# DALTONIANA

NEWSLETTER
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## NEWS FROM THE IRGCVD

As result of the election by written ballot the members of the IRGCVD directional committee for the quadrennum 1987-1991 will be : Verriest (59 votes), Marré (50), Pokorny (50), Zrenner (47), Drum (47), Birch (46), Moreland (43), Roth (42), Jaeger (41), Sperling (38), Ohta (38) and Serra (37). Suppleants : Lakowski and Mollon (each 32). In principle all officers remain in function till the 1989 symposium in Cagliari, where a president will be elected for the period 1989-1993.

An IRGCVD symposium has been scheduled from Monday April 2 to Wednesday April 4, 1990 in Tokyo (Japan). It has been acknowledged as a satellite symposium of the twenty-sixth International Congress of Ophthalmology held from March 18 to March 24, 1990 in Singapore. An ISCEV satellite symposium will be held from March 26 to March 31 1990 in Guangzhou, People's Republic of China. The data of both symposium have been chosen in order that participants could easily fly from Singapore to China and from China to Tokyo. The local organizer of the IRGCVD symposium in Tokyo is Yasuo Ohta. Eberhardt Zrenner helped much for scheduling. - Guy Verriest.

## LITERATURE SURVEY

A system of photometry and colorimetry based on cone excitations, by R.M. BOYNTON (Dept. of Psychology, Univ. of California at San Diego, La Jolla, California 92093, U.S.A.) Color Res. and Appl. 11, 244-452, 1986.

A system of photometry and colorimetry is proposed that is based upon cone action spectra. Instead of X, Y, Z tristimulus values, the new system divides the visual stimulus into L, M, and S components, which are related to the relative excitation levels of the three classes of human cone photoreceptors (long-wave-

length-sensitive L, middle-wavelength-sensitive M, and short-wavelength-sensitive S). On the assumption that luminance is proportional to L + M, with S cones making no contribution to it, a chromaticity diagram results in which the relation between chromaticity coordinates and cone excitations is transparent, rather than inadvertently obscured as in the CIE system. - The Author.

Field additivity of Stiles's Pi-4 color mechanism, by A. REEVES (Northeastern Univ., 360 Huntington Avenue, Boston, Mass. 02115, U.S.A.) J. Opt. Soc. Am. A 4, 525-529, 1987.

Stiles's middle-wave color mechanism Pi-4 is field additive for mixture of 410-, 480-, 530-, 622-, and 670-nm adaptation fields, when studied with a 1-deg, 200-msec, 500-nm foveal test flash at 10 times absolute threshold. - The Author.

Role of the blue mechanism in wavelength discrimination, by P.K. KAISER (Dept. of Psychol., York Univ. Downsview, Ontario M3J IP3, Canada) and R. M. BOYNTON (Dept. of Psychol., Univ. of California at San Diego, La Jolla, CA 92093, U.S.A.) Vision Res. 25, 523-529, 1985.

The role of blue cones as well as the pathways they supply (collectively called the "blue mechanism") is evaluated by comparing ordinary wavelength discrimination functions with those obtained using two methods designed to inhibit the blue mechanism selectively. These methods use a just-noticeable-border criterion (JNB), instead of the usual one of just-noticeable-difference, and a yellow preadapting field to induce transient tritanopia. Without transient tritanopia, the data obtained using the just-noticeable-border criterion reveal a small contribution of the blue mechanism to wavelength discrimination. Transient tritanopia, with JNB, produces an additional selective loss of wavelength discrimination in a spectral region flanking 460 nm, which yields a function resembling those for tritanopes previously examined. - The Authors.

Higher order color mechanisms, by J. KRAUSKOPF, D.R. WILLIAMS, M.B. MANDLER and A. M. BROWN (AT & T Bell Laboratories, Murray Hill, NJ 07974, U.S.A.) Vision Res. 26, 23-32, 1986.

Evidence supporting the existence of higher order color mechanisms, that is, ones beyond the previously identified second stage mechanisms is presented. This evidence includes a reanalysis of the data of Krauskopf et al. (Vision Res. 20, 1123-1131, 1982) on the desensitizing effects of viewing chromatically modulated fields, new experiments on a generalized version of the "transient tritanopia" experiment of Mollon and Polden (Phil.

Trans. R. Soc. Lond. 278, 207-240, 1977) and results on the relationship between discrimination and detection of brief color changes. - The Authors.

Just noticeable inhomogeneity criterion for determining wavelength discrimination functions, by P. K. KAISER and M. AYAMA (Dept. of Psychol., York Univ., North York, Ontario, Canada M3J IP3) Vision Res. 25, 1327-1330, 1985.

The visual criterion of just noticeable inhomogeneity is described for determining wavelength discrimination functions. It involved determining the wavelength differences between reference and test fields required to produce a just noticeable inhomogeneity which cannot be eliminated by a brightness adjustment. The fields formed a checkerboard pattern the element size of which was variable. Tritanopic $\Delta\lambda$ functions were obtained by using the small field insensitivity of the fovea. Just noticeable border, data obtained from bipartite field studies, were replicated with this checkerboard field. - The Authors.

Estudio de la eficiencia en la reproduccion diapositivada de tests pseudoisocromaticos (Efficiency of slide color reproduction of pseudoisochromatic tests), by E. HITA, J. PERALES, J. ROMERO and A. CRUZ (Depart. Optica, Fac. Ciencias. Granada, Spain), Optica Pura y Aplicada 18, 19-31, 1985.

Detection capacity and diagnosis of slide color reproduction of Ishihara's test (1979 edition) are analyzed. In order to perform this evaluation, different commercial films are utilized. These results obtained for the different films are compared with direct application of Ishihara's test and different other tests for color anomalies detection. Two groups of observers have been employed to accomplish the experiment one with normal color vision and one of color defective observers. Data evaluation shows a better behaviour of the reproductions on Kodakchrome-64 and Agfachrome Profesional-100 films in the detection of anomalies in color vision. - The Authors.

Color-axis determination on the Farnsworth-Munsell 100-hue test, by V. C. SMITH, J. POKORNY and A. S. PASS (Eye Res. Lab., Univ. of Chicago, Chicago, Illinois. U.S.A.) Am. J. Ophthalmol. 100, 176-182, 1985.

Error scores on the Farnsworth-Munsell 100-hue test were partitioned into those representing red-green and those representing blue-yellow losses. Data from two groups of normal observers were used. One group showed results characteristic of published norms; one group showed superior performance. Both observers showed a correlation between red-green and blue-yellow

scores indicative of a strong performance factor in this test. The difference between blue-yellow and red-green scores eliminates their correlated variance and allows evaluation of the axis. Both groups showed an increase in difference scores, with age indicating developement of a blue-yellow axis. This increase was significant for the observers characteristic of the norms. We suggest cutoff scores to allow a decision as to whether a given patient shows a blue-yellow or red-green axis. - The Authors.

An averaging method for the interpretation of the Farnsworth-Munsell 100-hue test. - I. Congenital colour vision defects, by S.J. DAIN (School of Optom., Univ. of New South Wales, P.O. Box 1, Kensington, New South Wales 2033, Australia) and J. BIRCH (Dept. Optom., City Univ., Northampton Square, London ECIV OHB, U.K.) Ophthal Physiol. Opt., 7, 267-280, 1987.

A method is described for identifying polarity in Farnsworth-Munsell 100-Hue test data. The method is facilitated by the use of a micro-computer and involves the plotting of "averaged" scores for each cap of the test. Results are presented for 30 protanopes, 30 deuteranopes, 1 tritanope and 2 typical rod monochromats. Analysis of the results shows that the proposed technique is compatible with standard methods of interpreting 100-Hue plots and is suitable to use when error scores are high and when polarity is difficult to interpret. - The Authors.

An averaging method for the interpretation of the Farnsworth-Munsell 100-Hue test. - II. Colour vision defects acquired in diabetic retinopathy, by J. BIRCH (Dept. Optom., City Univ., Northampton Square, London ECIV OHB, U.K.) and S.J. DAIN (School Optom., Univ. of New South Wales, P.O. Box A, Kensington, New South Wales 2033, Australia) Ophthal. Physiol. Opt., 7, 281-291, 1987.

The Farnsworth-Munsell 100-Hue test is frequently used to assess acquired colour vision defects. In diabetic retinopathy the acquired defect is a mild or severe type III (Tritan) defect which may be coupled with poor overall hue discrimination. In consequence, error scores are often high and the 100-Hue polar diagram is difficult to interpret. In this study the averaging method of analysis proposed by Dain and Birch is used to examine 120 100-Hue plots obtained by patients with proliferative diabetic retinopathy. These plots have either moderate (150-300) or high error scores (>300). The method of analysis is found to be effective in determining whether a Tritan defect is present or not. - The Authors.

Rechnergestützte Verfahren zur Klassifizierung von angeborenen und erworbenen Farbensinnstörungen (Calculating methods for the classification of congenital and acquired colour vision defects), by M. BAIER und E. ZRENNER (Max-Planck-Inst., Parkstr. 1, D-6350 Bad Nauheim, B.R.D.) EDV in Medizin und Biologie 15, 77-83, 1984.

Several diagnostical examinations of congenital and acquired color vision deficiencies are rarely used for clinical screening because of their very time-consuming methods of data acquisition and evaluation. In this study three methods are described which demonstrate the automation of such color vision tests by a computer. This allows color arrangement tests, and the measurements of spectral sensitivity functions and cone interactions, as revealed by transient tritanopia, to be used in clinical routine examinations. - The Authors.

Quantification et automatisation du Panel D-15 (Quantification and automation of the Panel D-15 test), by Ph. LANTHONY (Laboratoire de la Vision des Couleurs, Centre National d'Ophtalmologie des Quinze-Vingts, 28 Rue de Charenton, - F-75012 PARIS, France) Bull. Socs. Ophtalmol. Fr. 85, 1287-1290, 1985.

A new method of quantitative evaluation of the Panel D-15 is proposed. The principle is to calculate the intervals between the Panel D-15 caps according to the intervals of the corresponding 100-hue caps. The calculation is performed by means of an automatized system. - The Author.

FM 100-hue test and lightness discrimination test, by A. PINCKERS and J.R.M. CRUYSBERG (Dept. Opthalmol., St. Radboud Hospital, Philips van Leydenlaan 15, 6500 HB Nijmegen, The Netherlands) Docum. Ophthalmol. 64, 19-22, 1986.

Some practical tips are given. With the help of the caps of the FM 100 Hue test simpler tests can be made, such as a Panel D-15 test. If 16 additional grey caps are procured the light sensitivity can also be determined. The durability of a colour specimen is doubled if a ring is fitted into the cap. - The authors.

Clinical electroretinography for short wavelength sensitive cones, by M. SAWUSCH, J. POKORNY, and V. SMITH (Eye Res. Lab., Univ. of Chicago, Chicago Ill., U.S.A.) Invest. Ophthalmol. Vis. Sci 28, 966-974, 1987.

We measured electroretinogram (ERGs) for the isolated short-wavelength-sensitive (SWS) cones using a substitution technique. The stimulus was a 5 Hz alternation of 460 nm and 565 nm or 490 nm and 565 nm light of equivalent photopic luminous efficiency. We used a 571 nm narrow-band adaptation field of 7000 td to

improve SWS cone isolation and to suppress rod activity. The resulting SWS cone ERG amplitudes were 10-30 μV with latencies of 60-80 msec. A rapid clinical protocol to assess the radiance response function of the SWS cone ERG is described. - The Authors.

Spectral sensitivity for observers with protanomalous, extreme protanomalous and protanopic colour vision, by P.R. KINNEAR (Dept. of Psychol., Univ. of Aberdeen, King's College, Old Aberdeen AB9 2UB, U.K.) Ophthal. Physiol. Opt. 6, 197-200, 1986.

Contemporary models of colour vision include a channel for luminosity arising from a combination of some or all of the cone outputs. Accordingly any alteration, reduction or loss at the cone level ought to affect the shape of the spectral sensitivity curve, yet there have been few reports of any significant differences being found between the curves of protanomalous and protanopic subjects. A modified minimum flicker technique was used to determine the spectral sensitivity curves of observers with protanomalous, extreme protanomalous and protanopic vision. Significant differences were found among the mean curves of these categories of vision from 550 nm upwards. - The Author.

Rasterperimetrie mit Farbreizen (Computerized perimetry by coloured stimuli), by H. KRASTEL, W. JAEGER, J. HUBER and S. BRAUN (Univ.-Augenklinik Heidelberg, Bergheimer StraBe 20, D-6900 Heidelberg, B.R.D.) Fortschr Ophthalmol 83, 690-701, 1986.

Luminosity loss towards the short and/or towards the long wavelength end of the visible spectrum precedes overall reduction in light increment sensitivity in several optic nerve and retinal disorders. Long wave luminosity loss occurs e.g. in macular degeneration or in cone dysfunction syndromes, in correspondence to the well known pseudoprotanomaly, or to scotopization. Short wave luminosity loss accompanies the majority of tritan defects, either or retinal, or of optic nerve origin, as evidenced by tritanomaloscopic data. Protan and tritan defects, together with their accompanying loss in luminosity are not limited to the central retinal area. Accordingly, detection of perimetric stimuli of selective long or short wave content, i.e. red and blue stimuli, is often impaired prior to detection of white stimuli. Preferential blue vision field plots are obtained in yellow adaptive illumination, modifying the Marré, Marré and Schreiber, the Hansen, and the Kitahara techniques. The Tübingen Automatic Perimeter of Aulhorn and Durst is applied. In e.g. toxic retinopathies, in carriers of x-linked retinal dystrophies, in dominant optic atrophy, and in glaucoma, preferential blue perimetry is shown to improve detection of field defects in comparison to

standard white perimetry. Red stimuli are presented on a white background. In e.g. Stargardt's disease, in a female carrier of protanopia, in chorioretinitis luica and in congenital achromatopsia red scotomata are recorded which either are not apparent on standard white perimetry, or only to a minor extent. Computerized perimetry by coloured stimuli essentially is not a colour perimetry and so, it does not demand difficult qualitative decisions from the patient. Instead it is a light increment perimetry, which takes advantage of circumscript regions of the spectrum where a selective loss in luminosity occurs in several disorders prior to overall reduction in sensitivity. - The Authors.

Color vision defects in diabetic retinopathy. II. Correlation with clinical findings, by H. TOKUDA, T. YASUMA, and H. ICHIKAWA (Dept. of Ophthalmol., Nagoya Univ. School of Med., Japan) Acta Soc. Ophthalmol. Jpn. 88, 266-274, 1984.

Rayleigh matching, wavelength discrimination, spectral sensitivity and unique hue functions were measured in patients having diabetic retinopathy to investigate the relationship between these color vision functions and the retinal disorders. The modified Airlie House Classification system (1981) was used to classify the clinical findings.

1. There was a correlation between the color matching range and the red end of the matching range (pseudoprotanomaly) when 3.5 degree and 10 degree fields were used.

2. Patients having an advanced stage of the disease showed a wavelength discrimination loss in the short- and mid-wavelength range. The loss at 530 nm had a high correlation with abnormalities of venous caliber in their fundi.

3. In patients whose wavelength discrimination ability was decreased in the short wavelength range, the wavelength of unique green was shifted in the long wavelength direction, but unique blue and unique yellow were not affected. This indicates that the initial impairment in color vision may occur in the B/Y opponent channel.

4. There was a correlation between venous caliber measures in the fundus and the dependence of the increment threshold spectral sensitivity curve on stimulus duration; the spectral sensitivity curves of patients having veins with a caliber of 2a or 2b (advanced duration was increased from 20 msec to 200 msec). This is consistent with the hypothesis that these patients have defect in their neural response. - Yasuo Ohta.

Screening of colour vision defects in diabetic patients, by M. MANTYJARVI, (Hiihtäjäntie 7 A 5, SF-70200 Kuopio, Finland) Acta Ophthalmol. (Kbh) 65, 178-184, 1987.

Fifty patients with long-standing diabetes, retinopathy and earlier photocoagulation served as subjects in this study. They performed two screening tests: the Standard Pseudoisochromatic Plates part 2 and the Panel D-15 and were further tested with the Nagel anomaloscope and the 100-hue test. To elucidate their colour discrimination in practice, they also took two urine glucose tests and one blood glucose test.
Thirty-four of the patients had a blue-yellow colour vision defect as judged by the 100-hue test. All those who failed one or several of the practical tests were disclosed by either the SPP or the D-15 tests. An abnormal SPP result was common in those who passed the practical tests (47%) but less prevalent with the D-15 test (14%). Red-green defects which probably would have been disclosed by ordinary plates were also frequent. - Anders Hedin.

Estimation of visual function after optic neuritis : a comparison of clinical tests, by E. A. C. M. SANDERS, A. C. W. VOLKERS, J. C. VAN DER POEL, and G. H. M. VAN LITH (Dept. Neurol., Univ. Hospital, Leiden; Dept. Biomedical Physics and Technology, Erasmus University, Rotterdam; and Eye Clinic, Dijkzigt University Hospital, Rotterdam, The Netherlands). Br. J. Ophthalmol. 70, 918-924, 1986.

A group of 53 patients who had suffered an attack of unilateral (n= 45) or bilateral (n= 8) optic neuritis more than six months before were subjected to a battery of tests to determine their spatial contrast sensitivity, visual field, and colour vision. The 106 eyes investigated were classified according to their clinical status and visual acuity at the time of the study into unaffected (n= 45), recovered (n= 33), and non-recovered (n= 28). At least one of the three tests gave an abnormal result in 67%, 88%, 100% of the three groups respectively. The results obtained with these three tests showed a significant statistical association. - The Authors.

A comparision of colour and luminance discrimination in amblyopia, by A. BRADLEY, Ch. DAHLMAN, E. SWITKES and K. de VALOIS (School of Optom. and Dept. Psychol., Univ. of Calif., Berkeley California, U.S.A.) Invest. Ophthalmol. Vis. Sci, 27, 1404-1409, 1986

Using isochromatic luminance gratings and isoluminant red-green color gratings luminance and color discrimination in amblyopia were examined. Complete color and luminance contrast sensitivity functions were measured monocularly from each eye of six normal and six amblyopic observers. Similar spatial frequency-specific color and luminance discrimination deficits were found in five of the amblyopes. One amblyope with a slight lumi-

nance deficit showed no color deficit. It appears that color and luminance discrimination are similarly affected in most amblyopes when spatial factors are effectively controlled. - The Authors.

Effects of yellow filter glasses on colour discrimination of normal observers and on the illumination level, by E. AARNISALO. (Annankatu 20, SF-28100 Pori 10, Finland,) Acta Ophthalmol. (Kbh.) 65, 274-278, 1987.

Ten normal subjects performed the 100-hue test while monocularly looking through one of seven different Schott filters with sharp short wavelength cut-off. Calibration of the filters showed a deviation from the stated transmission for some filters. Total error scores rose significantly when the filters with 50% transmission at 480, 497, and 510 nm were worn; in these cases the error axis was of the tritan type. The filters with 50% transmission at 438 nm and lower gave no significant effects on the error scores. Maximum reduction of illumination caused by a filter was 9%.

The study was undertaken in order to elucidate the effects of adding a retinal protecting filter to the operating microscope. It is concluded that a filter of the '438 nm' type can be used without sacrificing colour discrimination; a higher short wavelength absorption is possibly preferable, however. In practice a filter with 500 nm cut-off does not significantly influence tissue recognition at surgery. - Anders Hedin.

Visual depth of focus measured for various colored displays, by L.R. RONCHI (Istituto Naz. di Ottica, 6 Largo Fermi, I-10125 Florence Italy) and L. di FRAIA (Istituto Elettrotecnico dell, Università, 21 Via Claudio, I-80125 Naples Italy) Color Res. and Appl. 11, S52-56, 1986.

The proper focussing of a display on the retina is one of the basic prerequisities for a "good" quality image. The question arises how large is the dioptre range allowing sharp vision of a multicolored display. The effect of the spread of monochromatic images due to eye chromatic aberration is mitigated partly by the width of the spectral band covered by the emission of the phosphor, partly by the existence of the depth of focus of the eye. An experiment is described in which the insensitivity to defocus is recorded for presbyopic eyes, that is, by the use of subjects over the age of 50 whose eyelens ability to accommodate is strongly reduced, so that the range of clear vision is mainly limited by the depth of focus of their eye. For single-color displays this range is found to be about one dioptre for some displays, about two dioptries for others. In the case of multicolored displays, the overlap of the sharpness ranges for various

colors covers less than half a dioptre. The effect of pupil size in relation to illuminance at the eye, due to both display and environment, is also considered. Above, say, 100 lux, the depth of focus of single-color displays may even be as large as three dioptres. - The Authors.

Kleurzienstoornissen (Color Vision deficiencies), by D. VAN NORREN, (Lindenlaan 5, NL-3831 XN Leusden, The Netherlands). Stencyl, 49 p., Rijksuniversiteit Utrecht, Vakgroep Oogheelkunde, October 1986.

In this report a description is presented of congenital and acquired color vision defects in a context of physiological data. Further chapters are ligth sources, photometry, color systems and test methods. Also, the practical consequences of color vision deficiencies are discussed. - The Author.

## PAPERS WITHOUT SUMMARIES

BOYNTON R.M. - Color, Science of. In : Encyclopedia of Physical Science and Technology, Vol 3, 187-210, Academic Press, 1987.

GOACHER R.E. - CoDAX : A screening test for colour perception. Ophthal. Physiol. Opt. 6, 113-114, 1986.

HILL A.R. - Defective colour vision in children. In : MacFARLANE A., Progress in child health Vol. 1, chapter 5, 51-73. Publ. Churchill Livingstone, Edinburgh, 1984.

HILL A.R. - Making decisions in ophthalmology. In : OSBORNE N & CHADER J. : Progress in retinal research Vol. 6, Chapter 8, 207-244. Publ. Pergamon Press, Oxford, 1986.

ENDTER O.K. & MÜLLER H.E. - Untersuchungen der individuellen Farbensehens mit dem PC. (Examinations of individual colour vision by means of the personal computer). IBM Hochschul-Kongress '86, Baden-Baden. Oct. 27-28, 1986.

KAISER P.K. - The Boswell effect (?). Color Res. & Applic. 10, 186-187, 1985.

KAISER P.K. - The Helmholtz-Kohlrausch effect. Color Res. & Applic. 10, 187, 1985.

KEUNEN J.E.E., VAN NORREN D. & VAN MEEL G.J. - Veroudering van het oog: Dichtheid en regenerationsnelheid van kegelpigmenten (Aging of the eye: density and regeneration rati of cone pigments) Ned. Tijdschr. Geneesk. 130, 1870, 1986.

LANTHONY P. - Les troubles de la vision des couleurs : une anomalie fréquente. La Revue du Praticien 36, 1465-1471, 1986.

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MARSHALL J., GREENSTEIN V., KLINE D., OWSLEY C. & WERNER J.S. - Optical radiation and the aged eye. In : WAXTER M. & HITCHINS V.M. (ed.): Optic radiation and visual health, p. 103-124. CRC Press, Boca Raton (Fl., U.S.A.), 1986.

MOLLON J.D. - Questions of sex and colour. Nature 32/6089, 578-579, 1986.

MOLLON J.D. (ed.) - W.S. Stiles Memorial Issue of Perception, vol. 15 nr 6, 1986. Contame papers of Aguilar, Mollon, Stiles, Wright, Estevez, Rushton & Macleod, Pugh jr & Kirk, Stockman & Mollon, Boynton et al., Ikeda & Nakana, Enoch et al. and Alpern.

MOLLON J:D. - On the origins of polymorphisms (polymorphism of photopigments in the platyrhini and in man). In : Frontiers of visual science, Proceedings of the 1985 symposium, National Academy Press, Washington D.C., 1987.

MTANDA A.T., CRUYSBERG J.R.M., PINCKERS A. & VAN DER WERF S.P.G.M. - Onderzoek van de visuele functies by amblyope volwassenen (Examination of visual functions in amblyopic adults). Ned. Tijdschr. Geneesk. 130, 1870, 1986.

OWSLEY C., KLINE D.W., WERNER J.S., GREENSTEIN V., & MARSHALL J. - Optical radiation effects on aging and visual perception. In : WAXTER M. & HITCHINS V.M. (ed.) : Optic radiation and visual health, Chapter 7, (p. 125-136). CRC Press, Boca Raton (Fl. U.S.A.), 1986.

ROTH A., HERMES D., PELIZZONE M. & BOROT N. - L'apport des équations colorées métamériques au diagnostic des neuropathies optiques. Ophthalmologie 1, 21-25, 1987.

TANCZOS Zs. - Interaction of cones and rods in determination of the color hues and the opponent color induction. Actes du 5ème Congr. de l'AIC, Monte-Carlo, 1985.

TUCK J.P. & LONG G.M. - On the interchangeability of standard plate tests for colour vision. Ophthal. Physiol. Opt. 6, 345-347, 1986.

## PAPERS READ AT THE 21ST SESSION OF THE COMMISSION INTERNATIONALE DE L'ECLAIRAGE (Venice, June 1987)

Physiological causes on individual variations of colormatching functions, by Y. NAYATANI, K. TAKAHAMA and H. SOBAGAKI.

Categorical color perception and color rendering of light sources, by R.M. BOYNTON

Progress in lighting for the partially sighted, by W.G. JULIAN and G. VERRIEST.

Subjective lighting needs of partially sighted, by H. LINDNER, K. PALM and H.W. SCHLOTE.

Stability of coloured glass filters over a period of about 35 years, by J. BASTIE and B. MERCIER.

Some considerations on eye protectors for blue light hazard, by K. KOHMOTO, T. AZUMA and K. MISU.

## PAPERS READ AT THE SYMPOSIUM "SEEING CONTOUR AND COLOUR" (Manchester, U.K., August 9-13, 1987)

Issues in human color vision development, by Angela M. BROWN.

Normal and abnormal opponent-colour processing and the role of stimulus contour, by D.H. FOSTER, R.S. SNELGAR, M.O. SCASE, J.R. HERON, and W.P. HONAN.

A new test of colour vision using TV and computergraphics, by K GÜNDÜZ, G. ARDEN and S. PERRY.

Can color perimetry be more sensitive than achromatic perimetry?, by P. E. KING-SMITH, A.J. VINGRYS, and S.C. BENES.

Detection of light and dark, red and green, blue and yellow, by P. E. KING-SMITH, A.J. VINGRYS, and S.C. BENES.

Luminance, saturation and hue in central achromatopsia, by M RIZZO.

Spectral sensitivity in diabetes - some preliminary findings, by F. STAPLETON, I.J. MURRAY, C.M. DICKINSON, S.K. BHARGAVA and R. BROWN.

## TOPICAL MEETING ON COLOR APPEARANCE

This meeting took place from June 29 through 30, 1987, at Annapolis, Maryland, USA. An audience of approximately 50 persons attended, and subjects expressly related to the chromatic perception and suprathreshold levels were treated.
The works were presented in five different sections, to wit: Quantifying color appearance; Adaptation and color contrast;

Spatial and temporal aspects of color; Color constancy and rendering; Problems in color reproduction.

The invited conferences were: Quantifying Color Appearance Visually and Instrumentally, by Fred W. Billmeyer, Jr.; Evaluating Color Appearance using the OSA Uniform Color Scales Samples and a Color-Naming Method, by Robert M. Boynton; Color Appearance: the Roles of Chromatic Adaptation and Contrast, by Steven K. Shevell; Simultaneous Color Contrast and Constancy, by Lawrence E. Arend; On the Role of Figural Organization in Perceptual Transparency, by Jacob Beck; Facilitation of Red-Green Perception by Luminance Pedestals, by C.F. Stromeyer; Linear Model Algorithms for Color Correction, by Laurence T. Maloney; Color Constancy and Color Rendering: Concomitant Engineering of Illuminants and Reflectances, by Michael H. Brill; Computational Approach in Colour Reproduction, by William B. Cowan (Canada); Color Appearance Problems in Motion Pictures and Television, by L. E. Demarsh; and Color in the Hands of the Artist and Eyes of the Beholder, by Dorothea Jameson.

It may be generally stated that the interest was centered on the existing difficulty to quantify our every day perception of object colors in complex scenes either by applying multidimensional scaling (J. Gordon & I. Abramov), quantitative measurement (de Mattiello), or uniform diagram (G. Fry).

The subject of color harmonies was also treated by M. Albert-Vanel (France) and A. Nemcsics (Hungary).

The works of W Cowan & M.W. von Granau (Canada), K. Laxar, V. Smith & J. Pokorny, D. Drum and K. Blackwell & G. Buchsbaum, referred to the part played by the illuminance and the different surrounds on the adaptation and chromatic contrast, and those of C. Ingling, Jr. Scott S. Grigsby &V. Billock, treated the subject of color mechanisms. The W. Stine & J. Spanow's work discussed the retinex theory models while Polaroid researches - J. Thornton, J. Burkhardt, B. Donovan & J. Mc. Cann - dealt with color reproduction. Lastly, Drs. J. Worthey, A. Elsner, A. Hill (U.K.), R. Lee Jr. and J. Rosenbaum, referred, in different works, to the color performance and reproduction.

The participants mentioned, who don't indicate their origin, belong to Laboratories located in the United States. - Maria L.F. de Mattiello.

## OBITUARY

### HELEN PAULSON

Helen Paulson, noted expert on color vision tests and testing, died December 14, 1986 at her home in Newark, New York.

Helen spent her entire career at the Naval Submarine Medical Research Laboratory in Groton, Connecticut. She came to work at the laboratory in 1948, shortly after graduating from Connecticut College for Women. This period of time following World War II was marked by great interest in basic research and its application to problems of the Armed Forces. Helen became an assistant to Dean Farnsworth in his research on color vision testing. She was involved from the very beginning in the development of the Farnsworth Lantern, the D-15, the H-16, and the testing of all submariners for color vision defects.

She became Dean's "right-hand woman" and, increasingly, an expert in her own right on all aspects of color vision testing. After his untimely death, she was "the" expert on the battery of tests used by the Navy to screen its personnel. She was a grand master at detecting malingering in men who were trying to get out of an assignment. Her subsequent research comparing the results of hundreds of color defective individuals on large numbers of color vision tests gave definite results on the efficiency of the various measures of assessing color vision. Questions from all the other Armed Forces and from a variety of civilian groups were continually referred to Helen.

Helen was also extremely active in civic and church affairs. Her energy and intelligence made themselves felt in many spheres. She worked very effectively to solve problems in her community and in addition she was on the Board of Directors of the Northeastern Region of the Lutheran Church.

She retired from Civil Service in June of 1983. In September of that year she married Dr. Gerard Duffner (who had been Commanding Officer of the Laboratory on two separate occasions in its early years) and went to live in Newark where he is in private pratice. Her death was unexpected, and she will be sorely missed.

She was member of the IRGCVD and was present at our second international symposium in Edinburgh. - Jo Ann Kinney.

## COLOR IN ENVIRONMENTAL DESIGN
Winterthur August 8-11, 1988

The AIC Symposium 1988 will be forum for experts with a special interest in the question of how colour can be handled in the human environment for the sake of the users. The participants are persons eager to see how other professionals have tried to find solutions for practical tasks or have dealt scientifically with problems like the impact of colour on human beings. Further information by the organizer: Colour Course Centre, Prof. Werner Spillmann, c/o Winterthur Polytechnic, Department of Architecture, 8401 Winterthur/ Switzerland.

## COLOR 89
Buenos Aires March 13-17, 1989

The 6th Congress of the Association Internationale de la Couleur (AIC) will be held at the Centro Cultural General San Martin. The Congress is being organized under the general direction of the President of the AIC, Professor Dr. Heinz Terstiege, and of the AIC Executive Commitee, and under detailed direction of the Executive Board of the Argentine Group Colour (Grupo Argentino del Color - GAC). In keeping with the objectives of the AIC to provide, through its Congresses and Proceedings, a record of the state of the art and science of color at four-year intervals, the Congress will include approximately eight invited survey lectures presented by international experts, each dealing in depth with one aspect of color. The titles of these lectures and the names of the speakers will be announced at a later date. Offers of papers, which may deal with any aspect of the science, art and technology of color, must be submitted to the Program Chairman with three copies of an extended abstract of not more than 1000 words by September 1, 1988. Papers will be accepted in English, French or German, but the preferred language is English. Authors will be notified regarding acceptance by November 1, 1988. All inquiries and correspondence should be addressed to: Color 89, Grupo Argentino del Color, c/o Division Optico, INTI, C.C. 157, 1650 San Martin (BA), Argentina.

## REPRINT OF THE AO-HRR PLATES

There will be a reprinting of the AO-HRR Plates. Lloyd Powell, President of Richmond Products is the promoter. The printing is to be done by American Printers & Lithographers, with inks to be supplied by Handschy Ink and Chemicals. An attempt will be made to achieve isomeric matches to as many of the original colors as possible. Ronnie Lakowski is performing spectrophotometry to assess the accuracy of the colors. Also, I think it imperative to have an empirical evaluation and would like to get a quick field validation of the proof sets by placing them in the hands of IRGCVD members who have access to large numbers of color defective observers (both congenital and acquired). A number of researchers volunteered at the Annapolis meeting. If any others are interested, please contact me. We also will need some "clean" sets of AO-HRR plates. Not suprisingly, those who have access to the largest testing populations also have the most worn-out tests. - Joel Pokorny.