

DALTONIANA

NEWSLETTER

OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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LITERATURE SURVEY

Hue discrimination in peripheral vision under conditions of dark and light adaptation, by B.A. AMBLER (Dept. Psychol. University of Texas, Arlington, Texas 76109) Perception and Psychophysics 15, 536-590, 1974.

Chromatic thresholds were measured under conditions of light and dark adaptation and a record was kept of what color sensations were reported throughout the photochromatic interval. Method: four chromatic stimuli (470 nm, 510 nm, 580 nm and 670 nm) and one achromatic stimulus, subtense 56 sec of arc, at 8° and at 72° in the right visual field, 150 msec exposure time. Right eye only. First under dark adaptation, then light adaptation. Dark adaptation for 30 min. Light adaptation to 585 fL, 160° visual angle, for 2 1/2 min. Threshold measurements during a 3 to 6 min period after the adapting light was turned off. Increasing method of limits. - Increases found in the chromatic threshold under conditions of dark adaptation support the idea that rods do influence color perception. The subjects reported lights near the achromatic threshold to be blue for all four chromatic stimuli and for the achromatic stimulus at 72° and for all stimuli except 670 nm at 8° indicating that rods may add a blue component to peripheral color vision. This blue explains why there were no significant differences between light and dark adaptation thresholds for the 470 nm stimulus at 8°. - Ingeborg Schmidt.

Effect of surround on perceived saturation, by I.T. PITT and L.M. WINTER (Res. Division, Kodak Ltd. Headstone Drive, Harrow, Middlesex, HA1 4TY, England), J. Opt. Soc. Amer. 64, 1228-1331, 1974.

Method: A Kodak transparency illuminator provided a light surround of 250 cd. m⁻², 5300°K. In the center

constant color was produced of an angular subtense of 10° by a Kodak Wratten color filter. Next to the illuminator a black surround was placed with a variable color in its center from a Burnham type colorimeter, its controls handled by the observer. The observer was adapted to the apparatus lights. 30 Kodak color filters placed on the illuminator in turn in a random order were matched with the variable colorimeter. While matching colors no viewing restrictions were placed on the observer. A more complex work was carried out with a mosaic of six adjacent squares of filter colors by considering each color of the mosaic in turn. The results show that a dark surround not only increases the apparent brightness of a color but also reduces its apparent saturation, this effect occurring both with uniform areas of color and with mosaics of six colored squares. That is for equivalence with a light surrounded color, a color with a dark surround must have a higher purity. The results may have application in the fields of photography and television.- Ingeborg Schmidt.

Human and macaque blue cones studied with electroretinography, by D. VAN NORNEN and P. PADMOS (Institute for Perception TNO, Soesterberg), Vision Res. 13, 1241-1254, 1973.

The spectral sensitivity of the human and macaque blue cone system was measured using an electroretinographic criterion response. It was necessary to take very low criteria (about 1 μ V) since the blue system was proved to show a low maximum response. The human and macaque blue cone curve have distinctly different peak wavelengths of 432 and 440 nm respectively. The waveform of the blue system response to 10 msec flashes appeared very similar to that of the long wavelength mechanisms, although a 5-10 msec longer latency was observed. At higher adaptive states the blue and red-green responses showed distinct differences. - The Authors.

Colour vision in rhesus monkey. studied with subdurally implanted cortical electrodes, by P. PADMOS and V. GRAF (Institute for Perception TNO, Soesterberg), Proc. XIth ISERG symp., 207-214, 1973.

A set of nine electrodes (dimension of electrodes 0.1 x 0.3 mm) is chronically implanted on the subdural surface of the primary visual cortex of Macaca mulatta. Responses to monochromatic, foveal light stimuli on various coloured backgrounds are recorded. On a white background the spectral sensitivity function shows three submaxima, like the functions Sperling and Harwerth (1971) found in behavioural experiments. From these results, and the chromatic adaptation experiments, it is evident that the responses reflect colour antagonistic interactions between cone systems. The extent to which these antagonistic interactions contribute to the electroretinographic response, is discussed. - The Authors.

A blue sensitive mechanism in the pigeon retina : λ_{max} 400 nm, by V. GRAF and D. VAN NORDEREN (Institute for Perception TNO, Soesterberg), Vision Res. 14, 1203-1209, 1974.

Electroretinographic studies of the pigeon visual system have revealed a blue mechanism with λ_{max} 400 nm. Spectral sensitivity after strong selective chromatic adaptation is well fit by a Dartnall nomogram combined with an appropriate oil-droplet. The relationship of these data to pigeon luminosity and wavelength discrimination are discussed. - The Authors.

Spectral transmission of the human ocular media, by D. VAN NORDEREN and J.J. VOS (Institute for Perception TNO, Soesterberg), Vision Res. 14, 1237-1244, 1974.

The existing literature on transmission of the human ocular media in the visible region is reviewed. Added is an ocular density curve derived from the CIE scotopic sensitivity function and the absorption curve of human rhodopsin. The ocular density curve fits the literature data very well and can serve as the transmission curve of a standard observer. The extent of individual differences in ocular density is calculated to be ± 25 per cent of the average density values. - The Authors.

The role of some spatial parameters of gratings on the McCollough effect, by J.J. UHLARIK and A.G. OSGOOD (Kansas State Univ. Manhattan, Kansas, 61506), Perception and Psychophysics 15/3, 524-528, 1974.

In order to observe the McCollough effect the subjects were alternately adapted to vertical and horizontal gratings that consisted of black bars and colored slits, the slits of one grating green, of the other magenta. They subsequently viewed black and white striped test gratings and reported complementary color aftereffects that were specific to the orientation of the test gratings. The widths of the black bars and the slits was varied independently during adaptation and testing. The results suggest that the major determinant of pattern (orientation) contingent color aftereffect was the width of the black bars. - Ingeborg Schmidt.

The McCollough effect : Influence of several kinds of visual stimulation on decay rate, by D. SKOWBO, T. GENTRY, B. TIMNEY and R.B. MORANT (Brandeis University, Waltham, Mass. 02154), Perception and Psychophysics 16/1, 47-49, 1974.

Experiments were carried out to determine whether the decay rate of the McCollough effect could be differentially influenced by the type of visual stimulation that followed. The effect was induced by alternately viewing a vertical or a horizontal grating projected either on a green or a violet background, alternated every 5 sec for 10 min, followed by 50 min exposure to alternating vertical and horizontal achromatic gratings or alternating green and violet homogenous chromatic fields, natural visual stimulation (outdoors), or complete darkness. Exposure to achromatic gratings caused marked fading of the effect. The other types of stimulation were associated with similar and such less rapid decay. - Ingeborg Schmidt.

The colour receptors studied by increment threshold measurements during chromatic adaptation in the Goldmann perimeter, by E. HANSEN (University Eye Clinic, Rikshospitalet, Oslo, Norway), Acta Ophthal. (Kbh.) 52, 490-500, 1974.

The Goldmann perimeter has been equipped with additional background illumination using a projector. Broad-banded filters provide blue, purple and yellow backgrounds in the 30° central field. Test stimuli are obtained by adding nine interference filters (half-height band widths 30-47 nm) to the standard projection system. With this apparatus, the achromatic threshold to coloured stimuli during colour-adaptation has been tested centrally and peripherally. Test subjects were five colour-normal men. Using the standard white and the three coloured backgrounds, three cone mechanisms are distinctly shown. Static perimetry in the horizontal meridian using suppression of two cone mechanisms shows distinct differences between the profiles obtained with blue-violet, yellow-green and red stimuli. The foveal low blue sensitivity is clearly demonstrated. - Anders Hedin.

The significance of the TMC and HRR color-vision-tests as to red-green defectiveness, by J.J. VOS, W. VERKAIK and J. BOGGARD (Institute for Perception TNO, Soesterberg), Amer. J. Optom. 49, 847-859, 1972.

The HRR and TMC pseudo-isochromatic tests were examined for their structure by statistical analysis of test results. It is concluded the HRR test is the best, with the restriction, however, that the official scoring method is not optional. An improved scoring, called HRR-R (from "reevaluated") is proposed. - The Authors.

Ishihara-Okuma's new test-plates for colour-defectives, by T. OKUMA (Dept. Ophthal., Yokohama City University School of Medicine), H. MASUDA (Fujisawa Municipal Hospital), C. KAWADA (Hiratsuka Kyosai Hospital) and U. SHINJO (Miyazaki Prefectural Hospital), Acta Soc. ophthal. jap., 77, 1359-1365, 1973.

The authors made new pseudo-isochromatic plates for red-green defects. On each test-plate a coloured ring with a gap consisting of a pattern of small discs is printed in the background pattern of different colour. The new test-plates contain the screening tests of the Ishihara's tests type and the qualitative and quantitative diagnostic tests of the modified Okuma's tests type. The results of these new tests were on the whole satisfactory. The new test-plates will be published. - Yasuo Ohta.

An evaluation of quantitative diagnosis of congenital color defectives by pseudoisochromatic plates, by K. FUKAMI (Saiseikai Kyoto Hospital), Folia ophthal. jap. 24, 153-157, 1973.

In order to make a quantitative diagnosis of congenital color defectives by pseudoisochromatic plates, summarized results of Okuma's plates, T.M.C. plates and H-R-R plates were investigated

and compared with the results of Panel D-15, Ichikawa's Color Perception Lantern and Nagel's anomaloscope. The results of the plates were not in a complete agreement, but not far apart from each other.

The summarized results can detect mild color defectives as recognized by means of a lantern test, by which a mild and a moderate group are separated in Majima's classification for social adaptability.

In this new classification a severe group is separated by D-15, a moderate and a mild group are decided by the summarized results and a very mild group has those who are diagnosed as normal by 2 kinds of the above-mentioned 3 plates series.

Comparing Majima's and this classification, it is evident that a test employing color lights, for example a lantern test, is important for a social aptitude test of color defectiveness. - Yasuo Ohta.

An upper limit of non-random cap arrangements in the Farnsworth-Munsell 100 hue test, by P.A. ASPINALL (Dept. Ophth., Edinburgh, Scotland), Ophthalmologica 168, 128-131, 1974.

From a random series of cap arrangements error scores in the F.M. 100 Hue test were calculated. Scores greater than 200 for any box or 984 for the four boxes can be assumed to result from a random arrangement of caps. Scores lower than 200 a box or 984 for the whole test depend on at least some visual function, whatever this function may be.

Because the scoring method of the F.M. Hue test introduces additional errors at the junction of boxes these random arrangement data are important : misinterpretation of junction induced peaks can be avoided. - A. Pinckers.

Experimental studies on colour vision with mixture of colour lights. Report 1. Colour vision of normal subjects, by H. KATO (Dept. Ophthal., Tokyo Medical College), Acta Soc. ophthal. jap., 77, 1350-1358, 1973.

Colour matching experiments with some standard colour lights in order to see how the colour discrimination ability changes with the increase of age. By means of the Pickford-Nicolson anomaloscope 3 kinds of colour equations are utilized : red+green=yellow, green+blue=blue-green, yellow+blue=near illuminant A.

1) The matching ranges increase with age (for red-green discrimination, significantly over 60 years of age; for green-blue and yellow-blue discrimination, significantly even in the 40's).

2) Changes in brightness sensitivity. - Yasuo Ohta.

Frequency of congenital dyschromatopsia in polish children, by L. BRUDNIAK, Klin. Oczna, nr. 5, 1974.

8.011 pupils of Warsaw schools (4.011 boys and 4.000 girls) have been examined in order to establish the incidence of congenital color anomalies. Ishihara, Rabkin and Velhagen plates,

Farnsworth's dichotomous test as well as Nagel's anomaloscope were used. Colour anomalies were found in 7,25 and in 0,4 per cent of boys and girls respectively. The importance of the early definition of the colour sense in children is stressed, from the point of view of proper choice of their training in the future. - Felicia Jakubik.

Recent advances in the study of acquired defectiveness of colour vision, by G. VERRIEST (Dept. Ophthal., Univ. Ghent), Atti Fond. G. Ronchi e Contr. Ist. Naz. Ott. 29, 369-416, 1974.

This is a analytical and critical review and principally an extensive bibliography relating to the advances made between 1968 and 1973 in the study of the acquired colour vision deficiencies : the general papers, the macular, peripheral and objective methods of examination, the influences of age and of retinal illuminance, the effects of pathological lesions at the different levels of the visual organ including the intoxications, and the experimental deficiencies as well in man as in animals. It is hoped that this publication can be useful as memory aid and as source of references for all people more or less interested by the acquired colour vision defects. - Guy Verriest.

Enlargement of foveolar infundibulum (L'élargissement de l'entonnoir fovéolaire), by M. BONNET (Lyon, France), Arch. Ophthal. (Paris) 34, 179-192, 1974.

M. Bonnet describes enlargement of foveal infundibulum as a clinical entity and reports 6 cases. Colour vision (100 Hue test, 28 Hue test) is normal or slightly disturbed; no axis direction is found. - A. Pinckers.

Drug effects on vision : strategies for study and selected results, by J.L. BROWN (Dept. of Psychology, Univ. of Rochester, Rochester, New York), Human Factors 16, 354-367, 1974.

A review of experimental procedures to study drug effects on the visual sensory system and of selected papers reporting drug effects including those on color vision. -Ingeborg Schmidt.

Contribution to the objective evaluation of colour disturbances after administration of antimalarica, by J. BALIK and V. REJKOLEC, Ceskoslov. Oftal. 30, 9-12, 1974.

Electroretinographic examination in scotopic conditions with colour filters of peak wavelengths of 405, 444, 501, 557, 591 and 656 nm in a group of 18 patients, using antimalarica for a longer time and with certain colour vision disturbance, and in a group of 13 patients without colour vision disturbance showed a statistically verified difference by application of the filters of 405, 444, 501 and 591 nm. The disturbance has not the character of inborn colour perception disturbances and by objective examination an unsteadiness of colour perception only is found. - Marion Marré.

The visual professional aptitudes (Les aptitudes visuelles professionnelles), by G. VERRIEST (Dept. Ophthal., Univ. Ghent) and G. HERAÏS (Dept. Ophthal., Inst. méd.-chir. Ixelles), Bull. Soc. belge Ophtal. 169/1, 1-552, 1975.

The different chapters of this book of 552 pages are successively devoted to the lighting of the visual tasks; to the methods of examination and to the ergonomic aspects of the various vision parameters (visual acuity, visual field, adaptation, colour vision etc.); to the establishment and to the application of concrete visual requirements; and to the professional formation and/or readaptation of the amblyopic and blind people. Each of these chapters is provided of an extensive bibliography and of the full references to the belgian laws and regulations. Moreover, a table suggests the visual requirements and the adaptation possibilities to blind and amblyopic people of more than 1,000 professions. - Guy Verriest.

OBITUARY

Hermann M. BURIAN,

member of the International Research Group on Colour Vision Deficiencies.

Born of Austrian parents on 6th January 1906 in Naples where his father, Richard Burian, was director of the Division of Physiology of the Stazione Zoologica. Studied medicine in Belgrade, obtaining the M.D. degree in June 1930. He worked successively in the Department of Photo-chemistry of the University of Leipzig under Prof. W. Weigert (1931), in the University Eye Clinic of Bern under Prof. Siegrist and Prof. Goldmann (1931-1933), in the Second Eye Clinic of the General Hospital of Belgrade under Dr. Nizetic (1934-1935), in the Physiologic Institute of the German University of Prague under Prof. Tschermak and Prof. Schubert (1936), and in the Dartmouth Eye Institute in New Hampshire under Prof. Bielchowsky and Prof. Ames (1936-1940). Naturalized american citizen in 1941. He was professor of ophthalmology successively at the Dartmouth Medical School (1940), at the State University of Iowa (1951), at the University of North Carolina in Chapel Hill and at the Duke University School of Medicine in Durham (1971).

Hermann Burian was an internationally recognized authority on binocular vision and ocular motility, electrophysiology of the eye, anatomy and development of anterior chamber angle and developmental glaucoma. He was the author of several books and more than 150 papers on ophthalmology. He has been secretary for the Western Hemisphere and thereafter vice-president of the ISCERG; he founded and was president of the International Strabismological Association. He served on the boards of six journals of ophthalmology and orthoptics.

He died on November 25, 1974 in Milan, while lecturing there. - Compiled by Guy Verriest.

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

55. Papers of Prof. H.G. SPERLING (Graduate School of Biomedical Sciences at Houston, The University of Texas, 6420 Lamar Fleming Blvd, HOUSTON, Texas 77025, U.S.A.).

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