

DALTONIANA

NEWSLETTER

OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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Nr 5 - 15th July 1972

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ALL MEMBERS WHO INTEND TO PARTICIPATE OR TO PRESENT
A PAPER AT OUR NEXT SYMPOSIUM IN EDINBURGH AND WHO DID NOT
RETURN THE FORM JOINED TO Daltoniana nr. 3 ARE REQUIRED TO
SEND BY RETURN OF MAIL THE FORM ON THE LAST PAGE OF THIS
NUMBER.

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LITERATURE SURVEY

Three-color visual response, by W.A. THORNTON (Fluorescent and Vapor Lamp Division, Westinghouse Electric corp. Blomfield, New Jersey, 07003), J. Opt. Soc. Amer. 62/3, 457-459, 1972.

The perceived chromaticity of an object or a light source is established with minimum power input to the eye when light from the object or the light source is composed of a mixture of spectral colors near 450, 540 and 610 nm. In white light these are the most effective wavelengths for color discrimination of illuminated objects: least effective are wavelengths near 500 nm and 580 nm. Proper identification of chromaticities of colored objects is improved by elimination of the latter two wavelengths. The findings are related to the three-color response of human vision consisting of well-separated channels peaking near 450, 540 and 610 nm with minima near 500 and 580 and at the spectral ends. - Ingeborg Schmidt.

On the variability of total visual scotopic transmittance of red and blue filters, by L. RONCHI and M. CETICA (Istituto Nazionale di Ottica, Arcetri, Florence 50125, Italy), Atti Fond. G. Ronchi 27/2, 180-190, 1972.

The total visual scotopic transmittance of two Wratten filters (N. 47, blue and N. 25, red) is first estimated by making reference to a given scotopic sensitivity function. It is found to amount to about 10% for both the filters. On the other hand, the experimental values, recorded by comparing the absolute threshold for illuminant A, with that recorded after having inserted the selective filter in the beam (test spot size 6') range from 3% through 20% for the blue filter, and from 0.7% through 12% for the red filter. This spread of data is ascribed to the individual differences in the course of sensitivity across the dark-adapted retina, and to its dependence on both wavelength and flash duration, for a small test-spot. -Lucia Rositani-Ronchi

Phenotypic diagnosis of protan and deutan heterozygosity, by Th. P. PIANTANIDA (Univ. of Texas Graduate School of Biomed. Sciences, Houston, Texas, 77025), Invest. Ophthalm. 10/12, 979-984, 1971.

During repeated anomaloscopic testing it was found that the variability of brightness matches was smaller for dichromatic than for trichromatic persons and that the spectral region of least variability of brightness matches was characteristic: it occurred at a color mixture setting of 20 for deuteranomalous subjects, at 40 for normal subjects and between 40 and 73 for protanomalous subjects. Variability of heterochromatic brightness matching was found to be a manifestation of heterozygosity by testing 18 women, including 5 deutan heterozygous, 18 protan heterozygous, 4 normal homozygous and 1 assumed nonallelic compound heterozygous. Their anomaly quotients ranged from 0.74 to 1.22, all of which are within the limits of normal color vision. The data indicate that a minimum of the brightness settings to the long wavelength side of the normal match point (40 (R+G)=15Y) is characteristic of heterozygosity for protan color vision defects and a shift of minimum average variance of brightness settings to wavelengths shorter than the normal match point is indicative of heterozygosity for deutan color vision. - Ingeborg Schmidt.

An analysis of the reliability and validity of the Ishihara color plates with mentally retarded males, by J. SALVIA and J. YSELDYKE (Institute for Research on Exceptional Children, Univ. of Illinois) Percept. Motor Skills 33/1, 243-246, 1971.

69 institutionalized mentally retarded boys, age range 8 to 17 years, were tested to determine reliability and criterion validity of the Ishihara color plates which contained

7 number plates and 7 trail plates. All plates were shown, using a type illuminant. No time limit was imposed. If both naming and tracing were incorrect the plate was considered failed. Any child who failed one of the 7 plates in a section was diagnosed as color blind on that section. All boys were tested for the first time during July 1969 and the test was repeated during April 1970. The result of an anomaloscope test (Pickford, Brit. J. Physiol. Opt. 14, 2, 1957) was used as the criterion to estimate the validity of the Ishihara plates. The Ishihara number plates classified 39% of the boys as color blind on both test periods. Administration of the Ishihara trail plates classified 23% as color blind on the first test and 21% on the retest. Six boys (8.7%) failed the anomaloscope. These 6 boys failed both the number and the trail plates on test and on retest. Three reliability indices were calculated. The results indicated that despite of high internal consistency the diagnostic stability and validity of the Ishihara plates are too low for accurate screening of a population of low intelligence. - Ingeborg Schmidt.

Colour-Stress Test, by V.N. MARINCHEV and S.K. ZHULMURZIN, Annals of Ophthalmology (Moscow) No 1, p. 60, 1972.

An original method for investigating photo- and colour-stress under clinical condition has been devised to be used as a physiological load test. It provides for the application of a pulsing lamp with a set of neutral and coloured filters. The movement of successive images is analyzed on a screen illuminated by an intermittent light. Mean values for the duration of photo- and colour - stress for clinically healthy subjects have been deduced and the method was tried on glaucomatous patients. Coloured stimuli are shown to have an advantage over the white ones. The method is simple, not time-consuming, the equipment for its implementation being portable and easy to handle. - Marion Marré.

About Disturbances in Colour Vision in Hypertonic Disease and Atherosclerosis, by M.S. TRUSOV, Ophthalmological Journal (Odessa) No. 1, 19-22, 1972.

118 patients with hypertonic disease and 36 patients with atherosclerosis were examined. Perception thresholds (Soviet Anomaloscope AN-59) increase to all basic colours : red, blue, green. However no direct relationship between thresholds of colour perception and height of arterial pressure, changes in the eye fundus or disturbance in the peripheral vision was found. - Marion Marré.

The distribution of the spectral locus of "Unique Green" in samples of normal trichromats, By H. KALMUS (Galton Laboratory, University College London, England), Ann. Hum. Genet. (Lond) 35, 369-374, 1972.

Contrary to Rubin's (1962) and Richards (1967) findings but in agreement with Hurvich et al. (1968) and Verriest (1970), no bi-modality was found in the distribution of the spectral

locus of unique green among male and female samples of normal trichromats and using several methods.

As no separate groups for pure-green perception could be ascertained, the question of a possible link with the sex-linked modality in anomaloscope readings as described by Waaler does not arise. Richards does not mention the proportion of sexes of his subjects but in Rubin's sample there were over 50 per cent females. Their two groups would thus not agree with the three groups postulated by Waaler and Linksz, for female observers. - H. Kalmus.

Pure (unique) green and a neutral zone in the spectrum of colour defectives, by H. KALMUS (Galton Laboratory, University College London, England), Ann. Hum. Genet. (Lond.) 35, 375-377, 1972.

Fifty-four colour defectives were tested on a monochromator by a method of forced choice, a method of free choice, or both for the spectral locus of pure (unique) green and defining pure green as neither "blue" nor "yellow". Some defectives could find a wavelength which appeared more or less saturated to them while others found a wider range colourless, describing it as white or grey. In the free-choice experiment only subjects experiencing some green sensation could produce useful readings. Protan as well as deutan defectives showed some displacement of unique green towards shorter wavelength or alternatively the more severe cases had a neutral zone in the spectrum even more displaced in the same direction. - H. Kalmus.

Possible cases of relaxed selection in civilized populations, by R.H. POST (Dept. of Human Genetics, University of Michigan Medical School, Ann Arbor, Michigan 48104, U.S.A.), Humangenetik 13, 253-284, 1971.

Colour blindness, and in particular deuteranomaly is significantly less frequent in populations living in "primitive" conditions such as hunters and food gatherers, than among people who have for longer periods lived as agriculturists or in towns. It is argued that civilization has relaxed the selective disadvantage and is thus responsible for the observed increase in colourblindness. Other genetical characters such as myopia or deviations of the nasal septum may have similarly increased since man became more settled in his habitat. The findings of Adam, which to some extent contradict Post's conclusions are discussed. - H. Kalmus.

Linkage studies in X-linked retinitis pigmentosa, by P. GRUTZNER (Universitäts-Augenklinik, Freiburg, Germany), R. SANGER (The Lister Institute, London, England) and B.E. SPIVEY (Pacific Medical Center, San Francisco, California, U.S.A.), Humangenetik 14, 155-158, 1972.

Together with the information from other families described in the literature, it seems likely that the 3 loci, that for retinitis pigmentosa, for color vision and for Xg blood groups, are well spread out on the X chromosome. - H. Kalmus.

New families, one with two recombinants for estimation of recombination between the deutan and protan loci, by S. ARIAS and A. RODRIGUEZ (IVIC, Apartado 1827, Caracas, Venezuela) Humangenetic 14/4, 264-268, 1972.

In an isolate of German ancestry several compound heterozygotes for extreme protanomaly and 3 different deutan genes were discovered. Of 35 informative sons (in 9 sibships), four (in 3 sibships) are said to be recombinants. However no details of the methods used for diagnosis are presented in this article, and only one of the pedigrees is described. In this pedigree a female who is deceased but stated to be doubly heterozygous in repulsion for an extreme protanomaly gene and an unidentified deutan gene has produced three sons: one protan defective, one with normal colour vision and one stated to carry both the protan and deutan gene. More information - quoted as "submitted for publication" - will be required to draw firm conclusions from this apparently unusual situation.

From the combined published data on offspring from compound heterozygous women, including their own, the authors estimate the recombination fraction to be around 0.1; they have not quite correctly analysed the published data and as stated their own data need further factual confirmation. - L.N. Went.

PREPRINTS OF SUMMARIES OF PAPERS WAITING
PUBLICATION

IVth CONGRESS OF THE EUROPEAN SOCIETY OF OPHTHALMOLOGY

(Budapest, April 17 - 21, 1972)

Reflectometry of visual pigments, by R.A.WEALE.

There are certain visual defects, e.g. restrictions of the visual field, slow dark-adaptation, nyctalopia, which make it desirable to determine the concentration and dynamics of the visual pigments contained in the rods and cones.

Considerable information on the physiology relating to the healthy eye has been obtained by the use of a modified ophthalmoscope in which the usual white illuminating light is replaced by spectral lights and the practitioner's eye by a photo-cell (Rushton, 1963; Weale, 1965). Such apparatus simply measures the relative amounts of light returning from the fundus. For example, if the normal eye is dark-adapted,

and visual pigments have been allowed to accumulate, then the photo-cell measures a weak amount of light because some of it is absorbed by the pigments. But if these have been bleached away by a powerful flash, then the photo-cell will record a larger return of light from the fundus. A comparison of these measurements enables one to determine the nature and concentration of visual pigments.

More recently, the technique has been applied successfully to pathological retinæ (Carr, Ripps, Siegel and Weale, 1966). But in view of the large demands made on the patient's cooperation, the photo-electric variant of fundus reflectometry is at present unsuitable for routine clinical use. The contrary is, however, true of its photographic antecedent (Weale, 1957). This entails fundus photography and can be carried out with standard equipment. In its most recent form, Highman and Weale have projected a bright blue-green and black grating on the retina and photographed the same part of the retina afterwards. The photographs clearly show where the blue-green bars bleached the retina. A comparison of the contrast between the light and dark bars provides a measure of the pigment concentration (Highman, 1971). Its regeneration in the dark can be monitored in this way, and data on pathological retinæ (e.g. with retinitis pigmentosa) have been obtained. The evaluation of the negative is being computerised so that the processing of data can be reduced from several hours to a few minutes.

Colour vision, by G. VERRIEST.

The author defines normal colour vision, its intra-individual variations following the state of adaptation of the eye and following the size and the site of the field of observation, and finally its inter-individual variations due to the influence of age and to the existence of congenital and acquired deficiencies of colour vision. These deficiencies are described and classified; their causes are specified; some indications are given for what concerns their clinical interest and their recognition by means of usual tests. The association of the Ishihara test, Tritan-Plate, AO H-R-R; Panel D-15 and anomaloscope is recommended for the routine examination of macular colour vision; different perimetric techniques can be used in the appraisal of peripheral colour vision. This is an important part in the functional examination of the visual organ.

Colour flicker vision tester and its clinical applications, by K. HUKAMI, M. IDEKA and M. URAKUBO.

The colour flicker vision tester employs the flicker photometry between red and green stimuli with and without a red adaptation field. With this tester colour normals and its defectives were tested, and further carriers of prot- and deuteranomalous vision.

The test discriminated colour defectives very clearly from normals, but it showed no correlation between the present results and those determined with an anomaloscope as to the degrees of colour defectives.

Carriers of protanomalous vision showed the Schmidt's sign and furthermore they exhibited a low selective chromatic adapting effect. Carriers of deuteranomalous vision showed deviations from normals in spectral sensitivity and also a low selective chromatic adapting effect.

Binocular colour sensitivity in terms of colour mixing,
by A. MEDGYASZAY.

By using a complementary instrument connected to the Nagel's anomaloscope Type I, the binocular colour sensitivity was determined under conditions of normal colour vision and colour vision deficiencies, and compared with the monocular anormal quotient of the same patients examined. Our examinations of colour mixing presented a more complete quality of the binocular colour sensitivity.

Correlation-statistical investigations into the connection between the spectral sensitivity of the fovea centralis and the three mechanisms of colour vision, by E. MARRE and M. MARRE.

In the case of diseases of the retina the functional defect of the three mechanisms of colour vision (M.C.V.) can be found in the entire area of the fovea. The defect in the blue M.C.V. caused by affections of the retina brings about in a way not yet explainable - a small decrease of the sensitivity in the entire area of the fovea throughout the whole spectrum. Diseases of the optic nerve show, very likely, only a correlation between the spectral sensitivity of the entire foveal region and the one of the green-M.C.V. In the majority of all cases with acquired colour vision deficiencies the level of the maximum of the spectral light-sensitivity can be explained by the connection between the green-M.C.V. and the red-M.C.V.

Acquired colour-sense deficiencies in glaucoma, by C. CVETKOVIC.

Incidence and seriousness of acquired colour-sense deficiencies are directly proportional to the degree of progress of the glaucomatous process. Two groups of defects of colour-sense can be discriminated: (1) alterations which are not characteristic for glaucoma, i.e. disorders in the refractive media (corneal oedema, incipient cataract); (2) dyschromatopsias due to damages of the nervous elements of the retina and optic disc. In the course of glaucoma the acquired dyschromatopsia appears first as a decrease in the hue discrimination in

the colour tint changes and can be detected by the aid of the Panel D-15 as the patient confounds the neighbouring colours. Parallely with the progress of the glaucoma the alterations in the colour discrimination become more pronounced and reach finally the stage of achromatopsy.

The author has examined 100 glaucoma patients during six years by the aid of Ishihara, Panel D-15 and Nagel anomaloscope. Parallely with progress of the anatomical changes and functional disturbances also the incidence and severity of the acquired colour-sense defects increased. The incidence of the disturbances of the blue-yellow discrimination was significantly higher. In the case of patients whose conditions has been followed for years, the progress of the colour-sense deficiency seemed to be more dependent on the tolerance level of the optic disc to the intra-ocular pressure than to the absolute height of the tension in the eye.

Visual perception and visually evoked potential, Colour-dependent variations of the V.E.R., by P.V. BERARD, J. FERRERO-DERANSART and A.F. TASSY.

The first results obtained arise the assumption that the colour-dependent variations of the V.E.R. do not reflect retinal duality but rather a special adherence of wavelengths to different heights of the suprarretinal optic pathways.

Colour vision deficiencies in lorry-drivers, by W. WITUSIK.

Acquired chromato-asthenopia and achromatopsia was found in 3 per cent among the 800 examined lorry-drivers. This deficiency was caused, on one hand, by the intoxication of low concentration combustion gases (effect of carbon monoxide) and of petroleum gases; on the other hand, by excessive smoking and consumption of spirits by the lorry-drivers.

Studies on genetic carriers of protanopic and deuteranopic types of defective colour vision - clinical applications of a colorimeter for colour blindness (Subtester), by H. ICHIKAWA and A. MAJIMA.

Schmidt reported that proto-carriers show a lowering of spectral sensitivity for the lights of long wavelengths.

We produced a portable colorimeter (Subtester) for genealogical investigation which enables to detect proto- and deuterocarriers easily and accurately by measuring spectral sensitivity for lights of 3 dominant wavelengths (635, 575 and 545 nm).

Protanopic and deuteranopic defectives, their genetic carriers and normals were examined with this instrument. Approximately 70% of the proto-carriers and 60% of deuterocarriers showed deviations from normals. Furthermore discussion will be made on a few interesting pedigrees in which the Subtester was useful in the studies of genetic carriers.

Turner's syndrome and protanopia, by P. GRUTZNER and E. ALEXANDRIDIS.

In a patient with Turner's syndrome the responses on the Nagel anomaloscope corresponded to those from persons with achromatopsia. The position of the neutral point and the hue discrimination curve led to the diagnosis of dyschromatopsia. One of her brothers was protanope. The suspicion of XO-XX mosaicism could not be confirmed by the culture of lymphocytes.

Oscillatory potentials in congenital achromatopsia with amblyopia, by A. DAMEL and A. GONELLA.

The authors examined eight patients between 8 and 16 years of age. In every case amblyopia, nystagmus and minute macular changes were observed as well as central scotomas and modifications in the photopic part of the adaptation-curve.

The study of the colour vision was performed according to the school of Ghent, executing the following tests in each case : Ishihara, Tritan plate, AO HRR, Panel D-15, 100 hue under an illuminant C and finally anomaloscope.

The analysis of the bioelectric activity of the retina was recorded by a classical ink-writer; subnormal electroretinogram was found with the absence of the photopic activity and a lowered C.F.F.

The study of the oscillatory potentials was carried out by using an oscilloscope Tektronix 5030. The xenon-lamp photostimulator was used producing three different intensities.

The subject of this work is to establish a ratio between the photopic complex and the oscillatory potentials.

Visual field and colour vision disturbances in occupational intoxications, by I. KRAUSE-LIEBSCHER.

Hypoxidoses due to intoxication lead to the development of well-known visual disturbances. The author gives particulars of the symptomatology on the basis of examples and stresses the necessity that the factory physician has to consult the ophthalmologist of the works in order to clear up the differential diagnostic, pathophysiologic and therapeutical problems.

LISTS OF THE PUBLICATIONS ON COLOUR VISION
DEFICIENCIES OF MEMBERS OF THE RESEARCH GROUP

15. Papers by Prof. Leo HURVICH and Dr. Dorothea JAMESON-HURVICH (Dept. of Psychology, Univ. of Pennsylvania, 3813-15 Walnut Street, Philadelphia, Penn. 19104 U.S.A.)

HURVICH L.M. & JAMESON D. - Some quantitative aspects of an opponent-color theory. II. Brightness, saturation, and hue in normal and dichromatic vision, J. opt. Soc. Amer. 45, 602-616, 1955.

- HURVICH L.M. & JAMESON D. - A quantitative theoretical account of color vision. Trans. N.Y. Acad. Sci., 18, 33-38, 1955.
- JAMESON D., HURVICH L.M. - Theoretical analysis of anomalous trichromatic color vision, J. opt. Soc. Amer. 46, 1075-1089, 1956.
- JAMESON D. - The opponent pairs scheme : Abnormal color vision. Part 2. In : Mechanisms of colour discrimination (Ed. Galifret, Y.), 261-271. London : Pergamon Press 1960.
- HURVICH L.M., JAMESON D. - Color vision. In : Annual Review of Psychology. Vol. 11, 99-129. Palo Alto, California : Annual Reviews, Inc. 1960.
- HURVICH L.M., JAMESON D. - Color theory and abnormal red-green vision, Doc. Ophthal. 16, 409-442, 1962.
- R HURVICH L.M., JAMESON D. - Does anomalous color vision imply color weakness? Psychon. Sci. 1, 11-12, 1964.
- HURVICH L.M., JAMESON D. - Theorie der Farbwahrnehmung. In : Handbuch der Psychologie. Vol. 1. (Ed. Metzger, W.), 131-160. Göttingen : Verlag für Psychologie, Hogrefe, 1966.
- R JAMESON D., HURVICH L.M. - Opponent-response functions related to measured cone photopigments. J. opt. Soc. Amer. 58, 429-430, 1968.
- YAGER D., JAMESON D. - On criteria for assessing type of colour vision in animals, Animal Behaviour 16, 29-31, 1968.
- R HURVICH L.M., JAMESON D. - Color vision and color coding, In : Perception and Its Disorders. Vol. 48, Research Publications, Association for Research in Nervous and Mental Disease, 12-25. Baltimore : Williams and Wilkins, 1970
- R HURVICH L.M. - Is the central fixation area of the fovea blue-blind? In : AIC "Color 69" Stockholm, 49-57. Göttingen, - Musterschmidt, 1970.
- HURVICH L.M. - Color vision deficiencies. In : Handbook of Sensory Physiology, Chapter 23. Vol. VII/4. Visual Psychophysics. Heidelberg : Springer-Verlag 1972.
16. Papers by Prof. D.B. JUDD (3115 Leland street, Chevy chase, Maryland 20015, U.S.A.)
- JUDD D.B. - Color-blindness and anomalies of vision, Soc. Motion Picture Engin. 26, 616-636, 1936.

JUDD D.R. - Colorblindness and the detection of camouflage. Science, 97, 544-546, 1943.

JUDD D.B. - Facts of color-blindness, J. Opt. Soc. Amer. 33, 295-307, 1943.

JUDD D.B. - Standard response functions of protanopic deuteranopic vision, Res. nat. Bur. Stand. 33, 407-437, 1944.

JUDD D.B. - Color vision. In : O. GLASSER, Medical Physics, Chicago, 1944.

JUDD D.B. - Current views on color blindness, Docum. ophthal. 3, 251-288, 1949.

JUDD D.B. - Color perceptions of deuteranopic observers, J. Res. nat. Bur. Stand. 41, 247-271, 1949.

JUDD D.B. - The color perceptions of deuteranopic and protanopic observers, J. opt. Soc. Amer. 39, 252-256, 1949.

JUDD D.B. - Response functions for types of vision according to the Müller theory, J. Res. nat. Bur. Stand. 42, 1-6, 1949.

JUDD D.B. - Standard response functions for protanopic and deuteranopic vision, J. Opt. Soc. Amer. 35, 199-221, 1945; 39, 505, 1949.

JUDD D.B., PLAZA L. & FARNSWORTH D. - Tritanopia with abnormally heavy ocular pigmentation, J. Opt. Soc. Amer. 40, 833-841, 1950.

JUDD D.B. - Cequera para el color y teorías de la vision cromatica, Anal. Real Soc. Espan. Fisica Quimica 47, 35-67, 1951.

JUDD D.B. - Basic correlates of the visual stimulus. In : S.S. STEVENS, Handbook of experimental psychology, New York, 1951.

JUDD D.B. & WYSZECKI G. - Color in business, science, and industry, New York, 1952. (2nd ed., New York, 1963).

JUDD D.B. - Entoptic color perceptions of the macular pigment by observers of normal and color-defective vision according to a three-components theory. In : Coloquio sobre problemas opticos de la vision, Madrid, 1953.

JUDD D.B. - Problemas actuales del color, Madrid, 1954.

JUDD D.B. - Color vision and Colorimetry. In : E.V. LONDON and H. ODISHAW, Handbook of Physics, New York, 1958.

- JUDD D.B. - Relation between normal and dichromatic vision, Acta chromat. 1, 89-92, 1964.
- JUDD D.B. - Fundamental studies of color vision from 1860 to 1960, Proc. nat. Acad. Sci. 55, 1313-1330, 1966.
- JUDD D.B. - Color appearance, Die Farbe, 14, 2-26, 1966.
- JUDD D.B. & EASTMAN A.A. - Prediction of target visibility from the colors of target and surround, Illum. Engin. 66, 593-598, 1967.
- JUDD D.B. - Physiological optics at the National Bureau of Standards, Applied Optics 6, 13-26, 1967.
- JUDD D.B. & YONEMURA G.T. - CIE 1960 UCS diagram and the Müller theory of vision, J. Res. Nat. Bur. Stand. 74A, 23-29, 1970.

PERSONALIA

An honorary degree of doctor of science has been awarded at Goucher College to M. Catherine Rittler, a Goucher alumna, who has been an investigator and teacher in the Department of Ophthalmology at the College of Physicians and Surgeons of Columbia University since 1936.

OFFICIAL COLOUR VISION REQUIREMENTS

FINLAND (1972)

	Colour vision requirements	Tests
Private car driving	No limitations	
Lorries	No limitations	
Taxis, busses	Achromats excluded	
Railways cat. 1-5	Normal	Velhagen
cat. 6	No limitations	
Aviation profess.	Normal	Ishihara
private	Normal	Ishihara
Marine (deck)	Normal	Velhagen
Army aviation	Normal	Ishihara
transport	Normal	Ishihara
militia	No limitations	

J. Helve.

AUSTRIA (1972)

Colour vision requirements	Tests
Private car driving Lorries, taxis, busses Railway Airway (civil and military)	Protanopes and achromats excluded
	Stilling (or Velhagen, or Ishihara) and (if the testee makes a mistake) Nagel anomalos- cope

O. Neubauer.

SECOND SYMPOSIUM OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

EDINBURGH 28TH - 30TH JUNE 1973.

PAPERS ALREADY ANNOUNCED

- J. BIRCH-COX : Isochromatic lines and the design of colour vision tests.
- S.R. COBB : Genetic aspects of colour vision falling within normal limits
- J. FRANCOIS : Chromosomal aberrations and congenital deficiencies of colour vision.
- B.V. GRAHAM : Color vision deficiencies of the peripheral visual field.
- H. KALMUS : The colour rule as a diagnostic instrument.
- M. MARRE, U. NEMETZ and O. NEUBAUER : Color vision and the "pill".
- J.D. MORELAND : Calibration problems with Nagel anomaloscopes.
- J.D. MORELAND : A new anomaloscope employing interference filters.
- R.W. PICKFORD : Personality and colour vision deficiencies.
- M. RICHTER : Experiences in color vision examinations of industrial personnel.
- A. ROTH : About the anomaloscope.
- H. SCHÖBER and I. RENTSCHLER : Fast evaluation of data in subjective colour comparison.
- G. VERRIEST : The spectral curve of relative luminous efficiency in different age groups of aphakic subjects.
- G. VOGT : Spectral mixture curves for protanopic, deuteranopic, and tritanopic subjects.
- R.A. WEALE : Erythronopsia ex aphakia
- L.N. WENT : Colour vision and linkage studies in a pedigree with a tritan defect.

To be detached and returned to Dr. G. Verriest
before 31th august 1972.

SECOND SYMPOSIUM OF THE INTERNATIONAL
RESEARCH GROUP ON COLOUR VISION DEFICIENCIES :
EDINBURGH 28th - 30th JUNE 1973.

"RECENT ADVANCES IN COLOUR VISION DEFICIENCIES"

Preliminary registration form

I, the undersigned (name, and, if still not member of
the Group, function and full address in block capitals)

- do not intend to participate to the symposium
- intend to participate to the symposium
 - without presenting a paper
 - presenting a paper of 5 min
 - 10 min
 - 15 min

on the following subject

Probably I will require accommodation for one
 two
 three persons

Please send also invitations to

Signature.