DALTONIANA

NEWSLETTER

OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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FIND IN THE LAST PAGES OF THIS ISSUE

1) THE ANNOUNCEMENT OF A COMPETITION FOR IDEAL TRAFFIC SIGNAL DESIGN
2) THE PRELIMINARY INSCRIPTION FORM FOR THE IRGCVD INT. SYMPOSIUM IN CAGLIARI

LITERATURE SURVEY

Neurones with strong inhibitory S-cone inputs in the macaque lateral geniculate nucleus, by VALBERG A., LEE B.B. and TIGWELL D.A. (Inst. of Physics, Dept. of Biophysics, Univ. of Oslo, Blindern, N-0315 Oslo 3, Norway).

Neurones with strong inhibitory short-wavelength sensitive cone (S-cone) inputs have been identified in the macaque geniculate using a tritanopic confusion line test, i.e. by stimulation with equiluminous stimuli which leave excitations of long-and middle-wavelength sensitive cones (L- and M-cones) constant while differentially S-cones. mathematical simulation of the responses of these cells, using known spectral sensitivities of the cone receptors, demonstrates that they receive excitation from M-cones, inhibition from S-cones, and little or no inhibition from L-cones. Excitatory and inhibitory pools are largely spatially coextensive. - The Authors.

Heterochromatic brightness match across the visual field, by L.R. RONCHI, V. GALASSI PRINCIPE and E. RANGO (Ist. Naz. Ott., Firenze, Italy), Die Farbe, 32/33, 151-158, 1985/86.

Some experimental data are displayed, indicating how the ratio of (photopic) illuminances at the brightness match varies when stimulus size is varied, at various retinal locations.

Stimuli giving mainly an achromatic contribution to brightness (white, yellow, greenish) are compared to a red stimulus which is expected to produce an extra brightness signal. The photometric implications at the site of the "receiver unit area" are discussed. - The Authors.

Blue cones contribute to border distinctness, by R. M. BOYNTON, RH. T. ESKEW Jr and C. X. OLSON (Dept. of Psychol. Univ. of California at San Diego, La Jolla, CA 92093, U.S.A.) Vision Res. Vol. 25, No 9 pp. 1349-1352, 1985.

A conclusion reached by Kaiser and Boynton in wavelength discrimination experiments, that differential blue-cone excitation makes a small contribution makes a small contribution to the distinctness of borders in small fields, was verified using a rating procedure for borders produced in the La Jolla Analytic Colorimeter. - The Authors.

Constant hue loci of unique and binary balanced hues at 10, 100, and 1000 Td, by M. AYAMA, T. NAKATSUE and K. KAISER (Dept. of Psychol., York Univ., 4700 Keele Street, North York, Ontario M3J 1P3 Canada) J. Opt. Soc. Am. A, 4, 1136-1144, 1986.

Constant hue loci for unique red, yellow, green, and blue and the loci of four binary balanced hues (e.g. equally reddish and yellowish) were measured at 10, 100, and 1000 Td for two observers. Wavelengths of the unique hues were not invariant from 10 to 1000 Td. In Judd's modification of the 1931 CIE chromaticity diagram, only the unique yellow loci at 10 and 1000 Td plotted as straight lines. The other constant hue loci were curved, and all the constant hue loci changed with retinal illuminance. - The Authors.

Flicker photometry : residual minimum flicker by P.K. KAISER, M. AYAMA and R.L. PANDEY VIMAL (Dept. of Psychol., York Univ., North York, Ontario, M3J 1P3 Canada), J. Opt. Soc. Am. A, 3, 1989-1993, 1986.

We show that when all possible optical artifacts are eliminated in a flicker photometric procedure, there is still a residal minimum flicker after color fusion occurs. Our stimuli were alternated with approximately rectangular pulses; we obtained results contrary to those of a previous report in which the stimuli were alternated sinusoidally. In a subsidiary test using a computer-generated cosine wave on a RGB monitor, one observer perceived no residual flicker but a second observer did. - The Authors.

Unsettled issues in infant color vision, by J.S. WERNER (Lab. Psychol. Campus Box 345, Univ. of Colorado, Boulder, CO 80309, U.S.A.) and B.R. WOOTEN, Infant Behaviour and Development 8, 99-107, 1985.

The purpose of this paper is to clarify, several issues in infant color vision that, despite previous reviews in this journal, remain in dispute. We argue that the data are still insufficient to conclude that 2-3-month-old infants are adult-like trichromats, but they are at least dichromats. How closely infant hue perception parallels adult hue perception cannot be discerned from existing data. - The Authors.

Isolation of short-wavelength-sensitive cone photoreceptors in 4-6-week-old human infants, by V.J. VOLBRECHT and J.S. WERNER (Dept. of Psychol., Univ. of Colorado, Boulder, CO 80309, U.S.A.) Vision Res. 27, 469-478, 1987.

Spectral sensitivity was measured for nine infants, 4-6 weeks of age, and three adults under conditions of chromatic adaptation chosen to reveal the presence of short-wavelength-sensitive cones. Monochromatic test stimuli (400-550 nm) were presented at 2 Hz superimposed on a broadband, yellow background. Following 4 min of adaptation to the background, test stimuli were presented while recording the steady-state, visually-evoked cortical potential (VECP). Response averages were obtained for several radiance levels at each test wavelength, and the amplitude of the fundamental frequency was extracted from the digitized response with a fast-Fourier transform. These data were used to construct response vs intensity functions for each wavelength. A fixed criterion response was chosen from the later family of functions to generate individual spectral sensitivity curves. These VECP spectral sensitivity functions matched the psychophysically-determined functions of adults, measured by the method of adjustment and with the same stimulus configuration. Peak sensitivity for infants and adults under these conditions occured at about 440 nm, and the main lobe of the curve (400-500 nm) was well fitted by the Vos-Walraven short-wavelength cone fundamental. The only major difference between the infant and adult data was in the relative sensitivity of the secondary mode of the curves (above 500 nm). These results demonstrate the presence of short-wavelenght-sensitive cones and a functional pathway to the visual cortex by 4-6 weeks of age. - The Authors.

Aging of the human lens, by J. POKORNY, V.C. SMITH, and M. LUTZE (Eye Res. Lab., 939 East 57 th Street, Chicago, Illinois 60637, U.S.A.), Applied. Opt., 26, 1437-1440, 1987.

The optical density of the human lens changes during life. Literature concerning both the spectral density function and the rate of such changes is reviewed. Analysis indicates that two components govern the spectral lens density function, with one increasing gradually during life. The average lens density increases linearly at 400 nm by 0.12 density unit per decade between the ages of 20 and 60 and by 0.40 density unit per decade above age 60. A tabulation of the two components of the average 32-yr old lens is given, as are equations to derive the average spectral lens density functions for observers aged 20-80. - The Authors.

Foveal cone pigment density difference in the aging human eye, by P.E. KILBRIDE, L.P. HUTMAN, M. FISHMAN and J. S. READ (Dept. Ophthalmol. Eye and Ear Infirmary, Univ. of Illinois, Coll. of Med. at Chicago, 1855 West Taylor Street, Chicago, IL 60612, U.S.A.) Vision Res. 26, No 2, pp. 321-325, 1986.

Using fundus reflectometry, we have measured a decrease in the density difference of the foveal cone visual pigments with age in human subjects. This decrease is consistent with a loss of visual pigment in the retina with age. Fundus reflectance and normalized density difference spectra data are presented for the subjects. A decrease in cone pigment with age would be consistent with both anatomic studies, which indicate a loss and

displacement of photoreceptors with age, and psychophysical studies, which demonstrate loss of photoreceptor function with age. - The Authors.

Aging and human macular pigment density, appended with translations from the work of Max Schultze and Ewald Hering, by J.S. WERNER, S.K. DONNELLY and R. KLIEGL (Dept. of Psychol., Univ. of Colorado, Boulder, CO 80309, U.S.A. and Max-Planck-Inst. for Human Developm. and Education, Berlin, F.R.G.) Vision Res. 27, 257-268, 1987.

The optical density of human macular pigment was measured for 50 observers ranging in age from 10 to 90 years. The psychophysical method required adjusting the radiance of a 1°, monochromatic light (400-550 nm) to minimize flicker (15 Hz) when presented in counterphase with a 460 nm standard. This test stimulus was presented superimposed on a broad-band, short-wave background. Macular pigment density was determined by comparing sensitivity under these conditions for the fovea, where macular pigment is maximal, and 5° temporally. This difference spectrum, measured for 12 observers, matched Wyszecki and Stile's standard density spectrum for macular pigment. To study variation in macular pigment density for a larger group of observers, measurements were made at only selected spectral points (460, 500 and 550 nm). The mean optical density at 460 nm for the complete sample of 50 subjects was 0.39. Substantial individual differences in density were found (ca. 0.10-0.80), but this variation was not systematically related to age. - The Authors.

Comparison of the Standard Pseudoisochromatic Plates to the Ishihara color vision test, by M.K. HASKETT and J.K. HOVIS (School of Optom., Indiana Univ., Bloomington, Indiana, U.S.A.), Am. J. Optom. Physiol. Opt. 64, 211-216, 1987.

The Standard Pseudoisochromatic Plates (SPP) color vision test was compared to the Ishihara color vision test with respect to screening validity, digit confusion errors, and individual plate efficiency. Results from 315 1st and 3rd grade males confirmed previous reports that the SPP is an effective screening test. Moreover, the SPP test was superior to the Ishihara test with respect to digit confusion errors. Color normal children made about 5 to 7 times as many errors on the Ishihara test as on the SPP. Screening inefficiency values of individual plates of both tests were calculated. A high inefficiency value of a SPP plate was usually caused by its inability to detect color defective subjects. - The Authors.

Evaluation du Panel D-15 désaturé. I : Méthode de quantification et scores normaux. (Assessment of desaturated Panel D-15 I : Quantification method and normal scores), by P. LANTHONY (Lab. Vision des Couleurs, Centre Nat. Ophtalmol. des Quinze-Vingts, 28, rue de Charenton, 75571 Paris Cedex 12, France) J. Fr. Ophtalmol. 9, 843-847, 1986.

Description of a method of quantification of the desatured Panel D-15 test : the principle was the calculation of the difference between the caps of the desatured Panel D-15, according to the differences between the corresponding caps of the 100-hue test, thus allowing the calculation of partial and total scores. 337 normal subjects, divided in 5 years age groups,

were examined by this procedure. A color discrimination impairment was evidenced, the total scores being increased in the older age groups. These results give norms for clinical evaluations. - The Authors.

Normal values of F-M 100 hue test in japanese subjects, by S. NOYORI, K. HAMANO, M. TOMONAGA and Y. OHTA (Dept. Ophthalmol., Tokyo Medical College, Japan), Acta Soc. Ophthalmol. Jap. 91, 208-303, 1987.

The following-experiments were performed to examine normal values of F-M 100 hue test in Japanese subjects. F-M 100 hue test were performed in the order of both eyes, right eye and left eye on 121 subjects (61 male and 60 female) between the ages of 11 and 68 with normal colour vision and corrected visual acuity of better than 20/20. Subjects were devided into age groups by tens (teens, twenties, thirties, etc.) and results were examined for each age group. The mean total error score of each age group was the lowest in the subjects in their twenties and increased in the order of thirties, teens, forties, fifties and sixties. In all age groups, there was no significant difference in values between both eyes and one eye, or between male and female. In terms of hues, we found that partial error scores in the BG and the RP area tended to be high in all age groups. Upper limit of normal range of total error scores for each group was calculated by critical limit method with a risk probability of 5 % and the results showed strong coincidence with those of Osakabe (1982). The results between the age of 22 years and 44 years were better than those of Verriest (1963, 1982). - The Authors.

A comparative study of successive and simultaneous methods in colour discrimination, by J. ROMERO, E. HITA and L. JIMENEZ DEL BARCO (Depart. de Optica, Fac. de Ciencias, Univ. de Granada, Spain) Vision Res. 26, 471-476, 1986.

Simultaneous and successive methods of comparison of stimuli are studied by comparing experimental results of colour discrimination experiments. In this way, colour differential thresholds for two normal observers and four different stimuli were measured by the two methods. In most cases, the capacity to discriminate colour decreased when the successive method was used, although no differences were found in qualitative aspects of discrimination. These results differ somewhat from previous reports in this field, probably becaused of experimental differences in the method of obtaining the thresholds. - The Authors.

Red-green mixture thresholds in congenital and acquired color defects by K.L. SELLERS, G.M. CHIRAN, S.J. DAIN, S.C. BENES, M. LUBOW, K. RAMMOHAN and P.E. KING-SMITH (College of Optom., Dept. Ophthalmol. and Dept. of Neurol., Ohio State University, Columbus, OH 43210, U.S.A.) Vision Res. 26, 1083-1097, 1986.

A color television display was used to measure thresholds for mixtures of red and green on a white background; red and green components could be either incremental, decremental or zero, Ellipses are fitted to a plot of green contrast as a function of red contrast, and it is argued that the length of the ellipse is a measure of red-green color discrimination and the width of the ellipse is a measure of luminance discrimination. It is shown that the technique reliably distinguishes normals from

congenital color defectives and also protan from deutan subjects. For some cases of acquired color defects (e.g. optic neuritis), there is a roughly equal loss of color and luminance discrimination whereas, in other cases (e.g. hereditary optic atrophies), the loss of color discrimination is much greater than the loss of luminance discrimination. - The Authors.

Clinical studies of color vision with Gunkel's chromagraph, by F.C. CHU, D.B. REINGOLD, D.G. COGAN, S.M.J. HUNT, and D.H. YOUNG (Clinical Branch, National Eye Institute, National Institutes of Health, Bethesda, Md., u.S.A.) Arch Ophthalmol. 101, 1232-1235, 1983.

Color thresholds in a series of patients with local or systemic diseases were determined by a chromagraph method and subjected to computer analysis. When compared with normal persons, those with optic nerve disease (multiple sclerosis, optic neuritis, and optic atrophy) showed an overall weakness for all colors (enlarged neutral areas), with an additional specific defect in the orangecyan (greenish blue) axis. Those with the two retinal diseases studied (macular degeneration and retinitis pigmentosa) also showed threshold elevation for all colors, but with a special defect in the yellow-blue axis. The general elevation was greater for patients with retinitis pigmentosa than for those with macular degeneration, regardiess of the visual acuity. In patients undergoing treatment for systemic lupus erythematosus and rheumatoid arthritis, there was a mild elevation of the color threshold, especially for yellow. - The Authors.

Factors in using color video monitors for assessment of visual threshold, by A.J. VINGRYS and P.E. KING-SMITH (Coll. of Optom., Ohio State Univ., 338 West Tenth Avenue, Columbus, Ohio 43210-1240, U.S.A.) Color Res. and Applic. 11, S57-62, 1986.

Color monitors can be used for generating chromatic test spots for measuring visual thresholds. A technique for generating such stimuli is described and chromatic specification of the test stimulus is discussed. Temporal and spatial artifacts that may affect the detection of test spots are considered and applications to visual threshold measurements are briefly discussed. - The Authors.

Visual thresholds measured with color video monitors, by P. E. KING-SMITH, A.J. VINGRYS and S.C. BENES (Coll. of Optom. and Dept. of Ophthalmol., Ohio State Univ. Columbus, Ohio 43210, U.S.A.) Color Res. and Applic., 12, 73-80, 1987.

We describe the types of threshold measurement that can be made by using a circular test spot whose colorimetric, temporal, and spatial parameters can be varied. Examples are given of the application of a number of these tests to studies of normal and clinical vision. - The Authors.

A recent objective test for color vision, by S. VILLANI (Università di San Marino) Atti Fond. Cs. Ronchi, 41, 689-694, 1986.

Traditionally, the tests of color vision are "steady" in nature. This is the case of the anomaloscope and of the pseudo-isochromatic plates. However, nowadays people are faced with

"dynamic" situations, like the case of Color Television and VDT. The present Annotated Bibliography shows how the above solution has been reached. When coupled with the electro-oculographic technique, the test can be also used for testing objectively infants and animals. - The Authors.

Congenital color blindness and deficiency of glucose-6-phosphat dehydrogenase, by LEZHENG WU, et al; Eye Science 2, 260-262, 1986.

Through the study of cases with congenital color blindness and controls in Guangzhou area, using the methods of NBT qualitative test and Zinkham quantitative test to estimate G6PD activities, we found the frequency of G6PD deficiency in congenital color blindness (10.9 %) is much highter than in controls (3.5 %) statistically.

Thirty pedigrees with congenital color blindness were analysed. Simutaneously, the results showed the recombination rate was less than 0.05 and Lods value (Z) equal to 1.449 in eight families, which indicated a fairly linkage between the loci on X chromosome determining congenital color blindness and enzyme deficiency. - The Authors.

A pedigree with incomplete tritanopia, by H. ICHIKAWA, Y. MIYAKE (Dept. Ophthalmol., Nagoya Univ. Sch. of Med., Japan) and K. ICHIKAWA (Dept. Ophthalmol., Chukyo Hosp., Japan) Jpn. J. Clin. Ophthalmol. 39, 519-583, 1985.

A family with tritanopia affecting 3 members : a 35-y old female, her sister aged 33 y and their father aged 66 y. Each of the 3 cases had normal visual acuity. They manifested pure tritanopic findings and were free of RG defects when tested with various color vision tests. No pathological fundus findings were observed in the affected and unaffected family members. These findings led to the conclusion that the tritanopia in this family was decidedly hereditary and was of dominant autosomal nature. One of the 3 cases showed normal ERG and non-recordable blue ERG under background illumination. Psychophysiological studies made on the proband demonstrated no detectable blue cone response. The findings were suggestive of underlying defective functions in the blue cone system following loss of interreceptoral interraction between the blue cone and the longer wavelength sensitive red and blue cones. - Masuo Ohta.

Studies on methods of testing acquired color vision defects (1) The effects of visual acuity, by N. MIYAKAWA, K. ICHIKAWA and H. ICHIKAWA (Dept. Ophthalmol., Nogoya Univ. School of Med., Japan) Folia Ophthalmol. Jpn. 35, 1597-1603, 1984.

In this study, 6 persons with normal color vision were examined with 8 testing methods under various visual acuities using different plus lenses; 3 amblyopic patients without congenital color vision defects were also examined. The following results were obtained : (1) The lowest passing visual acuities for each color vision test were determined ; (2) If subjects fail each test despite their passing visual acuities, they likely have some eye disease ; (3) The Ishihara plates and the SPP (part 2) were considered the best tests in cases of good visual acuity ; (4) Arrangement tests were considered the best in cases of poor visual acuity ; (5) An anomaloscope is an effective tool for

examining color vision in cases whose near vision is over 0.02. - Yasuo Ohta.

Studies on methods of testing acquired color vision defects (2) The effects of the central visual field defect by N. MIYAKAWA, K. ICHIKAWA and H. ICHIKAWA (Dept. of Ophthalmol., Nagoya Univ. School of Med. Japan) Folia Ophthalmol. Jpn. 35, 1816-1822, 1984.

The color vision of 6 patients suffering from macular hole without retinal detachment and who had eccentric viewing, was examined with 8 testing methods. The following results were obtained : (1) If the visual acuity of a patient is below the lowest passing level (designated in previous report), his color vision test results by that method are better disregarded ; (2) Pseudoisochromatic plates were not suited to patients with eccentric viewing, because such patients' visual acuity is usually under 0.2, the lowest level for passing the pseudoisochromatic plate test ; (3) The Lanthony desaturated Panel D-15 was the most sensitive test among arrangement tests in cases of eccentric viewing ; (4) The Panel D-15 and the FM 100-hue tests were less sensitive than the desaturated Panel D-15 ; (5) The New Color Test (separation) was hardly influenced at all by eccentric viewing of less than 3 degrees from the fovea ; (6) 4 patients were examinable by anomaloscope. - Yasuo Ohta.

Discriminazione cromatica nell'afachico. Studio comparativo fra la correzione tradizionale e la pseudofachia (Chromatic discrimination in the aphakic subject, comparison between usual correction and pseudophakia), by R. PAOLETTI PERINI (Divisione Oculistica S.M. Nuova, USL 10/A, Firenze, Italy) Atti Fond. Cs. Ronchi, 4&, 725-727, 1986.

Results of a research on aphakic and pseudophakic people colour discrimination. The city University Colour Vision Test with desaturated tables has been used. The results obtained are reported and discussed. - The Authors.

Colour vision in cataract, aphakia and pseudophakia, by J. VOLA, J.B. SARACCO, J.P. PETRAKIAN, R. MARDRUS and B. RIDINGS, Eur. J. Implant and Refractive Surg. 3-5, 203-207, 1987.

Between 40 and 50 y of age 50 % of the subjects suffering from cataract have abnormal colour vision ; normal colour vision never occurs after the age 70 y. A blue-yellow defect persists in 60 % of the cases of aphakia with visual acuities ranging between 8 and 10/10. In pseudophakia colour vision becomes normal in 80 % of the cases. Anti-UV-trated lenses are discussed. - Jean Vola.

Etude de la vision des couleurs grâce à l'anomalomètre de Besançon chez des aphaques et des pseudophaques dont l'implant est ou traité ou non traité anti UV. (A study of colour vision by means of the Besançon anomalometer in aphakia and in pseudophakia with anti-UV-trated IOLs and with non anti-UV-treated IOLs), by Sofie MARTIN de MONTAIGNE. These, Marxeille 1987.

The Rayleigh match is normal in 53 % of the cases of aphakia (a), in 25 % of the cases of pseudophakia with non anti-UV treated IOLs (b_1) and in 83 % of the cases of pseudophakia with anti-UV-treated IOLs.

The Trendelenburg match is always abnormal except in 17 % of

the pseudophakia cases with anti-UV-treated IOLs. In this category the range of the Trendelenburg match is increased in 59 % of cases. - Jean Vola.

Foveal cone optical density in retinitis pigmentosa, by A.E. ELSNER, S.A. BURNS and L. A. LOBES Jr. (Dept. Ophthalmol., Univ. of Pittsburg, 203 Lothrop Str., Pittsburg PA 15213, U.S.A.), Applied Optics 26, 1378-1384, 1987.

We have used a color matching technique to estimate the optical density of the foveal cone photopigments in a group of patients with retinitis pigmentosa. We find that foveal cone optical density is reduced in patients with retinitis pigmentosa. This reduction of density can occur early in the disease process and is found in patients with minimal visual field loss or 20/20 visual acuity. Foveal cone optical density is highly correlated with visual acuity and correlated with visual field area. Full-field ERG measurements are severely reduced early in the disease before significant foveal changes occur. - The Authors.

Cone function and cone interaction in hereditary degenerations on the central retina, by E. ZRENNER, J. NOWICKI and R. ADAMCZYK (Max-Planck Inst. for Physiological and Clinical Research, D-6350 Bad Nauheim, RFG Docum. Ophthalmol. 62, 5-12, 1986.

Spectral sensitivity functions and the transient decrease of sensitivity to short wavelengths after the offset of yellow light (transient tritanopia) were measured by increment threshold techniques in patients suffering from hereditary macular degenerations. Color vision defects were determined by arrengement tests of the anomaloscope.

Central areolar choroidal dystrophy was found to produce a mild protan defect an to reduce foveal spectral sensitivity throughout the visible spectrum by a factor of 100; it also abolishes transient tritanopia. Electroretinogram (ERG) was normal, electro-oculogram (EOG) subnormal.

Stargardt s disease, despite numerous fluorescent macular spots, does not abolish transient tritanopia not does it reduce spectral sensitivity, although scotopic matches were preformed on the Nagel anomaloscope. Only in severe, advanced cases was transient tritanopia reduced and spectral sensitivity found to follow the absorption spectrum of rods. Routine ERGs and EOGs were normal.

Vitelliform macular degeneration, despite the ophthalmoscopically pronounced dystrophic macula, produced only very small changes in spectral sensitivity and transient tritanopia, although a widened matching range on the Nagel anomaloscope and electrophysiological abnormalities were found. Apparently damage of the retinal circuit which connects long and short wavelength-sensitive cones, caused by hereditary conditions, is different from that caused by retinotoxic drugs. - The Authors.

Einschränkungen der Netzhautfunktion bei Konduktorinnen der Chorioideremie (New tests for determining disturbances in carriers of choroideremia) by E. ZRENNER, L. KOHEN and H. KRASTEL (Max-Planck-Inst. für physiologische und Klinische Forschung, Bad Nauheim, F.R.G.) Fortsch Ophthalmol. 83, 602-608, 1986.

In seven obligate carriers of choroideremia, a special form of x-recessive inherited tapetochoroidal degeneration we

performed color vision tests as well as tests of cone-cone interaction (transient tritanopia) and rod-cone interaction (25 Hz flicker-threshold during dark adaptation). The visual acuity, the visual field as well as the spectral sensitivity functions were normal in all carriers. However, measuring transient tritanopia, the carriers' thresholds for blue testlight were increased by a factor of 8 during the phase of adaptation to bright yellow light. The sensitivity remained reduced also in the first seconds after the offset of the yellow adapting light. Consequently transient tritanopia provides a psychophysical criterion for the disturbance of cone-cone interaction in carriers of choroideremia that can help to better determine in functional loss in these patients. The examination of the visual field with blue test stimuli in presence of yellow background lights illustrates the spatial extent of defects in cone function. - The Authors.

Cone photopigment bleaching abnormalities in diabetes, by A.E. ELSNER, S.A. BURNS, L.A. LOBES, Jr., and B.H. DOFT (Dept. Ophthalmol. Univ. of Pittsburgh, 203, Lothrop Str., Pittsburgh PA 15213, U.S.A.), Invest. Ophthalmol. Vis. Sci. 28, 718-724, 1987.

We have used a color-matching technique to obtain estimates of the optical density of cone photopigments as a function of retinal illuminance in patients with insulin-dependent diabetes mellitus (IDDM). We found that the half-bleach illuminance of some patients is abnormally high. That is, it takes more light to bleach an equivalent amount of photopigment in these patients. Since low illuminance color matches for these patients are normal, this implies that these patients have normal amounts of photopigment, but the photopigment is not bleaching normally. This result clearly points to abnormalities in the outer retina of these diabetic patients. The most likely causes of this abnormality are either decreases in the ability of the cones to absorb light, or an increased rate of degeneration of the cone photopigments. - The Authors.

The color vision in aging macular degeneration, by SHIZHOU HUANG, HEPING SHI, LEZHENG WU and DE-ZHENG WU (Eye Res. Inst., Zhongshan Ophthalmic Center Sun Yat-sen Univ. of Med; Sci. Guangzhou, China) Eye Science 3, 198-200, 1987.

The color vision in 46 cases (78 eyes) with AMD and 22 normal subjects (44 eyes) was examined with panel D-15 and FM 100-hue test. 62,8 % of the AMD eyes showed color vision defect in the FM 100-hue test and 38,5 % appeared to be abnormal in the panel D-15 test. The defect was mainly of tritan-type in both of the tests. The total error score of the FM 100-hue test of the AMD patients with visual acuities of 1.0 or better was compared with that of the normal subjects and difference between the two groups was highly statistically significant, which suggested that the changes of color vision in AMD may occur earlier than those of visual acuity. It also showed that the difference between the total error score of wet form and that of dry form had highly statistical significance, which showed that the color vision in wet form may be more deteriorative than that in dry form. - The Authors.

Effects of ethyl alcohol on the electrooculogram and color vision, by E. ZRENNER, K.G. RIEDEL, R. ADAMCZYK, T. GILG and E. LIEBHARDT (Lab. of the Max-Planck-Inst. for Physiological and Clinical Research in the University Eye Hospital, Mathildenstr. 8, D-8000 Munich 2, FRG) Docum. Ophthalmol. 63, 305-312, 1986.

Color vision tests and electrooculography (EOG) were performed in 6 male and 2 female healthy young trichromatic volunteers between 60 and 130 min after finishing consumption of ethyl alcohol leading to blood levels of approximately 0.07 % to 0.16 %. The average number of errors in the desaturated Panel D-15 arrangement test rose from 0.86 to 2.0; the average error score in the Farnsworth-Munsell 100-Hue test rose from 26 to 79. The axis of erors in both tests was clearly tritanopic and tetartanopic, pointing to a specific effect of ethyl alcohol on the function of blue-sensitive cones and/or their interaction with longer wavelength-sensitive cones.

Ethyl alcohol decreased the size of the light-peak, apparently in a dose-dependent fashion, in each of the 16 eyes by values between 3 % and 79 %. The effect of alcohol on the EOG light peak was stronger between 30 and 95 min (23 % decrease in average) than between 95 and 130 min (14 % decrease) after the finish of alcohol administration. - The Authors.

Der Einfluss von Theophyllin und Coffein auf die sensoriche Netzhautfunktion des Menschen (The influence of theophylline and caffeine on the sensory function of the human retina), by L. KOHEN, E. ZRENNER und T. SCHNEIDER (Max-Planck-Inst. für Physiol. und Klin. Forschung, II. Physiol. Abt., D-6350 Bad Nauheim, B.R.D.) Fortschr. Ophthalmol. 83, 338-344, 1986.

In 6 normal observers colour vision (Farnsworth-Munsell 100-Hue Test and Panel D-15 Test désaturé) as well as the spectral sensitivity, dark adaptation and postreceptoral interaction between short- and longwavelength sensitive cones (transient tritanopia) and the cone-rod-interaction (increase of the 25 Hz flicker-threshold during dark adaptation) were tested before and after the intake of the xanthinederivatives theophylline and cafeine. In a therapeutical dosage theophylline enhances the physiological increase of the cone flicker-threshold during dark adaptation, while cafeine does the contrary. The simultaneously determined dark adaptation was not affected by the drugs. This indicates that the employed doses of theophylline and cafeine did not vary so much the sensitivity of the photoreceptors themselves but mainly the cone-rod interaction expressed in the rise of the cone flicker-threshold. All the other parameters were not influenced by these drugs. - The Authors.

Vision del color y su orientacion profesional. (Color vision and professional guidance), by F.J. PERALES PALACIOS, E. HITA VILLAVERDE and J.L. GARCIA SERRANO (Escuela Universitaria de Magisterio de Granada, Spain), Studium Ophthalmol. 5, 29-33, 1986.

A very general review paper. - Guy Verriest.

Eye disease and color defects, by J. POLORNY and V.C. SMITH (Eye Res. Lab., Univ. of Chicago, 939 East 57th Street, Chicago, IL 60637, U.S.A.) Vision Res. 26, 1573-1584, 1986.

It is sometimes disconcerting to the student of vision to

find that his new ideas are in fact rediscoveries of old ones. Nowhere is this phenomenon more striking than in the field of color defects where not only Maxwell and Helmholtz but also Helmholtz s great students, von Kries and König, enjoyed phenomenal insight. Before the turn of the century, these scientists described and defined not only the congenital but also the acquired color vision defects which accompany eye disease. Subsequently, study of acquired color vision defects declined. François and Verriest (1961) summarized the status of the area in Volume 1 of **Vision Research** :
"... the acquired defects were so neglected that the facts already known were almost completely forgotten and eventually cases of acquired deficiency were even considered as congenital."

The groundwork for understanding color defects in eye disease was established by the end of the nineteenth century. Thereafter the field was neglected as scientists concentrated on studies of normal color vision and congenital color vision defects. Spurred by the development of the Farnsworth 100 hue-test, interest was renewed in the 1950s. The past 25 years have seen an explosion of interest in color defects in eye disease. The International Research Group on Color Vision Deficiencies has played an important role in this activity. The development of new clinical tests and instruments as well as refinement of laboratory techniques are among the important developments. - The Authors.

Pathologie de la vision des couleurs (Pathology of colour vision) by P. LANTHONY (Centre National des Quinze-Vingt, Paris, France) Encyclopédie Médico-Chirurgicale (Paris) 21030, 6p., 1987.

Artificial sources representative of CIE standard illuminant D 65 by YUE-XIN SHU (Lab. of Color Sci., Shandong Textile Engin. Coll., Qingdao, Shandong, China), Die Farbe 32/33, 429, 1985/86.

Standard illuminant D65 is simulated by a xenon arc lamp behind two different interference-filter combinations. - The author.

ACHROMATIZING LENSES

A number of vision researchers have expressed an interest in purchasing a lens that corrects for the chromatic aberration of the eye. The one designed by Bedford and Wyszecki is apparently no longer available. Powell has designed an achromatizing lens that, like the Bedford-Wyszecki model, adequately corrects for longitudinal chromatic aberration. In addition, the air spaced design does not introduce transverse chromatic aberration as does the Bedford-Wyszecki lens. (See Ian Powell, Applied Optics, 20, 4152-4155, 1981, for a complete description).

The Powell lens is 15 mm in diameter and consists of a cemented doublet (4 mm thick) and a cemented triplet (7 mm thick) mounted 14,5 mm apart in an aluminium cell. For three viewing color displays, the lens system is designed to be placed 17 mm from the pupil. It adequately corrects for chromatic aberration in most subjects over a 14 degree field. In Maxwellian view, it may be placed 17 mm anterior to the optical system's exit pupil or at any analogous position.

We are in touch with Applied Physics Specialities, Ltd., of Don Mills, Ontario. They are prepared to make a batch of the Powell lens systems providing we can guarantee orders totalling 25-50 lenses, they can provide them for $450 (US). Shipping and brokerage costs are not included, but should not be more than about $50.00.

If you are interested, please respond immediately by sending the usual purchasing order to : Mr. Martin HIGH
Applied Physics Specialities, Ltd.
Don Mills, Ontario
CANADA M3C 2H2

Bill R. Wooten

Comment. - Achromatizing lens are very hard to obtain, for their costs on a custom basis would be exorbitant (probably several thousand dollars). Thus Wooten's arrangement is a unique opportunity. - Charles F. Stromeyer III

COMPETITION FOR IDEAL TRAFFIC SIGNAL DESIGN

The Color Blind Committee will award a prize of one thousand dollars ($1000 Can) for the most suitable design for traffic signals.

Traffic signals used in most countries are not suited to color blind drivers. Red-blind drivers do not have as much recognition or braking distances at stop lights as drivers with normal vision. Green-blind drivers confuse the traffic signals with each other and with street and advertising signs.

The Committee has decided that the present coding,- red for 'stop' and green for 'go' or 'safe', should be retained to avoid confusion.

Designs should be clearly drawn to stated scale on 8" X11 (approx.) paper, with an accompanying short description.

Entries may be submitted any time until June 1st 1988. Your name, address and telephone number should be noted on each sheet of paper.

Note : The Committee is informal and unofficial, and can offer no patent protection. It is not obligated to award any prize money if, in the opinions of the judging panel and the Committee's Executive Secretary none of the designs merit an award.

The Color Blind Committee
1020 Mc Gregor Ave., Victoria, B. C. V8S 3T9, Canada.

TENTH INT. SYMPOSIUM OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

CAGLIARI (Sardinia, Italy), JUNE 15-28, 1989.

PRELIMINARY INSCRIPTION FORM

(to be betached from one of the 1988 issues of Daltoniana and to be returned before Januari 1, 1989 to Dr. G. VERRIEST, Dienst Oogheelkunde, Universitair Ziekenhuis, De Pintelaan 185, B-9000 Ghent, Belgium).

The special themes of this symposium will be (a) Influence of field size on colour vision, (b) Genetics and colour vision.

Free papers will be accepted (methods of examination of central and peripheral colour vision, congenital and acquired defects, genetics of colour vision practical aspects etc.)

The (principal) authors have to be members of the IRGCVD and are asked :

a) to ask full verbal presentation for no more than two papers (the posters will be briefly presented and will be published!);
b) to send for each paper with this preliminary inscription form two copies of a (preliminary) summary of at most 200 words ;
c) to remit to Dr. Verriest before the end of the symposium the manuscript (in good english) to be printed in the Proceedings.

PAPER

THEME a / b
free

AUTHOR(S) : .....
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TITLE : .....
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WANTED PRESENTATION : poster
OR verbal 5 min 10 min

For further information concerning the scientifical programme contact Dr. G. VERRIEST (address above).
For the other matters contact the local organizer : Prof. Antonina SERRA, Via San Giovanni 423, I-09100 CAGLIARI, Italy.

Signed

Address