DALTONIANA

NEWSLETTER

OF THE INTERNATIONAL RESEARCH GROUP ON COLOUR VISION DEFICIENCIES

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LITERATURE SURVEY

Spectral sensitivity and wavelength discrimination of the human peripheral visual field, by J.A. van ESCH, E.E. KOLDENHOF, A.J. van DOORN & J.J. KOENDERINCK (Dept. Med. Physiol. Physics, State Univ. Utrecht, Princetonplein 5, 3584 CC Utrecht, The Netherlands), J. Opt. Soc. Am. A 1, 443-450, 1984.

Spectral sensitivity and wavelength discrimination are determined along the nasal horizontal meridian of the human peripheral retina. The target size as a function of eccentricity is varied according to a particular cortical magnification factor. Spectral sensitivity is measured by flicker photometry parameterized for the flicker frequency (10-20 Hz) and is found to be independent of the eccentricity (0-80°) for 20-Hz flicker photometry after correction of the foveal spectral sensitivity for macular pigment absorption. This 20-Hz function is chosen as being representative for the peripheral luminous-efficiency function and is used in the wavelength-discrimination experiments. The peripheral retina can perform wavelength discrimination up to an eccentricity of 80°. If field-size scaling according to the eccentricity-dependent cone density, the cortical magnification factor, or the reciprocal of the interganglion cell distance is applied, then wavelength-discrimination performance from 8° to 80° eccentricity is roughly the same. Foveal wavelength discrimination is considerably better than peripheral wavelength discrimination. - The Authors.

The macular pigment. I. Absorbance spectra, localization, and discrimination from other yellow pigments in primate retinas, by D.M. SNODDERLY, P. BROWN, F.C. DELORI and J.D. AURON (Eye Res. Inst., 20 Staniford Str. Boston, MA 02114, U.S.A.), Invest. Ophthalmol. Vis. Sci. 25, 660-673, 1984.

The nonbleaching yellow pigments of the primate fovea were studied by microspectrophotometry (MSP). Retinas fixed with glutaraldehyde/paraformaldehyde mixtures retained yellow pigments with absorbance spectra very similar to those recorded by MSP in fresh retinas. This allowed the suthors to prepare retinal sections for localization of the pigments. The spectrum of the macular pigment in fixed tissue is shifted slightly (about 6 nm) toward longer wavelengths, with maximum absorbance at 460 nm. Two short-wavelength yellow pigments also have been identified, with absorbance maxima at 410 nm (P410) and 435 nm (P435), respectively. All three yellow pigments are present in the fovea. The short-wavelength pigments are detected more easily outside the central foveal region because the macular pigment does not obscure them there. They are especially apparent when the MSP beam is confined to the outer nuclear layer of the inner segment layer of retinal sections. The macular pigment is most dense in the fiber layers (receptor axon layer and inner plexiform layer); its density declines markedly with retinal eccentricity. The maximal absorbance of P410 and P435 is usually lower than that of the macular pigment in the central fovea, but their densities and relative proportions change more gradually with eccentricity. Consequently, their maximal absorbance is higher than that of the macular pigment outside the foveal center. The P410 and P435 pigments may be two different oxidation states of one or more respiratory hemoproteins. Commonly used procedures for estimating the absorbance spectrum of the macular pigment by comparing the foveal center with a parafoveal region may be influenced by the amounts and the oxidation states of the short-wavelength pigments in the living eye. - The Authors.

The macular pigment. II. Spatial distribution in primate retinas, by D.M. SNODDERLY, J.D. AURON & C. DELORI (Eye Res. Inst., 20 Staniford Str. Boston, MA 02114, U.S.A.), Invest. Ophthalmol. Vis. Sci. 25, 674-685, 1984.

The spatial density distribution of macular pigment in primate retinas was described by two-wavelength microdensitometry of retinal sections. The macular pigment is most dense along the parth of the receptor axons in the center of the fovea. Another band of high density is present in the inner plexiform layer in many retinas. The density in both fiber layers declines to low, relatively constant levels within 1 mm eccentricity. Both the total retinal density of macular pigment and the contributions of subsets of the retinal layers were estimated by integreting along the path of light traversing the retina from the vitreal surface to the outer segments. The integrated densities were measured at several eccentricities to establish the profile of macular pigment density along a diameter through the fovea. The macular pigment profile was unimodal in some cases and trimodal in others. The main central peak always occured in the center of the fovea. The total retinal density of the central peak ranged from 0.42-1.0 absorbance. Most of the pigment is interposed between the outer segments and the stimulating light and is effective as a visual filter. The macular pigment is dichroic, with the major axis of absorption oriented tangential to a circle centered on the fovea. This is consistent with commonly accepted explanations of Haidinger's brushes. - The Authors.

Change in hue of spectral colors by dilution with white light (Abney effect), by W. KURTENBACH, C.E. STERNHEIM & L. SPILLMANN(Neurol. Universitätsklinik, Hansastrasse 9, D-7800 Freiburg/Br., FRG), J. Opt. Soc. Am. A 1, 365-372, 1984.

Monochromatic light, when mixed with white light, not only becomes desaturated but also changes in hue (Abney effect). This was **studied in** 3 observers by using 3 unique hues (blue, green and yellow) and 4 compound (intermediate) hues. The whites used for desaturation (desaturants) included Abney's white (3890 K), two bluish whites (10,000 and 20,000 K), and each observer's own, perceptually neutral white (6200-6980 K). Test stimuli of 0.5° diameter were presented to the dark-adapted fovea for 1 sec in a dark surround. Abney's results were confirmed, except in the shortwave and middle-wave parts of the spectrum. At short wavelengths we always observed a hue shift toward increasing redness, whereas Abney reported a shift toward blue. At middle wavelengths (500-556 nm), we found smaller effects than did Abney. Here Abney's white produced an increase in perceived yellow, whereas all other desaturants produced an increase in perceived green. Two colors, blue-green and yellow, changed least. In general, the hue shifts increased with decreasing colorimetric purity (from 1,0 to 0.5). The results are discussed in relation to color additivity, constant-hue loci, and the Bezold-Brücke effect. - The Authors.

Phase shift in red and green counterphase flicker at high frequencies, by W.B. CUSHMAN & J.Z.LEVINSON (Dept. Psychol. Univ. Maryland, College Park, Maryland 20742, U.S.A. J. Opt. Soc. Am. 73, 1557-1561, 1983.

When balanced red and green lights are alternated more than 20 Hz, the perceived flicker can be reduced by advancing the green flicker about 10° of the red-green cycle. The required advance for least flicker is greatest at retinal illuminances around 1000 td and frequencies between 30 and 35 Hz. A modified model is left for future publication. Meanwhile, other empirical properties of the advance required by green over red are described. In addition to the intensity dependence of this phase shift, we describe its dependence on intensity balance between red and green. Also, the intensity balance turns out to depend on the frequency being used, in contrast to the independence expected by Ives, the inventor of heterochromatic flicker photometry. - The Authors.

Variations of colour vision in a New World primate can be explained by polymorphism of retinal photopigments, by J.D. MOLLON, J.K. BOWMAKER & G.H. JACOBS (Dept. Exp. Psychol. Univ. Cambridge, Downing Street, Cambridge CB2 3EB, U.K.), Proc. R. Soc. Lond. B 222, 373-399, 1984.

The squirrel monkey (*Saimiri sciureus*) exhibits a polymorphism of colour vision : some animals are dichromatic, some trichromatic, and within each of these classes are subtypes that resemble the protan and deutan variants of human colour vision. For each of 10 individual monkeys we have obtained (i) behavioural measurements of colour vision and (ii) microspectrophotometric measurements of retinal photopigments. The behavioural tests included wavelength discrimination, Rayleigh matches, and increment sensitivity at 540 and 640 nm.

From all 10 animals, a rod pigment was recorded with λ_{max} close to 500 nm. In several animals, receptors were found that contained a short-wave pigment (mean λ_{max} = 433.5 nm) : these violet-sensitive receptors were rare, as in man and other primate species. In the middle- to long-wave part of the spectrum, there appear to be at least three possible Saimiri photopigments (with λ_{max} values at about 537, 550 and 565 nm) and individual animals draw either one or two pigments from this set, giving dichromatic or trichromatic colour vision. Thus, those animals that behaviourally resembled human protanopes exhibited only one pigment in the red-green range, with λ_{max} = 537 nm; other behaviourally dichromatic animals had single pigments lying at longer wavelengths and these were the animals that behaviourally had higher sensitivity to long wavelengths. Four of the monkeys were behaviourally judged to be trichromatic. None of the latter animals exhibited the two widely separated pigments (close to 535 and 567 nm) that are found in the middle- and long-wave cones of macaque monkeys. But the spread of λ_{max} values for individual cones was greater in the trichromatic squirrel monkeys than in the dichromats; and in the case of three, behaviourally deuteranomalous, trichromats there was clear evidence that the distribution of λ_{max} values was bimodal, suggesting photopigments at approximately 552 and 565 nm. The fourth, behaviourally protanomalous, trichromat exhibited a spread of individual λ_{max} values that ranged between 530 and 550 nm.

Good quantitative agreement was found when the microspectrophotometrically measured absorbance spectra were used to predict the behavioural sensitivity of individual animals to long wavelengths. The concordance of the two sets of measurements places beyond question the existence of a polyporphism of colour vision in *Saimiri sciureus* and suggests that the behavioural variation arises from variation in the retinal photopigments. Heterozygous advantage may explain the polymorphism. - The Authors.

A comparison of the responses to two colour vision tests, by R. PAOLETTI PERINI and G. PASSIGLI (Divisione Oculistica Arcispedale S.M. Nuova, Firenze, Italia), Atti Fond. G. Ronchi 39, 147-151, 1984.

A number of cooperative subjects are tested by the use of 100-Hue and of a "fast" Test. For some subjects the error scores are high, in either response. For others this is not the case. Of particular interest are the subjects who exhibit a large number of errors in City Test response, but not in the 100-Hue one. - The Authors.

Color vision screening : A comparison of the AO H-R-R and Farnsworth F-2 tests, by A.J. ADAMS (School Optom. Univ. Calif. Berkeley, Calif., U.S.A.) and L.W. HARWOOD (Tiburon, Calif., U.S.A.), Amer. J. Optom. Physiol. Opt. 61, 1-9, 1984.

Vision screening tests should include a simple, reliable, and valid test of color vision defects. In this investigation the single plate Farnsworth F-2 test and the AO H-R-R pseudoisochromatic plates were compared as primary screening tests for red-green color defective vision. The tests were administered to 2827 children, kindergarten through high school grades. Both tests failed a higher percentage of children than expected in the lower grades (kindergarten through 3). In grades 4 through high school, however, 4,16% failed the F-2 test and 4.02% failed the AO H-R-R, compared to a predicted 4.2% of the general population. Some children with normal color vision, particularly very young children, may fail the F-2 test because of difficulty picking out the less obvious blue square. Nevertheless, for screening purposes the F-2 test is comparable to the AO H-R-R test and except for kindergarten and grade 1 pupils is an excellent single plate color vision screening test. - The Authors.

The Rayleigh equation using the flicker method. (3). The effect of the color adapting field in a normal subject, by Sh. YAMADE (Dep. Ophthalmol., Shiga Univ. of Med. Sci., Japan), Folia Ophthalmol. Jpn. 34, 1636-1640, 1983.

The effect of a color adapting field on matching in the anomaloscope was studied using the flicker method. A yellow light and a mixture of the red and green lights of the anomaloscope provided a 12 Hz flickering field in a 2° diameter circle superimposed on a steady monochromatic background field. When the wavelength of the background field was longer than 575 nm and the intensity was strong enough, the results of a normal subject became similar to those of protans, the red cone mechanism being selectively adapted. Below 525 nm, the results resembled those of deutans, but the effect was little. The longer the wavelength and the higher the intensity of the background field, the stronger the effect of color adaptation, independently of field size. - Yasuo Ohta.

Retinal information transmission by X-cells : Arguments for colour perimetry? (Retinale Informationsübertragung durch X-Zellen : Argumente für die Farbperimetrie?), by W.M. PAULUS, H. HEFTER & Th. BRANDT (Neurol. Klinik Alfried-Krupp-Strasse 21, D-4300 Essen, B.R.D.), Fortschr. Ophthalmol. 81, 186-188, 1984.

Different retinal information processing of colour and luminance stimuli is analysed with respect to colour perimetry Information transmission for colour and luminance borders to the visual cortex is performed mainly by retinal X-cells, while Y-cells serve to gain control of cortical hypercolums. Contrast borders are a necessary precondition for excitation of retinal On-or Off-center units when stimulated with black and white but not if stimulated by homogeneous red and green colours. Thus, theoretically, an advantage of colour perimetry may be seen in the complete stimulation of all retinal units covered by the target which is of particular concern when using large test marks. - The Authors.

Color contrast perimetry, by W.M. HART, Jr., R.K. HARTZ, R.W. HAGEN & K.W. CLARK (Dept. Ophtalmol., Washington Univ. School of Med., St-Louis, Missouri, U.S.A.), Invest. Ophthalmo Vis. Sci. 25, 400-413, 1984.

A method for color perimetry is proposed in which colored test objects are presented in a white surround, so that the luminance of the object and its surround are identical. The color of the test object then may be varied in its degree of saturation, while maintaining a constant luminance. A color video instrument controlled by a microcomputer is used as a tangent screen. Foveally viewed, colored test objects are adjusted initially in luminance by heterochromatic flicker photometry to match the luminance of a white background at 100 asb. The relative foveal scotoma for blue light requires that test objects large enough to include the perifoveal retina be used for flicker photometry of blue test objects. Due to the progressively increasing threshold for luminance contrast detection in extrafoveal retina, differences in luminance between the colored objects and the white surrounding, as the test objects are moved into the extrafoveal visual field, appear to remain subthreshold. Test object detection can thus be expected to be a perimetric measure of color contrast detection, relatively unaffected by luminance contrast detection. This strategy should simplify the use of colored objects for clinical perimetric testing and should provide a specific test of color vision in the extrafoveal visual field. - The Author.

Temporal integration of the π_1/π_3 pathway in normal and dichromatic vision, by L.J. FRIEDMAN, M.H. YIM & E.N. PUGH Jr (Dept. Psychol. Univ. of Pennsylvania, Philadelphia, PA 19104 U.S.A.), Vision Res. 24, 743-750, 1984.

Stiles, π_1 and π_2 mechanisms are thought to reflect adaptation events at two sites in a single pathway, the first sit controlled by the short-wavelength cones alone, the second site controlled by opposing signals from three cones vs the other cone classes. We examined this pathway's temporal integration under conditions that yield the full gamut of possible adaptation states at the two sites. Critical duration of the π_1, π_3 pathway was always about 200 msec. In addition, we examined the π_1 and π_3 mechanisms of dichromatic vision. Our results suggest that protanopic and deuteranopic vision are characterized by a π_1/π_3 pathway similar to that in normal color vision. - The Authors.

Different types of congenital achromatopsia with residual cone functions, A new concept based on detection of remnant cone activities by large field examination of spectral sensitivity, by W. JAEGER & H. KRASTEL (Univ. Augenklinik, Bergheimerstrasse 20, D-69 Heidelberg, GFR), Festschrift Jules François Retinal and Chorioretinal Pathology, Aeolus Press, Amsterdam, 1983, pp. 57-69.

Evaluation of spectral sensitivity by means of a large field (120°) increment threshold method showed remnants of cone activities in most achromatopsia patients including the majority of those who would have been regarded as complete cases in terms of conventional examination. Thus these cases present a "krypto-incomplete" variation of achromatopsia.

Spectral luminosity functions obtained in yellow, blue-green and purple adaptive illuminations did not obey the principle of univariance. Their differences in shape indicated the activity of more than one photopigment. In these cases of so-called "krypto-incomplete" achromatopsia different patterns of remnant cone activities could be demonstrated. They coincide with the categories of manifest incomplete achromatopsia outlined in earlier publications (Jaeger, 1953). Complete and manifest incomplete cases of achromatopsia in siblings could already be detected by Franceschetti, Jaeger, Klein et al. (1958). Complete and "krypto-incomplete" types could also be found in siblings.

A common functional criterion of all achromatopsias (complete, manifest incomplete and krypto-incomplete types) is the lack resp. deficiency of rod inhibition, which accounts for the leading clinical symptoms : photophobia and scotopically governed spectral sensitivity in light adapted conditions. - The Authors.

Spectral sensitivity in so-called "Achromatopsia with progressive tapetoretinal degeneration" (Spektrale Empfindlichkeit bei "Achromatopsie mit fortschreitender tapetoretinaler Degeneration"), by H. KRASTEL, W. JAEGER, A. BLANKENAGEL & M. GERBERT (Univ. Augenklik, Bergheimerstrasse 20, D-6900 HEIDELBERG, B.R.D.), Fortschr. Ophthalmol. 80, 392-394, 1983.

Due to the poor prognosis of "achromatopsia with progressive tapetoretinal degeneration", reliable criteria need to be established for differentiation from congenital stationary achromatopsia. Besides electro-ophthalmologic tests, determination of spectral sensitivity may be of value. The latter examination additionally provides insight into pathomechanisms of the disease which is characterized by a photopic spectral sensitivity pattern. Therefore, it cannot be regarded as a combination of achromatopsia and tapetoretinal degeneration, despite of the patients' subjectively experienced visual impairment seeming to fit in this assumption. Actually, the underlying mechanism is a cone-rod dystrophy in which the cones of the central retinal area suffer from an early onset degeneration. Nystagmus, autosomal recessive inheritance and a possible lack of ophthalmoscopically detectable symptoms during childhood - this all argues in favour of a sophisticated analysis of any case imposing as "achromatopsia", in order to avoid overlooking of a progressive cone-rod dystrophy. - The Authors.

A rod monochromat's pattern VECP at high and low background levels : spatial tuning of colour mechanisms and rods compared, by L. KLINGAMAN (Div. Vis. Sci., Pennsylvania Colleg. Optom., Philadelphia, PA 19141, U.S.A.), Ophthal. Physiol. Opt. 4, 139-142, 1984.

The visually evoked cortical potential spatial-tuning function, e.e. checksize vs amplitude of response, was determined for a rod monochromat at a low background level of 0.2 scot td or a high background level of 200 scot td. The results showed evidence of a peak at 36' for the low-background spatial-tuning curve, but almost no peak was evident when the high background level was employed. This latter finding was interpreted as consistent with a rod saturation effect. Additionally, the shape of the spatial-tuning function found with the low background level was compared with that obtained from the blue or red and green cone mechanisms of normals. It was concluded that the blue cone mechanism may not use, as has been hypothesized, the same neural transmission pathway as rods because its spatial-tuning curve differed from both the rod and R and G systems. - The Author.

The response range of the blue-cone pathways : A source of vulnerability to disease, by C. HOOD, I. BENIMOFF & V.C.GREENSTEIN (Dept. Psychol., Columbia Univ., New York 10027, U.S.A.), Invest. Ophthalmol. Vis. Sci. 25, 864-867, 1984.

Retinal disease preferentially affects the sensitivity of the blue-cone pathways. This vulnerability to disease may be due, in part, to a more limited response range. A psychophysical technique, the probe-flash paradigm, was used to test this hypothesis. The data suggest that the S-cone pathways have a more limited response range than the L-cone pathways. Explanations for blue-cone vulnerability are discussed in the context of this finding. - The Authors.

Rod and cone activity in patients with dominantly inherited retinitis pigmentosa : Comparisons between psychophysical and electroretinographic measurements, by G.B. ARDEN et al (Moorfields Eye Hosp., London, ECVi 2PD, England), Br. J. Ophthalmol. 67, 405-418, 1983.

Extended electroretinographic (ERG) testing was carried out in a series of patients with retinitis pigmentosa, dominantly inherited. In 36 of 57 patients only cone b waves were evoked. In 20 of these, psychophysical tests showed only cone-mediated vision (Massof class I), whereas in 16, static scotopic perimetry demonstrated residual rod function (class II). In the remaining patients in whom rod ERGs were seen, the light intensities required to evoke responses were not greatly elevated over the normal.

A computer model was constructed to relate psychophysical threshold measurements to ERG data. This analysis of the results suggested that in 1 subgroup of patients the scotopic ERG is smaller than expected from the losses of visual field, and that in another the psychophysical elevation of rod visual threshold is greater than would be expected from the ERG measurements. - The Authors.

Visual efficiency in degenerating maculopathies, by D. TRUSIEWICZOWA, A. KORDALEWSKA & K. ZEBROWSKA, Clinika Oczna No. 3, 121-123, 1984.

In 31 patients (53 eyes) with normal or only slightly decreased visual acuity and slight macular changes the function of the central retina was tested. In 59% of the eyes disturbances of twilight vision were found, in 57% retinal sensitivity threshold curves were changed, in 34% acquired dyschromatopsia was present. The type and degree of these changes could not be predicted from the appearence of the fundus. Twenty one patients were treated with Cavinton. For the evaluation of the dynamic development of the disease and of therapeutic results the 100-hue test and static perimetry were most useful. - Felicia Jakubik.

Color perimetry of glaucomatous visual field defects, by W. M. HART Jr. & M.O. GORDON (Dept. Ophthalmol., Washington Univ. School Med., St-Louis, Miss, U.S.A.), Ophthalmology 91, 338-346, 1984.

A color video tangent screen has been devised, using microcomputer control of a video display to produce colored perimetric test objects matched in luminance to a white surround at 10-foot lamberts. Perimetric isopters for varying degrees of color saturation were determined by kinetic perimetry. This form of color perimetry was used to examine one eye of each of 40 patients with open-angle glaucoma as well as 20 glaucoma-suspect patients. For the first 23 eyes with manifest glaucomatous visual field defects, a masked comparison was made between the result of color perimetry and conventional perimetry with a Goldmann perimeter. For these 23 eyes, color perimetry did as well as luminance perimetry in 14, was less sensitive in 2, and was more sensitive in 7. All defects that were detectable by conventional perimetry were successfully demonstrated by the color method. Such defects often appeared to be greater in extent when mapped by the color method as compared to conventional luminance perimetry. - The Authors.

Optic nerve disorders and visual functions, by Y. ISAYAMA (Dept. Ophthalmol. School Med. Kobe University, Japan). A book of 209 p. Yukohsha Printing Home, Kobe 1984.

This volume includes such studies as the establishment of distinct diagnostic bases for various kinds of optic nerve disorders, the fundamental and clinical researches on recovering mechanism of optic nerve involvement, and psychophysical and electro-physical analysis of optic nerve dysfunction.

Acquired color vision defects in 56 patients (70 eyes) afflicted with optic nerve diseases were investigated using the 100 hue test. A close relationship was found between visual acuity and the total error score. Red-green (R-G) deficiency was observed in cases of severe loss of vision, but blue-yellow (B-Y) deficiency was frequently found in cases of rather good vision in the recovery phase. Color vision defects tended to persist following complete recovery of visual acuity and central sensitivity of the visual field. The 100 hue test is considered to be more sensitive for detecting the slight damage to the optic nerve. - Guy Verriest.

Studies on color vision defects in optic nerve disease using the Farnsworth-Munsell 100 hue test, by R. KAZUSA (Dept. Ophthalmol. School of Med. Kobe University, Japan), Folia Ophthalmol. Jpn. 34, 1044-1048, 1983.

Acquired color vision defects in 52 eyes of 37 patients with optic nerve disease were studied using the 100 hue test. A close relationship was revealed between visual acuity or central sensitivity of visual field and color vision deficiency. Red-green deficiency and excessive error on the 100 hue test were found in patients with severe loss of vision and central depression of the visual field. On the other hand, patients in the recovery period of optic disease tended to show blue-yellow deficiency and fewer errors on the same test. However, recovery of color vision was not parallel to improvement of visual acuity and field defects, color vision defects tending to be restored last. Thus, examination of color vision using the 100 hue test permits detection of persisting dysfunction of the optic nerve. - Yasuo Ohta.

Testing of colour vision for vocational purposes, by E. AARNISALO (Dept. Ophthalmol., Centr. Hosp. Satakunta, Pori, Finland), Acta Ophthalmol. (Kbh.) suppl. 161, 135-138, 1984.

All red-green defects of colour vision can be effectively screened with a combination of two pseudo-isochromatic tests. Severe (major) colour vision defects regarded as a serious handicap in all occupations needing colour naming ability can be quickly detected with the Panel D-15 dichotomous test. Only a trained ophthalmologist can make the detailed estimation of the type and degree of the colour vision defect with the aid of the anomaloscope and the Farnsworth Munsell 100-hue test. In the diagnosis of a congenital colour vision defect the exclusion of an eye disease with a consecutive acquired colour vision defect is important. - The Author.

Problems with the japanese school hygiene law amended in 1978, by A. MAJIMA (Dept. Ophthalmol., Nagoya City Univ. Med. School), N. NAKANISHI & N. UCHIDA (Div. Ophthalmol. Aichi Prefect. Center of Health Care, Japan), Folia Ophthalmol. Jpn. 34, 2062-2066, 1983.

The Japanese School Hygiene Law, enforced in 1958, was amended in 1978 as follows : (1) A color vision examination should be given to students of the 1st and 4th grades of elementary school; (2) The purpose of the examination is not to determine types and degrees of color vision defects but to detect students with defective color vision. The authors emphasize that students with severe color vision defect should be identified by examinations conducted in the first grade and that the results of such examinations should be immediately conveyed to the children's parents. - Yasuo Ohta.

The effect of tinted glass for corrective lenses on colour discrimination (L'effetto dei vetri colorati per lenti corrective sulla discriminazione cromatica), by A. SERRA, I.ZUCCA & M. SIOTTO PINTOR (Istituto di Clinica Oculistica, Cattedra di Ottica Fisiopatologica dell'Universitè di Cagliari, Italia), Atti Fond. G. Ronchi 39, 201-206, 1984.

Demonstration in 39 young normal subjects and by means of the 100 hue test of the deterioration of colour discrimination by usual tinted spectacles. - Guy Verriest.

Color-blind drivers' perception of traffic signals, by M.G. WILLIAMS, (RR #2, Galiano, BC VON 1PO, Canada), Can. Med. Assoc. J., 128, 1187-1189, 1983.

There is a dangerous and widespread assumption that color-blind drivers compensate well in recognizing traffic signals. This assumption is unjustififed because color-blind drivers are rarely identified at accidents. Testimony from experienced color-blind drivers clearly demonstrates that they have significant difficulties in recognizing traffic and vehicle signals. Further, tests show that signals designed to assist color-blind individuals (shape-coded and with the red signals framed in white) are preferred by these persons and are as satisfactory for individuals with normal vision as the standard signals are. - The Author.

Colour science in television and display systems, by W.N. SPROSON (BBC, retired). Publ. Adam Hilger, 222 p., hardcov £20.00, 1983.

This book aims to explain all aspects of colorimetry which are relevant to the theory and practice of television and visual display systems. Mr. Spronson discusses the problems of accurately reproducing colour on display devices, and the solutions that have been found to produce as lifelike a colour picture as possible. He explains the various ways in which the different NTSC, PAL and SECAM systems deal with transmitting colour information, detailing their various strengths and weaknesses. The book gives an introduction to basic colorimetry before proceeding to discuss colour analysis for cameras. Colour display tubes and optical components, such as filters and prism splitter blocks, are considered in detail, particularly with regard to spectral power distributions and chromaticity coordinates. - The Publisher.

1985 DEANE B. JUDD - AIC AWARD to DOROTHEA and LEO HURVICH

The Deane B. Judd - AIC Award was established in 1975 on honour of the memory of Dr. Deane B. Judd, a renowned twentieth century colour scientist. It is awarded biennially by the Association Internationale de la Couleur (AIC) to recognize and honour people who have performed work of outstanding merit in colour science. Previous recipients are Miss Dorothy Nickerson, Professor William David Wright (IRGCVD president), Dr. Gunter Wyszecki, Professor Manfred Richter (IRGCVD member) and Dr. David Lewis MacAdam.

The 1985 Deane B. Judd - AIC Award will be conferred jointly on Professors Dorothea Jameson and Leo M. Hurvich (both IRGCVD members) in recognition of their fundamental contributions to the science of colour vision. In particular, their collaborative research to provide quantitative bases for an opponent process mechanism of colour vision, and their elaboration of that concept through extensive experimentation and teaching over a period of 30 years, are among their contributions noted here for recognition by the AIC.

Professors Jameson and Hurvich began their collaboration at Harvard University in 1941, continued it at the Eastman Kodak Company, at New York University, and at the University of Pennsylvania where they still work. During their ten-year tenure at Kodak, Jameson and Hurvich provided the first psychophysical measurements of coded chromatic opponent-response functions that supported an opponent processing neurophysiological view of colour vision proposed by Ewald Hering in the nineteenth century but largely disregarded since that time. Direct electrophysiological support for the opponent-response mechanism came shortly after and largely as a result of the publication of Jameson and Hurvich's results in the mid 1950s. Since that time, the overwhelming evidence from both physiology and psychophysics has established the opponent-response model as the basic scheme of neural processing of the mechanism of colour vision. The many experimental results and publications of Hurvich and Jameson over the past thirty years have served not only to establish opponent-processing as the fundamental model of colour vision coding but also to stimulate countless other research projects that continue to provide elaboration of the concept and enhance our understanding of the mechanisms of colour vision. Many of the issues of colour that are explicable today would not be so without the general shift of conceptual attitude brought about by the work of Professors Jameson and Hurvich.