

# DALTONIANA

## NEWSLETTER

### OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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#### LITERATURE SURVEY

Correspondance. - May I suggest that future abstracts in Daltoniana will (still) include author's address, so as to enable readers to ask for reprints? - A. Adam.

Flicker responses in monkey lateral geniculate nucleus and human perception of flicker, by H. SPEKREIJSE, D. VAN NORNEN and T.J.T.P. VAN DEN BERG (Laboratory of Medical Physics, Univ. of Amsterdam, and Institute for Perception TNO, Soesterberg), Proc. nat. Acad. Sci. USA, 68, 2802-2805, 1971.

An analysis was made of the impulse discharge patterns - evoked by sinusoidal luminance modulation - of single cells in the lateral geniculate nucleus of the macaque monkey. The goal was to determine whether a correspondence could be observed between flicker detection by human subjects in psychophysical experiments and electrophysiological measurements of discharge patterns of single cells of the lateral geniculate nucleus. It was found that the average discharge patterns of single cells exhibited the following behavior when mean retinal illumination was changed: In the low-frequency region (less than about 10 Hz) the response strength (impulses/sec) is independent of the mean luminance, in accordance with Weber's law; above about 10 Hz the response depends on the absolute modulation amplitude, in accordance with the Ferry-Porter law. Therefore the main features of human critical flicker frequency data are already present in the cellular (lateral geniculate nucleus) response of the macaque monkey. However, the steepness of the high frequency fall-off in the response characteristics of these cells is much less than the corresponding fall-off in the human critical-flicker-frequency curves. - The Authors.

Macaque lens absorption in vivo, by D. VAN NORDEN (Institute for Perception TNO, Soesterberg), Invest. Ophthalmol. 11, 177-181, 1972.

The spectral density of the macaque lens was calculated from the difference between spectral sensitivity curves measured (with an electronretinographic technique) before and after lens extraction. The values found correspond with Boettner's data on excised lenses. - The Author.

Some dynamic features of colour vision, by D. REGAN and C.W. TYLER (Department of Communication, University of Keele, Keele, Staffordshire, England STS 5 BG), ISCEERG Newsletters 13/1, 1972.

The experiments are analogous with classical studies of threshold luminance perception, with wavelength changes replacing intensity changes. Throughout the spectrum the shapes of the sensitivity-vs.-frequency curves for the perception of wavelength modulation are quite different from the shapes of the analogous (De Lange) curves for luminance modulation. These curves are interpreted as descriptions of the different attenuation characteristics of the neural mechanisms which underlie the perception of threshold changes of stimulus wavelength and intensity respectively. Tentative attempts are made to use the data as fresh test of colour vision. The data indicate that dynamic wavelength discrimination curves cannot straight forwardly be related to CIE data. - Ilmari Rendahl.

Temporal summation and its limit for wavelength changes : an analogy of Bloch's law for color vision, by D. REGAN and C.W. TYLER (Department of Communication, University of Keele, Keele, Staffordshire, England STS5BG), ISCEERG Newsletters 13/1, 1972.

Temporal summation and its limits were studied at subjective threshold by varying the pulse duration of (a) constant-luminance pulse changes of wavelength, and (b) constant wavelength pulse changes of luminance. The data bear on the question of what part is played in color vision by the neural encoding of information in the time domain. They can provide fresh empirical tests of current theories of color vision. The findings are tentatively interpreted (a) in terms of different critical events in Walraven's luminosity and chromaticity channels; these critical events are supposed to limit temporal summation for luminance pulses and wavelength pulses, respectively, and (b) from the viewpoint that central neural processing plays an important part in (task dependent) summation. - Ilmari Rendahl.

Pigments and signals in colour vision, by W.A.H. RUSHTON, J. Physiol. 220/3, 1P-31P, 1972.

A review paper. The evidence for pigment loss in various types of colour deficiency is discussed. - Jennifer Birch-Cox.

Visual acuity and the blue cone monochromat, by D.G. GREEN, J. Physiol. 222/2, 419, 1972.

Under normal refractive conditions dichromats do not appear to suffer reduced visual acuity. This leads to the question of whether the inactive receptors have been filled with the remaining active visual pigments. The blue cone monochromat is a more extreme example of a reduced form of normal vision with a single cone system operating at photopic levels. Results reported here (from a technique involving the threshold visibility of a blue sine-wave grating superimposed on a bright yellow background) show that visual acuity is reduced by a factor of 6 from the normal. This is due both to lack of resolution and of contrast sensitivity. It is concluded that the blue channel remains the same as in the normal eye and that therefore no "filling in" of pigment has occurred. - Jennifer Birch-Cox.

Psychophysical estimates of visual pigment densities in red-green dichromats, by S.S. MILLER, J. Physiol. 213/1, 89-108, 1972. -1

Various methods are described in which the visual pigments present in dichromats can be measured; these include densitometry and heterochromatic flicker photometry in various preadaptive states. The results are compared and an estimation of the probable pigment densities is derived. - Jennifer Birch-Cox.

Rhodopsin bleaching signals in essential night blindness, by M. ALPERN, M.G. HOLLAND and N. OHBA, J. Physiol. 225, 457-476, 1972.

Two subjects with essential night blindness were examined. Cone vision was normal but dark adaptation curves revealed no evidence for functioning rod vision although bleaching experiments showed the presence of rhodopsin. It is concluded that the defect involves the rod automatic gain control and since in this case the cone gain control is normal it follows that the rod and cone gain controls must be independent in the normal eye. - Jennifer Birch-Cox.

Validity and reliability of the red-green AO H-R-R pseudo-isochromatic plates with mentally retarded children, by J.A. SALVIA and J.E. YSSELDYKE (Inst. Res. on Except. Children, Univ. of Illinois), Percept. Motor Skills 33,3/2, 1071-1074, 1971.

The reliability and validity of the 14 red-green plates of the H R pseudoisochromatic plates was tested on 69 institutionalized mentally retarded male children, obviously on the same group as used in the evaluation of the Ishihara plates (Salvia and Ysseldyke, Daltoniana No. 5, 2). The HRR plates identified 40.6% of the sample as color blind in an initial testing and 37.7% on a retest. The 6 children diagnosed as color blind by the anomaloscope failed the plates on both tests. The results indicated high internal constancy but low stability and validity. The use of the HRR plates with mentally retarded children is not recommended. - Ingeborg Schmidt.

Colour vision deficiency in the mentally retarded : Prevalence and a method of evaluation, by G.R. CURTIN and C.G. HEATH, American Journal of Mental Deficiency, 76/1, 48-52, 1971.

Recent studies have shown a much higher prevalence of colour vision deficiency in mentally retarded children than found in the nonretarded population. The AO-HRR Colour Vision Test was administered to 39 trainable mentally retarded, 71 educable mentally retarded, and 107 emotionally disturbed children. The order of test-plate presentation was modified and a simple conditioning procedure was used as a teaching device where necessary. Using this method, prevalence rates and male-female ratios were no different than those found in the nonretarded population. - Romuald Lakowski.

Colour perception among deaf students : an evaluation of the educational implications, by R.M. FREY and I.B. KRAUSE, Australian Journal on the Education of Backward Children, 18/1, 42-47, 1971.

Pointed out the differences between deaf and nondeaf children as to the degree of color blindness deficiency. The incidence of color deficiency among the deaf is approximately 5 times as great as among nondeaf individuals (for the nondeaf, 4% among males and .4% among females; among deaf youngsters, 10.7%). It was further found that deaf subjects were still largely able to identify color only used items with respect to generally accepted color cues on a par with the non-color-blind children. Thus, there seems to be little difference between deaf and nondeaf children in identifying objects by color as long as the items are traditionally coloured. - Romuald Lakowski.

Frequency of colour blindness among the Jats, by P.K. CHATTOPADHYAY, Human Heredity, 20/1, 23-29, 1970.

The frequency of colour blindness among the Jat males is 2.52% in Delhi and 4.53% in the Punjab. The difference between the Jats of the two areas is insignificant. The ratio protan to deutan type is 1:2.25 among the Jats of the Punjab, while all the affected males in Delhi were of the deutan type. The frequency of colour blindness among the Jats (Delhi and Punjab pooled together) is 3.53%. The protan : deutan ratio is 1:4. None of the females tested was found to be colour

blind. The similarity between the Jats and most of the North-western Indian populations indicates a considerable homogeneity in this region in regard to frequency of colour blindness. - Romuald Lakowski.

Anomaloscope testing of the colour vision of a New-Guinea Highland population, by R.G. HERVEY (Univ. of N.S. Wales, P.O.B. 1, Kensington, N.S.W., Australia), Hum. Biol. Oceania, 1, 144, 1971.

21 male and 9 female primitive villagers were tested with the Pickford-Nicolson anomaloscope, with the aid of an interpreter. Inability to describe small changes, both in color and in brightness, resulted in wide matching ranges of normal adults (in contrast to normal narrow ranges of English-speaking schoolchildren). This seems to be due to deficiency of color naming in the local language, and necessitated some modification in the procedure of testing. - A. Adam.

Visual acuity and color blindness among Brazilian Cayapo Indians, by F.M. SALZANO (Depart. Genet. Inst. Bioc. Univ. Rio Grande Sul, Porto Alegre, Brazil), Human Hered. 22/1, 72-79, '7

One out of 120 males from the Cayapo Indians tested with Ishihara plates was found to have defective colour vision (deuterodeficient). Amongst 149 females no abnormalities were observed. Visual acuity tested in 149 Indians was generally excellent, more than half having an acuity better than 20/20. These results are interpreted as favouring a hypothesis of selection for these characters amongst hunters and food gatherers. - L.N. Went.

An introduction to basic genetic principles applied to ophthalmology, by M.F. GOLDBERG (Symposium : Genetics applied to Ophthalmology at 76th ann. Meeting Amer. Acad. Ophthalm. a, Otolaryngol. Sept. 1971, Las Vegas), Trans. Amer. Acad. Ophthalm. Otolaryngol. 76/5, 1137-1159, 1972.

On the approximately 1600 human diseases known to be inherited roughly 10 to 15% are confined to the eye. The purpose of the review is to define several relevant genetic principles and to demonstrate their importance and applicability by illustrating them with examples of known human eye diseases. The four forms of mendelian inheritance, the importance to detect the asymptomatic carrier state for the purpose of genetic counseling, the chromosome-induced eye defects by an extra chromosome or by deletion or loss of chromosomal material and the multifactorial inheritance are reviewed. - Ingeborg Schmidt.

A contribution on juvenile atrophy of the optic nerve with dominant inheritance (in German), by W. WERNER and O. BENEDICT (A-8036 Graz, Augenbruggplatz 4, Univ. - Augenklinik, Österreich), Klin. Mbl. Augenheilk. 159/6, 789-803, 1971.

A report on the occurrence of juvenile atrophy of the optic nerve with dominant inheritance in 3 generations. Methods of examination : pseudoisochromatic plates of Ishihara and Velhagen, Panel D-15, Nagel-anomaloscope and selfmade discs of coloured paper of 1,5 cm diameter. Because the authors could not find an inversion of the isopters for red and blue objects and because the patients could read partially the blue-yellow plates of Velhagen and could recognize the selfmade coloured discs, they concluded that a disturbance of colour vision is not preponderant. (After studying the reported results, the referent could not agree in this point with the authors).-Marion Marré.

The assessment of acquired dyschromatopsia and clinical investigation of the acquired tritan defect in dominantly inherited juvenile atrophy, by D.P. SMITH (Victorian College of Optometry, Univ. of Melbourne), Amer. J. Optom. 49/7, 574-588, 1972.

The characteristics of acquired color vision defects, their classification, clinical importance in the diagnosis of eye diseases and the most suitable methods of examination are shortly reviewed. The preferable tests are the sorting tests which demand the arrangement of a full hue circuit, of which the FM 100 test is proven the most effective. Its disadvantages associated with testing acquired color deficiencies are first that it may be time consuming and secondly it is less useful than the Panel D-15 and the FM 28 Hue test for gross color vision defects. Seven clinical color vision tests were employed in a study of 12 members from three unrelated families affected with dominantly inherited juvenile optic atrophy. The complete clinical information of these patients is listed in an earlier paper (Smith, Amer. J. Optom. 49, 183, 1972). Two of the 12 patients had normal color vision, 8 had a tritan defect, one, a woman, had a very mild unilateral R-G defect and one was an achromat. As expected, the sorting tests proved superior to the pseudoisochromatic plates. 9 tritan eyes gave an unequivocal deutan response on the Nagel anomaloscope. The way in which previous failure to test color vision properly delayed accurate diagnosis of the patients condition is illustrated. - Ingeborg Schmidt.

The examination of colour vision as a control method in the ophthalmological use of ultrasound (Farbensinnuntersuchung als Kontrollmethode in den ophthalmologischen Anwendung des Ultraschalls), by J. SARMANY, A. BERTENYI and P. GREGUSS (II. Univ.-Augenklin., Budapest), Acta Facult. med. Univ. Brun. 35, 165-169, 1968.

The Panel D-15 test allowed to state an improvement of colour discrimination in 9 of 13 subjects suffering from

macular degeneration and acquired defectiveness of colour vision. - Guy Verriest.

The 100 hue test, a method of examination of colour sense and of colour discrimination (Der 100-hue-test, eine Methode zur Prüfung der Farbensinns und des Farbenunterscheidungsvermögen), by G. REPPIN, Verkehrsmedizin 19/11, 373-378, 1972.

A review paper dealing about the colour vision requirements in traffic, the minor forms of colour vision deficiency, the principles of the 100 hue test and the influence of age and sex on the obtained results. - Ernst Heinsius.

The clinical detection of optic atrophy with special reference to the temporal form in dominantly inherited juvenile optic atrophy, by D.P. SMITH, Australian J. Optometry, 55, 195-205, 1972.

Color of the optic disc is alone an insufficient indicator of the presence of optic atrophy and the demonstration of functional vision loss verifies the diagnosis. An acquired tritan dyschromatopsia is mentioned as a very characteristic functional impairment in dominantly inherited juvenile optic atrophy. It cannot be identified with pseudoisochromatic plates and sorting tests, some results of which are presented, must be used. - Damien P. Smith.

The handicap of abnormal colour vision, by B.L. COLE, Australian J. Optometry 55, 303-310, 1972.

The usefulness of color coding in industry and the inherited defects of color vision are briefly reviewed. Operations involving judgement of color are categorized into four classes : those involving comparative judgement of color; those involving connotative recognition of color; those involving denotative recognition and those involving aesthetic judgement. Guidelines for the employment of people with defective color vision are argued for each category. - Damien P. Smith.

Good vision and good visibility, by B. BLUMBERG, Australian J. Optometry, 54, 188-201, 1971.

The role of vision and lighting in transportation are discussed, with brief mention and review of the problem and problems of the color blind driver. - Damien P. Smith.

On the importance of deficiencies of colour vision in road traffic (Zur Bedeutung von Farbensinnstörungen im Strassensverkehr), by M. KALBERER (Dept. of Ophthal., Univ. Basel, Switzerland), Ophthalmologica (Basel) 163/3, 171-177, 1972.

Statistical and theoretical arguments show that discrimination of the individuals with congenital anomalies of colour vision is not justified in road traffic. - A. Pinckers.

Combined Panel D-15 and 100 Hue recording, by A. PINCKERS (Dept. of Ophthal., Univ. Nijmegen, Netherlands), Ophthalmologica (Basel) 163/4, 232-234, 1971.

Is it possible to plot the Panel D-15 results on a 100 Hue test score sheet. - A. Pinckers.

#### OBITUARY

Deane B. Judd, member of the International Research Group on Colour Vision Deficiencies

Deane Brewster Judd was born in South Hadley Falls, Massachusetts, November 15, 1900. He attended Ohio State University where he received the B.A. degree in 1922, the M.A. in 1923. He then went to Cornell where he received the Ph. D. degree in physics in 1926. He served as instructor in physics at Ohio State in 1923-24, and as Munsell Research Associate in colorimetry at the National Bureau of Standards the summer of 1926-27. Since 1927 he has been continuously at the National Bureau of Standards, where he helped the Bureau to maintain its worldwide reputation as a leader in the field of colorimetric research. He retired in November 1969, but remained as a guest worker. He died on October 15, 1972.

He was one of the world's foremost scientists in the field of colorimetry and color vision, and served on committees of many national and international organizations concerned with color: he was chairman of the CIE Committee of experts on Colorimetry from the time of its inception in 1955 to 1963 and has been president of the Optical Society of America and president of the Inter-Society Color Council. He was a member of the National Academy of Science - National Research Council's Committee on Vision; since its establishment in 1942, he has been president of the Munsell Color Foundation.

Dr. Judd's field of work was broad; it covered research in vision, color-blindness, measurement of color, development of color standards, studies of uniform color spacing. He is the author of more than 100 research papers on color, the author of the book, Color in Business, Science, and Industry (1952), and with Gunter Wyszecki (National Research Council, Ottawa) a co-author of the second edition (1963). On the Friday before his death he taped a message for the International Color Association that will meet in York, England, in July 1973, where the Newton Medal of the British Colour Group will be awarded to him posthumously.

(From the Journal of the Bureau Central de la C.I.E.).



Alex E. Krill, member of the International Research Group  
on Colour Vision Deficiencies

Dr. Alex E. Krill, 44, Professor of Ophthalmology at the University of Chicago, was killed December 8, 1972 in a jet airliner crash in Chicago. He was returning from Washington where he lectured that morning at the National Eye Institute.

Dr. Krill graduated from Ohio State University (M.D. 1954). He joined the staff of the University of Chicago as Assistant Professor in 1961 and was named Professor in 1968. Dr. Krill was director of clinical eye research and a member of the University Committee on Genetics and senior attending ophthalmologist at the University of Chicago Hospitals and Clinics. He was secretary-treasurer of the Chicago Ophthalmological Society, Secretary of the International Committee for Neuro-ophthalmology, and vice president of the International Society for Clinical Electroretinography.

He was chief editor of Ophthalmology Digest and a member of the editorial boards of several journals of ophthalmology. The Section on Ophthalmology of the American Medical Association awarded him a certificate of merit for presentation of the most meritorious paper at the 1970 annual meeting. He received the Fisher prize of the Chicago Ophthalmological Society in 1971 and the honor medal of the American Academy of Ophthalmology and Otolaryngology in 1967. Dr. Krill was a fellow of that Academy and of the American College of Surgeons.

He was very familiar with the European literature and was the author of some 80 papers dealing with diseases of the eye with particular emphasis on hereditary disease and on investigation of the visual functions. Hereditary Diseases of the Retina and Choroid, (Harper & Row), the first volume of a projected three volume work, appeared in late 1972.

The Chicago Ophthalmology Society established the Alex E. Krill Memorial Lectureship to be given annually each year in his honor. A Krill fund to support ophthalmic research at the University of Chicago was arranged by his family and friends.

Survivors include his widow, Suzanne, a daughter Eileen, his mother, a sister and two brothers.

(By courtesy of Frank W. Newell).

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

26. - Papers by Dr. Ilmari RENDAHL (Eye Clinic, Karolinska Sjukhuset, S-10401 Stockholm, Sweden).

RENDAHL I. - Clinical recording of the x-potential, A preliminary report, Acta ophthal. 35, 97-103, 1957.

RENDAHL I. - The ERG of the light-adapted human eye, Acta ophthal. 36, 900-916, 1958.

RENDAHL I. and HECK J. - Components of the human ERG. An analysis in normal eyes and in colour blindness, Preliminary report, Acta physiol. scand. 39, 167-175, 1957.

RENDAHL I. - Components of the human ERG, The photopic ERG in normal eyes, in deuteranopia and in deuteranomaly, Acta physiol. scand. : 44, 189-202, 1958.

RENDAHL I. - The photopic components of the human ERG, Doc. ophthal. 18, 344-351, 1964.

RENDAHL I. - Massundersökning av färgsinnet, Erfarenheter och metodutveckling (Mass examination of sense of colour, Findings and method development, In Swedish with a short English summary), Försvarsmedicin 6, 14-16, 1970.

27. - Papers by Prof. Manfred RICHTER (Unter den Eichen, 87, D-1000 BERLIN/Dahlem, Deutschland).

RICHTER M. - Die Erkennung der Farbenuntüchtigkeit im industriellen Betrieb, Farben-Chem. 4, 369-373, 1933.

RICHTER M., SCHMIDT I. and DRESLER A. - Grundriss der Farbenlehre der Gegenwart, Steinkopff, Dresden u. Leipzig, 1940.

RICHTER M. - Uebersichtige neuere Theorien des Farbensehens, Klin. Mbl. Augenheilk. 118, 240-259, 1951.

RICHTER M. - Die neuere Entwicklung auf dem Gebiet der Farbensinnprüfung, Klin. Mbl. Augenheilk. 119, 561-575, 1951.

RICHTER M. - Internationale Bibliographie der Farbenlehre und ihrer Grenzgebiete. 1. : Berichtszeit 1940-1949, Musterschmidt, Göttingen, 1952.

RICHTER M. - Recent developments in the examination of the colour sense, Brit. J. physiol. Opt. 10, 155-166, 1953.

RICHTER M. - Ergebnisse von Farbenseh-Prüfungen in Färberischen Betrieben, Farbe 2, 175-192, 1953.

RICHTER M. - Farbenfehlsichtigkeit - Methoden ihrer Feststellung, Med.-Markt 4, 79-82, 1956.

RICHTER M. - Die Ausgestaltung des Nagelschen Anomaloskops zu einem "Tritoskop", Farbe 6, 5-6, 1957.

RICHTER M. - Internationale Bibliographie der Farbenlehre und ihrer Grenzgebiete. 2.: Berichtszeit 1950-1954, Munsterschmidt, Göttingen, 1963.

28. Papers by Dr. André ROTH (Centre Hospitalier de Belfort, F-90 BELFORT, France).

R ROTH A. - Etude clinique du sens chromatique "central" dans l'amblyopie fonctionnelle, Docum. ophthal. 20, 631-635, 1966.

R ROTH A. - Le 28 Hue test selon Farnsworth, Bull. Soc. Ophthal. Fr. 66, 231-238, 1966.

R ROTH A. - Le sens chromatique dans l'amblyopie fonctionnelle. Etude clinique avant et au cours de la rééducation. Thèse de Doctorat en Médecine, Strasbourg, n° 7, 1966. Docum. ophthal. 24, 113-200, 1968.

29. Papers by Professor Dr. E. DODT (William G. Kerckhoff-Herzforschungsinstitut der Max-Planck-Gesellschaft, 6350. BAD NAUHEIM, D.B.R.).

R DODT E. and WADENSTEN L. - The use of flicker electro-retinography in the human eye, Acta Ophthalmologica, 32, 165-180, 1954.

R DODT E., COPENHAVER R.M. und GUNKEL R.D. - Photopischer Dominator und Farbkomponenten im menschlichen Elektroretinogramm, Pflügers Archiv, 267, 497-507, 1958.

R COPENHAVER R.M. and GUNKEL R.D. - The spectral sensitivity of color-defective subjects determined by electroretinography, A.M.A. Archives of Ophthalmology, 62, 55-68, 1959.

R DODT E., van LITH G.H.M. and SCHMIDT B. - Electroretinographic evaluation of the photopic malfunction in a totally colour blind, Vision Res. 7, 231-241, 1967.

R ALEXANDRIDIS E. and DODT E. - Pupillenlichtreflexe und Pupillenweite einer Stäbchenmonochromatin, Albrecht v. Graefes Arch. klin. exp. Ophthal. 173, 153-161, 1967.

OFFICIAL COLOUR VISION REQUIREMENTS

FRANCE (1972)

	Colour vision requirements	Tests
<u>Private car driving</u>	No limitations	
<u>Lorries</u>	No limitations	
<u>Taxis, busses</u>	No limitations	
<u>Railways :</u>		
- 1st class (drivers)	Normal	Ishihara
- 2nd class	Normal	Coloured lights
- 3th class	Coloured lights normal, only	
<u>Aviation :</u>		
- Professional pilote (1st cl.)	normal	Ishihara Beyne's lantern : 5 m, angle 2', duration 1/25".
- Navigator		
- Private pilote	Ishihara normal	Beyne's lantern
- Helicopter pilote	Beyne's lantern normal	5 m, angle 3', duration 1".
<u>Army :</u>		
- Recruited	No limitations	
- Carreer	No limitations	
- Gendarmery	No limitations	
- Naval school officers	Ishihara anormal Beyne's lantern normal	Beyne's lantern (5 m, angle 2' duration 1/10"
- Artillery missile, steersman, deck, hydrograph...	Normal	
- Airforces ((pilotes, navigators, machine gunners)	Normal	

J. Vola.

SOUTH AFRICA (1972)

1. Official Colour Vision Requirements relate only to
  - a) Civil Pilots Licence
  - b) Driving Licence for Train Drivers employed by the South African Railways.
2. The Colour Vision requirements for both these are identical and are as follows :
  - i) Grade I. Fully acceptable : A correct interpretation of the Ishihara test.
  - ii) Grade II Considered safe to be licenced although defective : Defective recognition of colour on the Ishihara Chart in the red/green and unable to recognise Signal Red.
  - iii) Grade III These have a more severe colour defect than Grade II and are considered unsafe.

There are no specific colour vision requirements for individuals applying for a licence to drive a vehicle on the roads.

Maurice H. Luntz.

NIGERIA (1972)

The official colour vision requirements in Nigeria are in principle the same as in Great-Britain. In the practice the test most often used is the Ishihara one. Where this book is not available, there are some local adapting procedures : one of them is the use of the colour patches of the worth four dot test.

I. Rethy.

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

For all information concerning sending of the draft program, inscription fee, accommodation, travel, social program, other congresses in the same time, etc. please contact

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