PROFESSOR OF PATHOLOGY and a PROFESSOR OF PHYSIOLOGY—The Secretary, University College, Cork.

ENGINEER for the Public Works Department of the Government of Sierra Leone—The Crown Agents for the Colonies, 4 Millbank, London, S.W.1 (quoting M/9552).

REPORTS AND OTHER PUBLICATIONS

(not included in the monthly Books Supplement)

Great Britain and Ireland

British Electrical and Allied Industries Research Association. Technical Report, Reference W/T4: Improvement of Load Factor in Farm Grinding. By W. H. Cashmore and C. A. Cameron Brown. Pp. 30. (London: British Electrical and Allied Industries Research Association.) 2s. 6d. net. [63]

Philosophical Transactions of the Royal Society of London. Series A: Mathematical and Physical Sciences. No. 802, Vol. 239: X-Ray Crystallography and the Chemistry of the Steroids, Part 1. By J. D. Bernal, Dorothy Crowfoot and I. Fankuchen. Pp. 135-182. 7s. 6d. Series B: Biological Sciences. No. 574, Vol. 230: The Colours of the Plumose anemone *Metridium senile* (L.). By D. L. Fox and C. L. A. Pantin. Pp. 415-450. 5s. 6d. No. 575, Vol. 230: On the Bicoecidae, a Family of Colourless Flagellates. By L. E. R. Picken. Pp. 451-474. 4s. (London: Cambridge University Press.) [63]

Proceedings of the Royal Society of Edinburgh. Section A (Mathematical and Physical Sciences.) Vol. 61, Part 1, No. 1: On Hamilton's Principal Function in Quantum Mechanics. By E. T. Whittaker. Pp. 19. 1s. 7d. Vol. 61, Part 1, No. 2: The Van der Waals Force between a Proton and a Hydrogen Atom. By Dr. C. A. Coulson. Pp. 20-25. 6d. Vol. 61, Part 1, No. 3: Reciprocity, Part 5: Reciprocal Spinor Functions. By Dr. Klaus Fuchs. Pp. 26-36. 1s. (Edinburgh and London: Oliver and Boyd.) [63]