DALTONIANA

NEWSLETTER
OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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THE NEW IRGCVD DIRECTORIAL COMMITTEE

The results of the election of the IRGCVD directorial committee for the 1983-1987 quadriennum, that was realized by means of the ballot sheet added to the September 1983 issue of "Daltoniana", are the following ones (each participant had to mark 12 names among 18) :

Number of returned ballot sheets : 60.

Are elected as the 12 members of the new directorial board : Verriest (58 voices), Wright (56), Marré (55), Birch (45), Roth (45), Zrenner (44), Lakowski (43), Smith (42), Ohta (41), Mollon (40), Jaeger (38), Sperling (37). Suppletive in case of vacancy : Grützner (36), Lanthony (33).

Prolongation of the presidency of Prof. Wright for two years : accepted (56), not accepted (1), no answer to this question (3).

The new directorial committee will have to solve some difficult problems as the profound crisis arosed by the rejection for publication of a Geneva paper.

Guy Verriest.

REPORT FROM THE COMMITTEE ON STANDARDIZATION

The following members of the Standardization committee of the IRGCVD met in Geneva : J. Birch (UK) (Chairman), A. Dubois-Poulsen (France), E. Hansen (Norway), Dr. Marré (DDR), Y. Ohta (Japan), J. Pokorny (U.S.A.), A. Roth (Swiss) and G. Verriest (Belg.). Apologies for absence were received from A. Hedin (Sweden), A.R. Hill (U.K.) and R. Lakowski (Can.).

The main purpose of the meeting was to consider the final draft of the document "A practical guide for colour vision examination" prepared by the committee. After discussion it was decided to accept this document without amendment and to submit it for publication in the British Journal of Ophthalmic and Physiological Optics. The manuscript has now been accepted by this journal and will be published in 1984. Reprints will

be sent to members when they become available.

The guide was originally intended for submission to the Concilium Ophthalmologicum Universale as a Standard for colour vision examination. However, the requirements of the C.O.U. changed during preparation of the manuscript and a further document is required. This will be prepared by Joel Pokorny and Guy Verriest and will be circulated to committee members for approval.

The committee decided to investigate the type of illumination used by members of the IRGCVD for colour vision examination. A questionaire requesting details of individual lighting conditions and the quality and quantity of illumination will be printed in Daltoniana. Your co-operation with this study will be appreciated.

The committee again discussed the situation with regard to the discontinuation of the HRR plates and the MacBeth Easel lamp. It was decided to continue this correspondance in order to obtain specific information about the release of copying of the pseudoisochromatic test. - Jennifer Birch.

SUBSCRIPTIONS

The membership list forwarded to me by Ronny Lakowski contains 221 names. I have received subscriptions for 1983 from 120 people. Clearly some people do not wish to continue with membership of the IRGCVD but others may be encountering difficulty making appropriate payments. Please write to me if this is the case.

Please note that the Annual Subscription is 10 £.

Payment by cheque, bankers order or international draft in pounds sterling and drawn on a London bank is preferred. However Eurocheques either made out in sterling or in the equivalent amount of local currency can be accepted. Payment by other means attracts a surcharge of approximately 20%. (At current exchange rates 18 U.S. Dollars equals approx. £10).

If you wish to remain active in the IRGCVD please help me to keep up to date. It seems extremely wasteful to print and distribute twice as many copies of Daltoniana than are actually required.

Please make cheques payable to the IRGCVD and send to me

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In the following issue of Daltoniana you will find a list of the members who have paid the 1983 membership fee. - Jennifer Birch.

LITERATURE SURVEY

Human visual pigments : microspectrophotometric results from the eyes of seven persons, by H.J.A. DARTNALL, J.K. BOWMAKER and J.D. MOLLON (Lab. Psychol., Univ. of Sussex, Brighton, BN1 9RH, U.K.; School of Biol. Sci., Queen Mary Col. London, E1 4NS, U.K.; Dept. of Exp. Psychol., Univ. of Cambridge Cambridge, CB2 1TN, U.K.), Proc. R. Soc. Lond. B 220, 115-130, 1983.

The material for this work was obtained from seven eyes removed because of malignant growths. Foveal and parafoveal samples of the retinas were taken and transverse measurements were made of the absorbance spectra of the outer segments of the rods and cones, using a Liebman microspectrophotometer. Four kinds of spectra were obtained with absorbance peaks at the following wavelengths : rods, 496.3±2.3nm (n=39); red cones, 558.4±5.2nm (n=58); green cones, 530.8±3.5nm (n=45); blue cones, 419.0±3.6nm (n=5). The ditribution of the peaks was unimodal for the rods. For the red and green cones, however, there was evidence for bimodal distributions, with subpopulation maxima at 563.2±3.1nm (n=27) and 554.2±2.3nm (n=31) for the reds and at 533.7±2.1nm (n=23) and 527.8±1.8nm (n=22) for the greens. A substantial difference in mean spectral location of the red cones was observed between patient 1 (561 nm) and patient 4 (553 nm). Both patients were classified as normal trichromats by all clinical tests of colour vision but there was a clear difference in their relative sensitivities to long-wave fields. In both direction and magnitude, this difference proved to be that required by the microspectrophotometric results. - The Authors.

Responses of the blue sensitive cone system from the visual cortex and the arterially perfused eye in cat and monkey, by R.P. SCHUURMANS and E. ZRENNER (Max-Planck-Institute for Physiological and Clinical Research, W.G. Kerckhoff-Institute, D6350 Bad Nauheim, FRG), Vision Res. 21, 1611-1615, 1981.

The blue cone mechanism interactions with longer wavelength sensitive cones are described for three sites based on electrophysiological recordings ERG, optic nerve response and VECP. Responses of the blue cone mechanism were seen to resemble those of rods, and the suggestion that blue cones, like rods, mediate their responses through only one set of bipolar cells is made. Indirect evidence (using bicuculline) is presented that GABA is the neurotransmitter involved in the blue cone sensitivity through the long wavelength cones. - Janet Voke.

The development of colorimetry (in German), by M. RICHTER (Unter den Eichen 87, D-1000 Berlin 45, B.R.D.), Die Farbe 29, 235-250, 1981.

In his opening address to the AIC Congress "Color 81", Prof. Richter traces the history of colorimetry from the 17th century to the present. While most of the citations will be familiar to readers of Daltoniana, it is a valuable summary

and includes references to some less well-known continental scholars. - C.R. Cavonius.

Fifty years of the 1931 CIE Standard Observer for colorimetry, by W.D. WRIGHT (68 Newberries Ave., Radlett WD7 7EP, U.K.), Die Farbe 29, 251-272, 1981.

In a companion-piece to Richter's summary of the history of colorimetry, Prof. Wright describes the events that led to the adoption of the 1931 CIE observer, including the rationale behind incorporating the photopic luminous efficiency function, and its applications since then. He discusses possible sources of error in the system, and the problems that one encounters in using it in research. - C.R. Cavonius.

Colour differences, by A.R. ROBERTSON (Division of Physics, National Research Council, Ottawa, K1A OR6, Canada), Die Farbe 29, 273-296, 1981.

A review of color-difference experiments, with particular attention to the differences in stimulus conditions and experimental procedures. CIE recommendations for research in this area are summarized, and suggestions are given for the developement of a generalized color-difference scheme. - C.R. Cavonius.

Metameric color stimuli, fundamental metamers and Wyszecki's metameric blacks, by J.B. COHEN and E. KAPPAUF (Univ. of Illinois at Champaign-Urbana), Am. J. Psychol. 95, 573-564, 1982.

In 1953, Wyszecki described radiometric functions as composed of two components - a fundamental color-stimulus function and a metameric black function. The present paper discusses procedures for accomplishing the decomposition or resolution of any visual stimulus into these two components. The method rests on the fact that the color stimulus space is a space of three dimensions and the metameric black space is orthogonal to it. Introduced and given specific attention here is the particular procedure wherein the stimulus-energy vector is premultiplied by $A(A'A)^{-1}A'$, A being any matrix of experimentally established color-mixture data with three linearly independent columns (primaries). This computation provides the fundamental metamer (as we shall call it) of the visual stimulus being analyzed. The difference between the stimulus-energy distribution and the fundamental metameric function provides the metameric black function. Examples of both types of functions are given and discussed. - The Authors.

Effect of chromatic adaptation on the achromatic locus : the role of contrast, luminance and background color, by J.S. WERNER (University of Colorado, Laboratory of Psychology, Boulder, CO 80309, U.S.A.) and J. WALRAVEN (Institute for Perception TNO, Kampweg 5, 3769 26 Soesterberg, The Netherlands), Vision Res. 22, 929-943, 1982.

Two superposed annular test lights of complementary spectral composition were presented as 60-90' incremental test flashes on 480' steady backgrounds. Two observers adjusted

the ratio of the two test lights to maintain an achromatic appearance under conditions of adaptation that varied with respect to background luminance, chromaticity and stimulus contrast. The shift in chromaticity of the achromatic point was in the direction of the chromaticity of the background, while the magnitude of the shift increased as an increasing function of background luminance and as a decreasing function of contrast. These data confirm and extend a model of chromatic adaptation that has the following properties : (1) non-additivity of transient test and steady background fields, in the sense that the background, although physically adding to the test flash, only affects its hue by way of altering the gain of cone pathways; (2) Vos-Walraven cone spectral sensitivities; and (3) adaptation sites in the cone pathways having the same action spectra as Stiles' π_5, π_4 and (modified) π_1 mechanisms, and which generate receptor-specific attenuation factors (von Kries Coefficients) according to Stiles' generalized threshold vs intensity function $\varphi(x)$ - The Authors.

A set of foveal receptor primaries, by H.W. HOLDAWAY (CSIRO, 338 Blaxdale Rd., Ryde, Sydney NSW 2112, Australia), Die Farbe 27, 41-57 (1978/79).

Yet another set of primaries derived from color deficiency data. It seems to use some risky extrapolations, and is constrained to fit a unique green of 502 nm. However, it should be of interest to those who work with such models. - C.R. Cavonius.

Retinal polarization effects, by B.F. HOCHHEIMER and H.A. KUES (Johns Hopkins Univ. Appl. Physics Lab., Laurel, Maryland 20707, U.S.A.), Appl. Optics 21, 3811-3818, 1982.

Retinal photographs taken with crossed polarizers in the input and recording light paths show a cross or brush pattern overlying the macula. Experiments were done indicating that this pattern is due to the birefringence in cone-photoreceptor outer segments. Haidinger's brushes are also attributed to cone outer segments, but the effect is due to a combination of the dispersion in the birefringence and the dichroism of the outer segments. The objective, polarized-light retinal pattern is shown to be a useful clinical tool for diagnosing diseases affecting the macula.- The Authors.

Statistical correlation between colour sense, age and sex (Correlazione statistica tra senso cromatico, età e sesso), by F. TOMEI and G. BARRAZZO (Eye Clinic, Univ. Pisa, Italy), Atti Fond. G. Ronchi 37, 71-84, 1982.

The authors have examined at the Nagel anomaloscope 102 subjects (49 females and 53 males) aged from 11 to 75 years. From the results they have worked out statistically the linear and non linear correlations between colour vision, age and sex. - The Authors.

Further study about colour discrimination from the ergo-ophthalmological stand point, by R. PAOLETTI-PERINI (Ospedale S. Maria Nuova-USL 10/A, 50100 Florence, Italy), Atti Fond. G. Ronchi 37, 97-106, 1982.

A report about a recent screening using the Ishihara

Plates, the Farnsworth Tritan Plate and the City University Colour Vision Test. The response to the Ishihara test has been recorded monocularly and a certain influence of training is noticed. The practical validity of the Tritan Plate and of the distinction between "typical" and "not typical" errors with the Ishihara Plates, in view of the diagnosis, are also tackled. - The Author.

A method for quantitative scoring of the Farnsworth Panel D-15, by K.J. BOWMAN (Department of Optometry, Queensland Institute of Technology, Australia), Acta Ophthalmol. (Kbh.) 60 907-916, 1982.

A method for quantification of Panel D-15 results is presented. The CIELAB colour differences were calculated for each cap with every other cap. The patient's scoring order is fed to a computer which calculates the sum of between-cap differences or total colour difference score (TCDS); this is minimum for a perfect arrangement and increases with the number of crossings. The TCDS gives a value representing the severity of the defect, but not its type. Without the aid of a computer, the TCDS can be obtained from data given in a table. The principle also holds for other tests working like the Panel D-15 (the Desaturated Panel, the H-16 test, etc.). The TCDS is useful when analyzing differences in colour vision between various groups as illustrated in the paper. - Anders Hedin.

Sahlgren's saturation test for detecting and grading acquired dyschromatopsia, by L. FRISÉN and H. KALM (Dept. of Ophthalmol., Univ. of Göteborg, Sweden), Am. J. Ophthalmol. 92, 252-258, 1981.

The SST consists of 12 test caps contained in a wooden box. There are 5 bluish green caps with different saturation, 5 bluish purple caps with different saturation, and 2 grey caps. The colors were taken from the swedish atlas of the Natural Color System. The colored caps bear on the bottom the number of chromaticness units. The task is to sort out all caps appearing to contain any bluish green or bluish purple color, and to transfer these caps to the empty partition of the box. Only grey caps are allowed to stay in the other partition of the box. All these caps considered to be grey are turned upside down, and the sum of the numbers (chromaticness units) printed on the bottom gives the test score. A score of 10 or less is normal. A score of 15 is suggestive of abnormality. A score of 20 or more is certainly abnormal and indicates defective color vision. Individuals with protan congenital color vision defects obtain abnormal scores. It is therefore sound practice to combine the SST with the Ishihara series.

According to the authors, the test is specifically designed for detecting and grading acquired color vision defects as its results depend on the elevation of the saturation threshold for bluish green and bluish purple colors that occurs in acquired diseases of the retina and the anterior visual pathways. - Guy Verriest.

Studies on color vision test. (2) Rodatest (Test Disc 173) for school children, by T. YASUMA (Dept. Ophthalmol., Nagoya Univ. School of Med., Japan), Y. TAKAYANAGI and H. UESAKI (Nagoya Ophthalmol. Assoc. for School Children, Japan), Jap. J. Clinic. Ophthalmol. 36, 207-215, 1982.

Screening of color vision defects using 9 Ishihara plates was performed on 4th grade primary school children. Rodatest (Test Disc 173) was performed in 884 so picked up children (males : 807, females : 77), and the results were compared with other color vision tests. Rodatest could satisfactorily discriminate between protans and deutans, but could not differenciate dichromats from anomalous trichromats. Concordance between Rodatest and Panel D-15 was found in protans but not in deutans. Concordance between Rodatest and a lantern test was found in deutans but not in protans. The percentage of cases non classified by Rodatest increased when the grade of color defects became stronger. Twenty percent of protanopes and 15 percent of deuteranopes were diagnosed as "weak" by using Rodatest; moreover, no concordance was found between Rodatest and Panel D-15 test in deutans. Thus Rodatest is not useful as an aptitude test of color vision. - Yasuo Ohta.

Color-discrimination perimetry, by H. UCHIKAWA, P.K. KAISER and K. UCHIKAWA (Dept. Psychol., York Univ., Downsview, Ontario M3J 1P3 Canada), Color Res. Applic. 7, 264-272, 1982.

Color-discrimination perimetry was performed using Munsell color chips to determine how far from the fovea specific color differences would be just-noticeably different. The results show that color-discrimination limits were larger in the red-to-purple and the blue-to-green regions of the color circle than in the purple-to-blue, the green-to-yellow, and the yellow-to-red regions. Achromatic color-discrimination limits went further into the periphery than did chromatic limits. We also performed color-naming experiments at the fovea and in the periphery (30° nasal). Our results are reasonably well accounted for by the deuteranopic tendencies in the periphery of the retina. - The Authors.

Spectral sensitivity measurements performed with the Goldmann perimeter, by K. AIRAS (Dept. Ophthalmol., Univ. of Turku, Finland), Acta ophthalmol., suppl. 148, 1981.

The spectral sensitivity functions of normal and colour defective human eyes were measured with a calibrated Goldmann perimeter provided with 8 interference filters. These filters were found to provide sufficient energy of the test light when superimposed on the standard 10 cd/m^2 (CIE illuminant A) background of the perimeter. The energy was measured by two independent methods. A preliminary series of experiments was performed to test the influence of the duration of the presentation of the test light on the peripheral thresholds measured with the 10 cd/m^2 background. An additional preliminary series of experiments was performed foveally (10 cd/m^2 background) to test the influence of the test area (100', 26' or 13') on the thresholds measured. The spectral sensitivity functions of 2 rod monochromats coincided with the CIE scotopic luminous efficiency function on 10 cd/m^2 backgrounds.

In the final experiments the largest test area (64 mm^2) and a long duration (approximately 1 sec) were used and the background was 0.25 cd/m^2 or 10 cd/m^2 (CIE illuminant A) or yellow 10 cd/m^2 (Schott OG 530). The measurements were performed foveally or 15°, 30° and 60° peripherally.

One of the aims was to investigate the alteration of the spectral luminosity function of the normal human eye from the fully dark-adapted state to the mesopic and low photopic illumination levels.

Another aim was to investigate the contribution of the different cone mechanisms to the threshold measurements made with the standard Goldmann perimeter. Thus the spectral sensitivity functions of normal eyes obtained at different peripheral locations in the visual field were related to the foveal measurements by substracting the peripheral results from the foveal ones. The shape of such difference spectra showed deflections in the violet, green and red parts of the spectrum indicating a relatively high sensitivity in the central visual field (cone mechanisms) compared to the peripherally performed measurements. The average results also showed that the sensitivity of the normal eye (at 0.25 cd/m^2 and 10 cd/m^2) to all coloured test lights used was higher foveally than peripherally. Compared to the normals and to the deutan subjects, 4 protan subjects showed (at 10 cd/m^2 and 0.25 cd/m^2) high central and peripheral thresholds in the long wavelength part of the spectrum. In addition in one subject with protanomaly the thresholds with 443 nm, 468 nm and 497 nm test lights were clearly higher than normal particularly when tested foveally. Remarkably high thresholds to all coloured test lights within 443 nm to 547 nm and 615 nm to 660 nm were found in the 4 deutan subjects when tested centrally. In all subjects with a tritan defect the threshold for the 443 nm test light was higher in the fovea than at 15° peripherally, and in deutans the thresholds for violet, blue and bluish-green test lights are higher foveally.

In all 4 tritan subjects both the foveal and the peripheral thresholds obtained with the violet (443 nm) test light were markedly higher than normally when using the 10 cd/m^2 A-background. Apparently the standard Goldmann perimeter, provided with a violet interference filter, can be used for the screening of subjects with a tritan type of colour vision defect. It is also important that compared to the normals 4 subjects with autosomal dominant optic atrophy showed defective thresholds of the 60 min dark-adapted eye.

The complex shape of the obtained foveal spectral sensitivity functions is likely to indicate a contribution of the opponent colour mechanism to the thresholds measured. On the other hand the smooth curves obtained in the peripheral field and by using a mesopic background reflect the dominance of the non-opponent luminosity mechanism. - Summarized by Guy Verriest from the conclusions of the author.

An equi-energy-color pattern generator and its application to V.C.P studies in a protan, by E. ADACHI, Y. CHIBA, J. CHIBA, K. ISHIKAWA (Dept. of Ophthalmol., School of Medicine, Chiba University, Japan) and S. ISHIKAWA (Creact Co., Ltd), Folia Ophthalmol. Jpn. 32, 1517-1521, 1981.

A color generator with outputs leading into the red, green

blue inputs of a color display monitor has been newly developed. In combination with the multiple TV pattern generator developed in 1977, multiple color patterns with variable functions can be versatilely displayed. The device permits the generation of the following color patterns : (1) Checkerboard of rating patterns, consisting of the pairing of any given color with its complementary color in equal energy; (2) The chroma and luminance of any given color can be varied by keeping the energy equal for a pair of checks or stripes; (3) It is also possible to give a pair of checks or stripes with different chromas; (4) A gray colored checkerboard or grating pattern is available. The energies of all colors are kept equal; (5) With the aid of masking circuits, the adaptation field can be varied like the test field, but independently of the test field. Using this generator, color vision experiments were performed on a normal subject and a protan, with the use of VECPs. - Yasuo Ohta.

The photopic spectral sensitivity of a dichromatic teleost fish (Perca fluviatilis), by N.D. CAMERON (Centre for Research on Perception and Cognition, University of Sussex, Falmer, Brighton BN1 9QG, England), Vision Res. 22, 1341-1348, 1982.

Spectral sensitivity curves for the freshwater perch were measured using an operant procedure. Sensitivity peaks were found at 530-560 nm and 660-680 nm. Compared with perch cone pigments ($P530_2$ and $P617_2$), the red-shift of the maximum longwavelength sensitivity suggested that opponent interactions between the cone types were responsible for the shape of the curve. The absorptions of the lens and yellow cornea were measured, and used to correct the sensitivity curve. It is suggested that the yellow cornea's function depends on its spectral selectivity. Like goldfish, perch show some aberrant high sensitivity around 400 nm. - The Author.

PAPERS READ AT THE INT. CONFERENCE "COLOUR VISION"

(Cambridge, U.K., 1982)

(by courtesy of John Mollon)

(end)

Spatial colour vision in strabismic amblyopia, by R. HILZ, M. BAIER and I. RENTSCHLER (University of Munich).

Colour vision in strabismic amblyopia studied with a 1.2 deg test field is impaired according to the degree of eccentric fixation (Marré and Marré, 1979). We investigated amblyopic wavelength discrimination using isoluminant gratings, in which adjacent bars differed in wavelength only. Three strabismic amblyopic subjects with reduced contrast sensitivity in their amblyopic eyes participated in this experiment. None of them showed any reduction of colour difference sensitivity in their amblyopic eyes as compared to their good eyes. This result confirms the notion that colour and pattern vision are functionally independent even at medium and high spatial frequencies.

PAPER READ AT COLOUR DYNAMICS (Budapest, 1982)

Dynamic aspects of binocular vision, as resultant of monocular chromatic perceptions, by L.R. RONCHI, S. VILLANI and G. PASSIGLI (Inst. Naz. di Ottica, 6 Largo Fermi, 50125 Florence Italy).

Colours are necessary to make the interiors attractive, agreable and inviting. Preferences and symbolism are tradictionally related to psychological realm. However, the influence of eye refraction should not be under-evaluated, amongst others because of subtle (subclinical) dependencies of anisometropia on spectral distribution of the illuminant. Anisometropia is a cue used by brain in processing monocular inputs.

PAPER READ AT THE 5TH EUROPEAN CONFERENCE ON VISUAL PERCEPTION (Leuven, 1982)

Color vision of glaucomatous patients (preliminary results), by T.Y. STEINSCHNEIDER and U. TICHO (Vision Research Laboratory and Department of Ophthalmology, Hadassah University Hospital, Jerusalem, Israel).

Color vision analysis and visual field plotting were performed on 37 eyes of 20 glaucomatous patients or patients with ocular hypertension. The patients' ages were between 25 and 80 years. Color vision was tested by spectral sensitivity curve measurements and visual fields were plotted by the Goldmann perimeter.

In 31 eyes out of 37 color vision deficiency was related to the visual field loss. Blue-yellow deficiency was common in eyes which presented minimal visual field loss and additional red-green defects were associated with advanced field loss. In 5 eyes severe color vision deficiency was associated with only minimal field loss. In 1 case, who recently suffered from an acute closed angle glaucoma, the color vision defect clearly preceded visual field loss. - The Authors.

CORRESPONDENCE

Dear Sir :

... The next meeting of the International Congress will be held in Rome, Italy on May 5-10, 1986. You are all urged to make plans to attend this meeting which should be an outstanding affair. Doctor Carl Kupfer is gathering information on as much of ophthalmic research as he can obtain from various parts of the world. Those of you who are interested in any specific aspect of ophthalmic research and where it is being done should contact Doctor Kupfer at the National Eye Institute, Building 31, Room 6A03, Bethesda, Maryland 20205, U.S.A.

A further attempt is being made to color code ophthalmic drugs and Mr. William C. Shepherd of Allergan and Mr. T.R.G. Dear of Alcon have agreed to be Co-Chairman of this effort to

get the various pharmaceutical companies throughout the world to use the same color coding eye medications... - A.E. Maumenee, president of the COU.

AMBIGUOUS TERMS

The Visual Functions Committee of the International Council of Ophthalmology decided, on proposal made by Prof. Reinecke to ask to each society relating to visual functions to submit a list of terms regarded as ambiguous and requiring improved definition.

Accordingly every member of the IRGCVD is invited to send to Dr. G. Verriest before May 1 1984 a list of such terms. Dr. Verriest will transmit these terms to the Visual Functions Committee on May 25 1984.

1983 DEANE B. JUDD-AIC AWARD TO D.L. McADAM

The Deane B. Judd-AIC Award was instituted in 1975 in honour of the memory of the outstanding colour scientist Deane B. Judd. It is awarded bienually by the Association Internationale de la Couleur (AIC) to recognize and honour persons who have performed work of outstanding merit in colour science. Previous recipients have been Miss Dorothy Nickerson, Prof. William David Wright, Dr. Gunter Wyszecki and Prof. Dr. Manfred Richter.

The 1983 Deane B. Judd-AIC Award has been conferred on David Lewis MacAdam in recognition of his extensive contributions to the science and technology of colour. In particular, Dr. MacAdam's work en spectrophotometry, spectroradiometry, optimal colours, dominant wavelength and excitation purity, uniform chromaticity diagrams and uniform colour solids for reflecting objects, perceptible differences in chromaticity and in tristimulus values leading to the well-known MacAdam ellipses and ellipsoids, chromatic adaptation, colour computations including some of the first use of computers, loci of constant hue and brigthness, and colorimetric fundaments of colour reproduction especially in colour photography, are among the contributions noted here for recognition by the AIC. His professional career has extended over fifty years : he was a physicist in the Kodak Research Laboratories at Rochester from 1936 until 1975, finishing as a Senior Research Associate; he was editor of the Journal of the Optical Society of America from 1964 to 1975; he is now a professor at the Institute of Optics at the University of Rochester, and still resides in that city (at 68 Hammond Street, Rochester, New York, 14615, USA). In addition to his many papers describing original research, he has written or edited four books on colour and allied topics. His contributions to colour standardization through national and international organizations, and his contributions to colour education, particularly in the fields of the history and the technical applications of the subject, have

earned him the admiration and gratitude of colleagues and associates throughout the international colour community. - (AIC press release).

OBITUARY

ALEX MUNSELL

(1895 - 1983)

Alexander Ector Orr Munsell died on March 26, 1983 in New York City. He was 87 years old. On Sunday May 15, 1983 a Memorial Meeting was held by a number of his friends who announced establishment of an Alex Munsell Memorial Fund "to carry on work in the spirit of Alex's lifelong activity."

The New York TIMES headline - "Gave Away Inheritance" - recalls the sensational news he made, beginning in the early depression days of the 1930's when he gave away the fortunes inherited from the maternal side of his family. But it is not his devotion to Marxism, his primary interest beginning in the early 30's (Carl Marzani called him "that unusual combination of a practicing Christian and a practicing Marxist"), that we want to recall here. Rather, it is to his earlier contributions to, and continuing interest in, the field of color science and in the Inter-Society Color Council, that we call attention. For it was Alex Munsell who, in 1921, took over control of the Munsell Color Company, established in 1918 to carry on the business of handling publication of books, charts, and school supplies for use in teaching the Munsell system of color notation developed by his father, Albert H. Munsell.

Prof. A.H. Munsell, an artist and art teacher at the Massachusetts Normal Art School, had developed the Munsell color system to provide a means for describing color in terms of a simple notation. This he described in 1905 in his book, "A Color Notation", and by 1915 in a set of color charts published under the title : "Atlas of the Munsell Color System". By 1917 friends in the graphic arts industry, who were enthusiastic about the industrial possibilities of use and application of the Munsell system of color notation, had suggested formation of a Munsell Color Company.

Following Prof. Munsell's death, June 28, 1918, when the company was hardly established, but with an office in New York, his friends carried on. Among other things Arthur Allen did during that time was to request the Bureau of Standards to undertake the fundamental standardization of a set of Munsell cards. The resulting report, published in 1920 by the Bureau (Technologic Papers of the Bureau of Standards No. 167) called attention to the importance of the system and made proposals for its improvement.

Alex Munsell, following his junior year at Harvard, had been drafted into the army and had spent some time overseas. It seems likely that after his return to civilian life this Bureau of Standards report helped to make him listen to his father's friends and let them persuade him to drop the medical studies he had started at Harvard in order to take on the active presidency of the Munsell Color Company. Legal changes were first made that put all stock into Munsell hands, his Mother as principal stockholder. Alex took over in July 1921.

From his earliest days with the Company, Alex Munsell was greatly influenced by Irwin G. Priest, chief of the Colorimetry Section of the Bureau of Standards and an active leader in the Optical Society of America's outstanding Committee on Colorimetry.

A Research Laboratory was soon established. This was separate from the Company, provided for by funds contributed by A.E.O.M., his Mother, and his sister Margaret. It was founded as a memorial to A.H. Munsell to carry forward the application of A.H. Munsell's particular contribution, namely : "a simple and practical notation, or method of writing color."

In early 1922 the Company was moved to New York. But, more and more, the burden of handling a school supply business irked Alex Munsell, so in the spring of 1923 the entire stock of Munsell crayons, water colors, drawing papers, etc. was turned over to other companies; the only things the Munsell company intended to continue handling were the production and sale of ATLAS papers, charts, disks, and Munsell publications. In the spring of 1923 the Munsell Color Company moved from New York to Baltimore, Md. In 1927 the investigative work came practically to a halt. A studied revision of the standard papers was made, and the results published in 1929 as the MUNSELL BOOK OF COLOR to distinguish it from the ATLAS OF THE MUNSELL COLOR SYSTEM which it was intended to replace. Funds for the Research Laboratory were continued for a few years more, but were discontinued in the early 30's.

Alex Munsell should be credited with making all this basic work possible. He was one of O.S.A.'s representatives to the organizing meeting of the Inter-Society Color Council in 1931. His interests, however, increasingly turned to fields of social problems.

In 1942, by gift he and his mother turned over ownership and thereby direction of the policies of the Company to nonprofit Munsell Color Foundation. As a "trustee representing the donor" he remained on the Foundation's Board of Trustees until the sale of the Company to Kollmorgen in 1969/70. He then resigned, breaking his last official link with the Foundation.

However, his interest in the Inter-Society Color Council continued. While his active work in color grew less and less after 1930, color science remained his second interest to the last. When I first walked into that office at 220 Tremont Street in Boston, I could not then foresee how much my contact

with Alex Munsell and the color ideas of his father would change my life by introducing me to the fascinating and rewarding field of color science. - Dorothy Nickerson (from Inter-Society Color Council News 285, 1-3, 1983; shortened by G. Verriest).

AIC MIDTERM SYMPOSIUM ON COLOR EDUCATION

Salamanca (Spain) 18th - 20th june 1984

All contributions related with the problems of teaching color in different education institutions at all levels and with the means for teaching color are wellcome. Participants wishing to present a paper are requested to send an abstract, as soon as possible, to the Symposium Secretariat :

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