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DALTONIANA

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The bulletin of the International Colour Vision Society

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Daltoniana on the web

Welcome to the first edition of the web based **Daltoniana**. This and following editions will be downloaded from the website and mailed to members from locations in North America, Europe and Australasia. As a consequence the editorship will be filled by Stephen Dain who authors the website.

Contents

Officers and Committee

President	André Roth
General Secretary	Ken Knoblauch
Treasurer	Ted Sharpe
Membership Secretary	Anne Kurtenbach
Daltoniana Editor	Stephen Dain
Proceedings Editors	Dick Cavonius , John Mollon and Eberhart Zrenner
Committee	Jenny Birch , Stephen Dain , Kenji Kitahara , Barry Lee , Jean Leid , John Mollon , Jack Moreland , Joel Pokorny , Eberhart Zrenner

Change of name

As a consequence of a decision taken by the members present at the Ghent, the Group will now be known at The International Colour Vision Society. The change reflects the inclusion of more than colour vision deficiencies in the interests and activities of the members. On the other hand, there was a widely expressed wish that the Society retain its link with colour vision deficiencies and this is reflected in the commentary which follows the Society's name.

"The **ICVS** is an international group of physiologists, psychologists, physicists, geneticists, optometrists, ophthalmologists and others who have a research interest in the many aspects of colour vision and colour vision deficiencies."

Changes at the top

As indicated in previous Daltonianas, Jack Moreland has retired as General Secretary. André Roth continues as President. In Jack's place, Ken Knoblauch has been elected as General Secretary.

Ken writes

As one of my first official statements as General Secretary of the International Colour Vision Society, I want to express my thanks in the name of our society to Jack Moreland for the job he has done over the past 9 years as our General Secretary. Jack presided smoothly over a number of important transitions of the organization. The first occurred when he assumed the responsibilities of General Secretary after the death of Guy Verriest. Everyone knows that Guy, who founded the society, ran it in a highly centralized fashion. With so much responsibility emanating from a single point, the transition could have been very difficult for the society, possibly fatal. The successful continuation of our group owes much to the enthusiasm of its members but equally to Jack for having kept all the gears turning, the scientific organization of our biennial meetings, editing of Daltoniana, the publication of the proceedings, etc. During his tenure, the quality of our presentations and proceedings have continued to augment to the point that we are on the threshold of seeing our proceedings published for the first time in an internationally recognized journal, Vision Research. Jack has, in addition, done much to decentralize the work of the society, seeing to it that the important offices were spread around the globe. This one accomplishment, I feel, will do much to guarantee the vigor of the organization. Finally, he has overseen our change of name, which while not redefining the society will more accurately represent us to the rest of the world.

General Secretary's report

As we pass our 25th anniversary, we have changed our name but not actually our focus. Perhaps to outsiders we seem to be redefining ourselves as a group concerned with broader issues of color vision and not simply one focusing narrowly on color vision deficiencies. But this would be a misperception. A perusal of our proceedings would reveal us to be interested in the myriad varieties of color vision, normal and abnormal, human and non-human. Our approaches stretch from the laboratory to the clinic, from urban to jungle environments. We explore the function and structure, the genetics and evolution, and the development and aging of color vision. Our name change reflects less a change of identity than a simple recognition of who and what we are (and have always been). This is not to suggest that our organization has not itself been evolving. The diversity of themes as well as the improving standards of our publications attest to our health and vigor as a society. The publication of our next proceedings in Vision Research represents an important landmark for us and will give us additional recognition, permitting us to attract younger members and perhaps also more established researchers who had not realized the

pertinence of our venue for their work. Finally, we need to continue with the development of our web site. The web site will provide our society with a permanent, central location for interaction. It can also become a resource for information and liaison between the organization and the rest of the world. Properly constructed and maintained, it can allow our society to remain active and visible in the two years between our meetings.

Minutes of the Director's meeting of the IRGCVD

July 5, 1997 Het Zuid, Ghent

Absent: Harry Sperling
Arrived late: Eberhard Zrenner

The problem of how to encourage members to pay their dues in a timely and regular fashion was discussed. Members tend not to pay in years between the meetings and in meeting years, wait for the meeting to pay. This practice leaves the treasury in a vulnerable position. It was suggested that this be mentioned to the members at the General Business Meeting. Another suggestion was to include a loose sheet of a different color with the delivery of Daltoniana as the dues form and to add a headline to Daltoniana to alert members when payments were due. The possibility of introducing a two-year membership was discussed.

Proposals for future meetings: The committee heard proposals for Goettingen in 1999, Cambridge in 2001 and Seattle in 2003. It was decided to recommend the Goettingen site for 1999. The containment of meeting costs was discussed. However, the idea of reducing the social aspects of the meeting was discouraged at this time because of its value for making contacts.

Finances: The treasurer gave his report. There will be an 80 pound per page charge for exceeding the 3 page limit in the Vision Research edition of the proceedings. The question of a refund was discussed for Vision Research subscribers. The final decision on the amount will be left to the treasurer. There will be an announcement in Daltoniana for Vision Research subscribers to identify themselves in order to qualify for the refund. The expenses of the General Secretary were discussed and it was agreed to continue the present arrangements. The problems of stabilising organisation finances were discussed. It was decided to recommend raising the dues to 120 DM.

The costs of publication of Daltoniana were discussed and the needs to re-assess them. It was decided to move toward a Web Newsletter to be edited by S. Dain. There would be a local distribution of hard-copy versions for members not on the internet from centers in N. America, Japan, Australia and Europe. In discussing the contents of Daltoniana, it was suggested that it could include book reviews, critical reviews, abstracts and discussions of issues.

New items for the Web site were discussed including the possibility of adding a FAQ-sheet to address frequently asked questions about color deficiency and color vision.

Committee Nominations: A. Roth for President K. Knoblauch for General Secretary

The publication of future proceedings volumes was discussed. Committee members will investigate University presses. Zrenner offered to investigate Aeolus.

In discussing the need to revise the By-laws, it was agreed that the General Secretary would draft a revision and circulate via email to the Committee for discussion.

The general business meeting was discussed. It was agreed to propose Honorary memberships for J. Vola and Y. Ohta. The change of name of the Group would be proposed and presentations for meeting sites would be made, allowing ample time for discussion.

The idea of participating in JERMOV as an organisation is no longer pertinent as JERMOV (now EVER) does not recognise organisation members, only individuals. The possibility of whether to organise a session on color vision with EVER was discussed.

The meeting was adjourned at 12h30.

Addendum: Jack Moreland will chair the Selection Committee for the Verriest Medallist.

Ted Sharpe's message on the refund: At the Director's Meeting, the question of a refund for the Ghent proceedings, which will be published as a special issue in Vision Research, was discussed for Vision Research subscribers. As announced at the General Business Meeting, it was resolved that a final decision on the amount be left to the treasurer, after the financial status of the Society becomes clear. At a later date, Vision Research subscribers will be requested to identify themselves in order to qualify for the refund.

Next Symposium

Will be held in the City of Goettingen, Germany July 23-27 1999 at the University of Goettingen

Membership dues

The membership list includes your membership status for 1997. If you have "No" in the column headed 1997 Status would you please send 1997 membership renewal to the Membership Secretary of Treasurer without delay and before someone might think of removing you from the list.

ICVS WEBNEWS

A reminder that the web site may be found at http://orlab.optom.unsw.edu.au/IRGCVD . I realise that it still uses IRGCVD but we need to advise the sites with links of a change. It will eventually be changed to at http://orlab.optom.unsw.edu.au/ICVS .

Other features planned include;
A useful links page. If you have or know of useful colour and colour vision links to personal sites, organisational sites please let Stephen Dain know.

A frequently asked questions page. This will be offered as a public service, aiming to answer the types of questions (idiot and sensible) people ask about colour vision deficiencies. If you have a favourite question you keep being asked and/or an answer of which you are particularly proud please send them (preferably both) to Stephen Dain.

For the computer trivia minded, the website is run on a Macintosh PM7100/WS using Webstar PS. The pages are compiled in raw html using Word 6.0.1 on a Macintosh PM8500. The soft ware will shortly be upgraded to the full Webstar and Adobe Pagemill. Suggestions and contributions welcome.

MEMBERSHIP

A message from the Treasurer and Membership Secretary

Dear Member,

We are now requesting membership dues for 1997.

The conditions of payment are listed below. Please fill out the accompanying form, noting the appropriate method of payment, and return it to Lindsay T. Sharpe. Subscriptions are payable in German Deutschmark (DM) only. The basic fee for 1997 remains 100 DM **plus service charges** (where applicable).

The following is a guide to the subscriptions in other currencies published on 8th October 1997 by the New York Federal Reserve Bank. PLEASE NOTE these are for information only. All subscriptions must be paid in German Marks.
Click here for uptodate exchange rates

German marks (DM)	American dollars(USD)	Australian dollars (AUD)	British pounds(GBP)	Canadian dollars(CAD)	Dutch guilders(NLG)	French Francs(FRF)	Japanese Yen(JPY
100	57.11	78.41	35.24	78.38	112.79	336.27	6905.77
25	14.28	19.60	8.81	19.59	28.20	84.07	1726.44
75	42.83	58.81	26.43	58.78	84.60	252.20	5179.33
106	60.54	83.12	37.36	83.08	83.12	356.44	7320.11
27	15.42	21.17	9.52	21.16	30.45	90.79	1864.56
80	45.69	62.73	28.19	62.71	90.23	269.01	5524.61

Please note that in order to receive the 1997 Proceedings volume from Ghent, you must have paid membership fees for both 1996 and 1997 (DM 100 a year) or you must have paid the membership fee for 1997 (DM 100) **plus** the volume supplement (DM 75).

Payment may be made by any of the following methods:

i) Bank transfer or international cheque (drawn on a German bank)

membership renewals	100 DM
new members	100 DM
student/retired	25 DM
Proceedings volume supplement	75 DM

ii) Eurocheque

membership renewals	100 DM
new members	100 DM
student/retired	25 DM
Proceedings volume supplement	75 DM

iii) Credit card (American Express or Mastercard/Eurocard or Visa)

membership renewals	106 DM*
new members	106 DM*
student/retired	27 DM*
Proceedings volume supplement	80 DM*

* (includes card service fee)

We would appreciate an early response.

Thank you.

Anne Kurtenbach (Membership Secretary)
Lindsay T. Sharpe (Treasurer)

The International Colour Vision Society
Memberships and Membership Renewals 1997

The full subscription is DM 100 for new members and renewing members or DM 25 for students and retired members (excluding credit card charges). Full members who are paid up for 1996 and 1997 are entitled automatically to the 1997 (Ghent) Proceedings. A supplementary fee of DM 75 ensures this entitlement for new members joining in 1997. All members receive the ICVS newsletter Daltoniana.

Subscriptions, payable in Deutschmarks (DM) only, may be made by the following methods.

PLEASE SELECT THE APPROPRIATE SECTION

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Lindsay T. Sharpe
Forschungsstelle fuer Experimentelle Ophthalmologie
Roentgenweg 11
D-72076 Tuebingen
Germany
Fax: + 49 7071 295777

Proceedings Volumes for 1991, 1993 & 1995

To stimulate sales of the Proceeding volumes, we are offering them to all ICVS members, including new, student and retired members, at a reduced price. The price per volume, including postage, is DM 100 by bank transfer or EUROcheque and DM 106 by credit card. Only limited numbers of the Sydney (1991) and Tuebingen (1993) Proceedings are available.

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D-72076 Tuebingen
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Fax: + 49 7071 295777

Membership List and request for email addresses

The mailed version of Daltoniana will have a list of members attached. This has not been made accessible from the web to minimise the possibility of inappropriate use. It is available to committee members as a password protected file.
Please send email addresses for inclusion in the Membership List to any of

General Secretary	Ken Knoblauch
Treasurer	Ted Sharpe
Membership Secretary	Anne Kurtenbach
Daltoniana Editor	Stephen Dain

You could also include a personal website, if you have one, and we could start a list of those.

Abstracts of colour vision papers. Compiled by Joel Pokorny

Birch J.
Clinical use of the American Optical Company (Hardy, Rand and Rittler) pseudoisochromatic plates for red-green colour deficiency.
Ophthalmic & Physiological Optics. 17:248-254, 1997
Abstract: The efficiency of the American Optical Company (Hardy, Rand and Rittler) (HRR) plates for screening, grading and classifying red-green colour deficiency was examined for 401 male colour deficient subjects previously identified and diagnosed with Nagel anomaloscope. There were 83 protanopes, 30 protanomalous trichromats, 96 deuteranopes and 192 deuteranomalous trichromats. Screening sensitivity was found to be 100% for dichromats and 96.4% for anomalous trichromats based on one screening error (35 subjects, including 7 dichromats, where identified by a single error). Thirty subjects (13.5%) made errors on screening plates only and were identified as having minimal colour deficiency. The HRR grading system did not distinguish dichromats and anomalous trichromats; 54% of dichromats were graded as having moderate rather than severe colour deficiency. Protan/deutan classification was correct for 95% of subjects who failed grading plates. HRR grades for anomalous trichromats were compared with the anomaloscope matching range and with pass or fail of the D15 test. The results show that only two rather than four grading categories can be distinguished by the HRR plates and that both the D15 and the HRR plates are needed in a vocational test battery to establish the severity of colour deficiency.

Sharanjeet-Kaur. Dickinson CM. O'Donoghue E. Murray IJ.
Spectral sensitivity in patients with dysthyroid eye disease.
Ophthalmic & Physiological Optics. 17:232-238, 1997
Abstract: The majority of patients with dysthyroid eye disease have an acquired colour vision defect. However, no psychophysical investigation of selective damage to colour or flicker pathways has been carried out. In order to clarify the nature of the visual pathology, we have used a psychophysical technique (spectral sensitivity)to selectively stimulate the chromatic and achromatic mechanisms. Spectral spots of size 1 degree presented at a rate of 1 Hz on a bright 1000 td white background are detected by the chromatic mechanism but a rate of 25 Hz reveals the achromatic mechanism. Fifteen patients (28 eyes) between the ages of 50-70 years were tested. The study showed that all patients had reduced spectral sensitivity, either 1 Hz, 25 Hz or both. The patients with reduced 1 Hz or 25 Hz spectral sensitivity only had a shorter systemic and ocular duration of the condition, had no proptosis, normal intraocular pressures in primary gaze, slightly higher intraocular pressures on upgaze, normal visual field plots and FM 100-Hue error scores higher than the normal age-matched values. The patients with reduced both 1 Hz and 25 Hz spectral sensitivities had a longer systemic and ocular duration of the condition, had proptosis, normal intraocular pressures in primary position, higher intraocular pressures on

upgaze and higher FM 100-Hue error scores than the age-matched normals and those in Groups 1 and 2. A total of 50% of patients in Group 3 had defective visual field plots. These data suggest that there is a damage of the large achromatic fibres and small chromatic fibres in dysthyroid eye disease. The mechanism of the damage could be one of ischaemic or mechanical or both.

Craven BJ.
A method for increasing the scoring efficiency of the Farnsworth-Munsell 100-Hue test.
Ophthalmic & Physiological Optics. 17:153-157, 1997
Abstract: This paper describes a method for scoring the Farnsworth-Munsell 100-Hue test, based on maximum-likelihood estimation, which in theory reduces test-to-test variability in scores and which is therefore better able to discriminate between different levels of overall colour discrimination than is the original Farnsworth scoring system. Error scores produced by the method are directly comparable to error scores produced by the traditional scoring system. It is hoped that this work will provoke further consideration of the efficiency of the scoring system as far as test-to-test variability is concerned, including the efficient detection of polarity in the subject's

Johansson B, Jakobsson P.
Luminance and color contrast sensitivity and VEP latency in subjects with normal and defective binocularity.
European Journal of Ophthalmology. 7:82-91, 1997
Abstract: Luminance contrast sinusoidal gratings (spatial frequencies 1, 2 and 4 cycles/degree) were compared with the corresponding color contrasting patterns (along the protan, deutan and tritan axes) to see whether they demonstrated normal binocular function in humans, and distinguished between normals and persons with defective binocularity. Contrast sensitivity and transient pattern VEP latency (on-responses) were measured in normals (n = 11, median age 36, range 12-46 years) and subjects with no stereopsis (n= 6, median age 13, range 8-38 years). The normal group had significantly higher contrast sensitivity with binocular stimulation for all patterns except tritan contrast gratings of 2 and 4 c/deg. The stereo-deficient group showed no higher binocular contrast sensitivity for any pattern. Differences between groups were significant with all gratings of 4 c/deg, and also with protan and deutan contrast gratings of 2 c/deg. In the normal group, binocular VEP latency was significantly shorter than the monocular with protan contrast gratings of 2 c/deg and tritan contrast gratings of 1 and 2 c/deg. Differences between the normal and the stereo-deficient groups were significant for all color contrast patterns of 2 c/deg; and tritan contrast gratings of 1 c/deg. We conclude that color contrast sensitivity and VEP measurements are potentially useful for demonstrating binocular function, and for separating normals from stereo-blind subjects. Color contrast patterns however are less effective than the corresponding luminance contrast patterns in evoking cortical potentials.

Kochendoerfer GG. Wang Z. Oprian DD. Mathies RA.
Resonance Raman examination of the wavelength regulation mechanism in human visual pigments.
Biochemistry. 36:6577-6587, 1997
Abstract: Resonance Raman spectra of recombinant human green and red cone pigments have been obtained to examine the molecular mechanism of color recognition by visual pigments. Spectra were acquired using a 77 K resonance Raman microprobe or preresonance Raman spectroscopy. The vibrational bands were assigned by comparison to the spectra of bovine rhodopsin and model compounds. The C=NH stretching frequencies of rhodopsin, the green cone pigment, and the red cone pigment in H2O (D2O) are found at 1656 (1623), 1640(1618), and 1644 cm(-1), respectively. Together with previous resonance Raman studies on iodopsin [Lin, S. W., Imamoto, Y.,Fukada, Y., Shichida, Y., Yoshizawa, T., & Mathies, R. A. (1994) Biochemistry 33, 2151-2160], these values suggest that red and green pigments have very similar Schiff base environments, while the Schiff base group in rhodopsin is more strongly hydrogen-bonded to its protein environment. The absence of significant frequency and intensity differences of modes in the fingerprint and the hydrogen out-of-plane wagging regions for all these pigments does not support the hypothesis that local chromophore interactions with charged protein residues and/or chromophore planarization are crucial for the absorption differences among these pigments. However, our data are consistent with the idea that the Schiff base group in blue visual

pigments is stabilised by protein and water dipoles and that the removal of this dipolar field shifts the absorption maximum from blue to green. A further red shift of the lambda(max) from the green to the red pigment is successfully modeled by the addition of hydroxyl-bearing amino acids (Ser164, Tyr261, and Thr269) close to the ionone ring that lower the transition energy by interacting with the change of dipole moment of the chromophore upon excitation. The increased hydrogen bonding of the protonated Schiff base group in rhodopsin is predicted to account for the 30 nm blue shift of its absorption maximum compared to that of the green pigment.

Modarres M. Mirsamadi M. Peyman GA.
Prevalence of congenital color deficiencies in secondary-school students in Tehran
International Ophthalmology. 20:221-222, 1996-97
Abstract: PURPOSE: A population-based study was conducted to determine the prevalence of color deficiencies in secondary-school students (ages 12-14) in Tehran. METHODS: A total of 2,058 students(1,136 males, 922 females) were examined with Ishihara pseudoisochromatic color plates. RESULTS: In the study population, 97 cases of defective color vision were detected, including 93 males and 4 females. The affected individuals all had negative histories of previous systemic and ocular disease or chronic use of medications. The visual acuity was 20/20 and the fundus was normal in all affected students. Of the 93 cases of defective color vision in males (8.18%),56 cases (4.93%) involved deuteranomaly, 13 (1.14%) protanomaly, 13 (1.14%) deuteranopia, and 11 (0.97%) protanopia. The four case sin females (0.43%) involved deuteranomaly in three cases (0.32%)and protanomaly in 1 case (0.11%). Deuteranopia and protanopia were not detected in females. CONCLUSION: This is the first study to determine the prevalence of congenital color blindness in Iran. The results agree with reports of prevalence of congenital colorblindness from Western Europe.

Heim M. Morgner J.
[Color vision defects in endogenous depression]. [German]
Psychiatrische Praxis. 24:73, 1997
Abstract: 8% of the men and approximately 0.5% of the women in a normal population suffer from congenital colour anomaly. We examined 75 women suffering from endogenous depressions. We found disturbed colour vision in 63% of them. We discuss the aetiopathogenic relationship between endogenous depression and disturbed colour vision.

Meissirel C. Wikler KC. Chalupa LM. Rakic P.
Early divergence of magnocellular and parvocellular functional subsystems in the embryonic primate visual system.
Proceedings of the National Academy of Sciences, USA. 94:5900-5905,1997
Abstract: In both human and Old World primates visual information is conveyed by two parallel pathways: the magnocellular (M) and parvocellular (P) streams that project to separate layers of the lateral geniculate nucleus and are involved primarily in motion and color/form discrimination. The present study provides evidence that retinal ganglion cells in the macaque monkey embryo diverge into M and P subtypes soon after their last mitotic division and that optic axons project directly and selectively to either the M or P moieties of the developing lateral geniculate nucleus. Thus, initial M projections from the eyes overlap only in prospective layers 1 and 2, whereas initial P projections overlap within prospective layers 3-6. We suggest that the divergence of the M and P pathways requires developmental mechanisms different from those underlying competition-driven segregation of initially intermixed eye-specific domains in the primate visual system.

Sharanjeet-Kaur. Kulikowski JJ. Walsh V.
The detection and discrimination of categorical yellow.
Ophthalmic & Physiological Optics. 17:32-37, 1997
Abstract: Threshold detection of most spectral lights presented on a white background is subserved by colour opponent mechanisms which produce distinct percepts of colours. Five ranges of wavelength scan

be discriminated: red, yellow, green, blue and violet [Mullenand Kulikowski (1990) Wavelength discrimination at detection threshold. J. Opt. Soc. Am. A7, 733-742]. However, under most viewing can also be detected and discriminated by activating the achromatic mechanism. Using 2-alternative forced-choice we studied detection and discrimination between spots (1 deg) which were either spectral colours or white (matching the background in colour temperature), with and without masking the achromatic mechanisms. For low colour temperatures of white (2700 K), yellow could be discriminated from white at slight suprathreshold levels of detection. However, at a colour temperature of 6800 K and with masking, the yellow-white discrimination threshold for 565-574 nm was also close to detection threshold (as for other wavelengths). We conclude that it is possible to demonstrate the role of the blue-yellow opponent mechanism in categorical perception of yellow (at threshold)by sensitizing its yellow branch and by suppressing the achromatic mechanism.

Bumsted K. Jasoni C. Szel A. Hendrickson A.
Spatial and temporal expression of cone opsins during monkey retinal development.
Journal of Comparative Neurology. 378:117-134, 1997
Abstract: The primate retina requires a coordinated series of developmental events to form its specialised photoreceptor topography. In this study, the temporal expression of cone photoreceptor opsin was determined in Macaca monkey retina. Markers for mRNA and protein that recognise short wavelength (S) and long/medium wavelength(L/M) opsin were used to determine (1) the temporal and spatial patterns of opsin expression, (2) the spatial relationship between S and L/M cones at the time of initial opsin expression, and (3)the relative time of cone and rod opsin expression (Dorn et al.[1995] Invest. Ophthalmol. Vis. Sci. 36:2634-2651). Adult cone outer segments were recognised by either L/M or S opsin antiserum. Of all adult cone inner segments, 88-90% contained L/M opsin mRNA, whereas 10-12% contained S opsin mRNA. Fetal cones initially showed cell membrane as well as outer segment labelling for opsin protein, but cell membrane labelling disappeared by birth. No cones at any age contained markers for both S and L/M opsin mRNA or protein. S and L/M opsin protein appeared in the fovea at fetal day 75. Once opsin expression progressed beyond the fovea, both mRNA and protein for S opsin were consistently detected more peripherally than L/M opsin. Cones at the peripheral edge of S opsin expression had basal telodendria that appeared to reach toward neighboring cones. Because interactions between cone populations could organize the cone mosaic, the spatial relationship between S cones and the first cones to express L/M protein was analysed quantitatively by using double-label immunocytochemistry. No consistent relationship was found between these two cone populations. Cones are generated at least 1 week before rods across monkey retina. However, rhodopsin protein appears in and around the fovea at fetal day 66,1 week before cone opsin protein. This suggests that independent local factors control differentiation in these two photoreceptor populations.

Nichols BE. Thompson HS. Stone EM.
Evaluation of a significantly shorter version of the Farnsworth-Munsell 100-hue test in patients with three different optic neuropathies.
Journal of Neuro-Ophthalmology. 17:1-6, 1997
Abstract: We tested the hypothesis that a subset of the Farnsworth-Munsell 100-hue test (FM-100) would be a sensitive, specific, and practical means of monitoring color vision in patients with chronic optic nerve disorders. We retrospectively analysed the records of 1,113 patients affected with optic neuritis (ON), Graves' ophthalmopathy with suspected optic neuropathy, or idiopathic intracranial hypertension with suspected optic neuropathy (IIH). One hundred six records of patients showed that an FM-100 had been performed (23 ON, 46 Graves', 37 IIH). Forty additional patients were studied prospectively(11 ON, 17 Graves', 12 IIH). The sensitivity and specificity of all possible 21 chip subtests were compared against the same statistics for the entire test. We found that for these three optic nerve disorders, a test consisting of chips 22-42 had nearly the same sensitivity and specificity as the entire test when compared with the clinical diagnosis. At 90% specificity, the ratio of sensitivities of the short version to the original version of the test were IIH, 53%/45%; optic neuritis, 85%/79%; and Graves', 67%/70%. The majority of the clinical value of the test can be achieved in one fourth of the original

examination time.

Bayer AU. Thiel HJ. Zrenner E. Dichgans J. Kuehn M. PaulusW. Ried S. Schmidt D.
Color vision tests for early detection of antiepileptic drug toxicity.
Neurology. 48:1394-1397, 1997
Abstract: A previous suggestion that antiepileptic drugs may induce color vision deficiencies prompted us to examine whether color vision deficiencies may occur at lower drug serum concentrations than those associated with symptoms of neurotoxicity. Eighty patients presenting with epilepsy received monotherapies of valproic acid, phenytoin, or carbamazepine; 18 patients did not receive antiepilepticdrug therapy. Color vision was tested by the Farnsworth-Munsell 100-hue test, spectral sensitivity, and the newly developed tritan screening plates. Patients treated with phenytoin or carbamazepine developed blue-yellow color vision deficiencies. In contrast, patients exposed to valproic acid or receiving no drug treatment showed normal color vision. There was a significant correlation($p < 0.0001$) between signs of neurotoxicity induced by phenytoin or carbamazepine and blue-yellow color vision deficiencies. In contrast, we found no correlation between these signs of neurotoxicity and the drug serum concentrations ($p = 0.0637$). Color vision testing in epileptic patients treated with phenytoin or carbamazepin eappears to be a sensitive method for early detection and monitoring of clinical neurotoxicity.

Orazem A. Scheibner H.
[Foveal deuteranoptic opposing color vision]. [German]
Ophthalmologe. 94:222-229, 1997
Abstract: By means of a visual tristimulus colorimeter according to Guild-Bechstein, the following items were determined for a mole deuteranopic observer on a foveal, i.e. 2 degrees diameter visual field: (1) the deuteranopic missing color, by means of the perceptual criterion "indistinguishably equal", (2) the neutralzone, by means of the perceptual criterion "neither blue nor yellow,"(3) the alychne trace, by means of the perceptual criterion "heterochromatically equally bright." The evaluation in the chromaticity chart resulted in two straight lines forming a dichromatic pencil, the deuteranopic missing color providing the carrier point (vertex). These two straight lines represent the referential chromaticities of a deuteranopic opponent color system.