

DALTONIANA

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The bulletin of the International Research Group for Colour Vision Deficiencies

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(NOTE CHANGE OF E-MAIL ADDRESS)

Next Symposium

The next Symposium of the group will be back in Ghent to mark (the passing of) our 25th Anniversary; our foundation meeting was held there in 1971. The dates are 5-9 July 1997. Prof. De Laey will be the local organiser and Prof. Moreland will deal with the scientific program.

Special topics for the Symposium are:

- 1) Development of Colour Vision (including infant/child vision)
- 2) Functional MRI
- 3) Gnosial Aspects
- 4) Traffic Regulation Standards

It is hoped to organise a workshop on Colour Coding in the Primate Retina.

The Executive Secretary cannot, as yet, confirm any names for invited speakers.

Arrangements have been made to publish the Proceedings in a special issue of Vision Research for which the Editors will be Dick Cavonius, John Mollon

and Eberhart Zrenner. Prospective authors should note that this will involve a considerable tightening of time-limits for the submission of manuscripts. A formal letter to the membership on editorial requirements for the issue is expected from the editors.

Next Verriest Lecture and Medal Award

Joel Pokorny has agreed to chair the Verriest Medal Committee. Although we do not yet have his statement of the exact criteria upon which the Committee will base its choice, if you wish to make a nomination to him, together with a supporting statement, please feel free to do so.

IRGCVD on WWW

Steve Dain has started work on setting up an IRGCVD home page on WWW and is waiting for contributions.

JERMOV Affiliation

Andre Roth will be approaching JERMOV (the European version of ARVO) about affiliation at its October meeting in Montpellier.

Elections for President and General Secretary

At the General Meeting of Members (during the Symposium), nominations for President and General Secretary will be needed. Andre Roth has agreed to stand again (for a 2 year period, until his retirement). Jack Moreland has said, however, "I am definitely stepping down". Please send nominations for president and general secretary and accompanying CVs to Jack Moreland in time for them to be presented to the membership at the Ghent meeting.

Changing IRGCVD to The International Colour Vision Society

A formal proposal to adopt the name "International Colour Vision Society" will be put to the vote at the Ghent meeting. Jack Moreland asks, "how about a competition for an ICVS logo (especially one that would work on e-mail)?"

News from the Treasury

There was an error in the treasury news in the last issue. Entitlement to the Proceedings volume of the 1997 Symposium is obtained by payment of membership dues for 1996 and 1997 or, if having joined in 1997, by a special volume supplement. The 40 or so IRGCVD members who are subscribers to Vision Research will be entitled to a refund of part of their dues, the amount as yet to be determined by the treasurer.

The treasury has provided a list of members together with their e-mail addresses where available. These are published as an appendix to this issue (please send a correction to "ted.sharpe@uni-tuebingen.de" if the e-mail address is missing, wrong or out-of-date). Note that the Yes's and No's refer to whether the member's dues are paid for 1996.

Jennifer Birch to represent IRGCVD

The IRGCVD will be collaborating with our "sister" the AIC in setting up a sub-group on Colour Education in Ophthalmology. Jennifer Birch has agreed to represent the IRGCVD.

Dalton's Legacy

"John Dalton's Colour Vision Legacy" is the title of a new book to be published by Taylor and Francis in December on color vision. It is the selected and edited proceedings of the international conference held in Manchester to honor Dalton's 200th anniversary. It is edited by Christine Dickenson, Ian Murray, and David Carden of the University of Manchester Institute of Technology. Because of the broad interest that this volume holds for our membership, an outline of the volume is reproduced here.

Section 1: DALTON'S COLOUR VISION

- (a) Dalton - Letter
- (b) Extraordinary Facts Relating to the Vision of Colours: With Observations
- (c) Dalton's Colour Blindness: An Essay on Molecular Biography

Section 2: PIGMENTS AND GENETICS

- (a) Primate Visual Pigments: Their Spectral Distribution and Evolution

- (b) Evaluation of the Genetic Contribution to Individual Variations in the Spectral Sensitivity of Deuteranopes
- (c) Induced Colour Blindness in Goldfish

Section 3: PATHWAYS AND CHANNELS

- (a) Parallel Pathways in Primate Retina
- (b) Chromatic Adaptation Aftereffects on Luminance and Chromatic Channels
- (c) Selectivity Limits of Spectral Sensitivity Functions for Chromatic and Achromatic Mechanisms
- (d) Spectral Sensitivity in Glaucoma and Ocular Hypertension
- (e) Human Colour Imaging Evoked Potentials in the Inferior Parietal Lobule (IPL) and Colour Sensitive Cells in Area 7 of the Monkey Implicating the IPL System in Higher Order Colour Processing Chromatic Visual Evoked Potentials: Special (g) Requirements for Blue
- (h) Latency of Transient Chromatic Response Revealed with Temporal Isoluminant Double-Pulse Method

Section 4: SPATIAL AND TEMPORAL ASPECTS OF COLOUR VISION

- (a) Spatial and Temporal Properties of Chromatic Processing: Separation of (b) Colour from Chromatic Pattern Mechanisms
- (c) Spatial and Temporal Contrast Sensitivity During Saccades: Evidence for Suppression of the Magnocellular Visual Pathway
- (d) Effects of Colour Difference on Perceptual Fading
- (e) Spatial and Temporal Sensitivities of Colour Discrimination Mechanisms
- (f) Temporal Characteristics of Colour Discrimination
- (g) Opponent Mechanisms Revealed by Chromatic Modulation Threshold
- (h) The Contribution of Colour to Contour Detection
- (i) Chromatic Contribution to Shape Perception is Revealed in a Non-Temporal Detection Task Using Distance
- (j) Reading Performance of Low Vision Observers for Equal Luminance Coloured Text

Section 5: DEVELOPMENT AND COLOUR VISION DEFECTS

- (a) The Development of Colour Vision in Infants
- (b) Do Congenital Colour Vision Defects Represent a Selective Advantage?
- (c) Some (But Only a Few) Colour Vision Defectives Have No Difficulty with Colour
- (d) Visualisation of Congenital Colour Vision Deficiencies with a VDU

- (e) Acquired Deficiencies of Colour Vision
- (f) Colour Discrimination Without Pattern Discrimination in a Human Hemianope
- (g) Rates of Age-Related Declines of Chromatic Discriminations are the Same for Equiluminant Stimuli Lying on Tritan and Constant S-Cone Axes

Section 6: TECHNIQUES IN COLOUR VISION TESTING

- (a) Developments in Anomaloscopy
- (b) A New Panel Test for Tritan Colour Deficiency
- (c) New Method for Investigation of Colour Sensitivity
- (d) Electrophysiological Correlates of Colour Vision Defects
- (e) An Analysis of VEPs Using Nonlinear Identification Analysis Method
- (f) Chromatic Thresholds in Visual Disorders
- (g) Electrophysiological Investigation of Adult and Infant Colour Vision Deficiencies
- (h) Clinical Applications of an Automated Test of Chromatic Discrimination
- (i) First Experiences with the Trafford Anomaloscope

Section 7: COLOUR CATEGORIES

- (a) On the Nature of Unique Hues
- (b) On the Existence of a Fixed Number of Unique Opponent Hues
- (c) The Influence of White Light on the Location of Unique Green
- (d) Categorical Characteristics of Multiple-Colour Memory
- (e) Estimation of Object's Hue Using Maximum-Likelihood Principle
- (f) Are Colour Categorical Borders Stable Under Various Illuminants?
- (g) The Paucity of Evidence for Cardinal Mechanisms
- (h) Colour Appearance and the CIE system

Section 8: COLOUR CONSTANCY

- (a) Colour Constancy from Colour Relations in the Normal and Colour-Deficient Observer
- (b) Colour Constancy in Acquired and Congenital Colour Vision Deficiencies
- (c) Adaptation or Contrast: The Controlling Mechanism for Colour Constancy
- (d) A Neurocomputational Model for Colour Constancy
- (e) A Functional View of Cone Pigments and Colour Vision
- (f) Dependence of Colour Constancy on the Time-Course of Illuminant Changes
- (g) Space-average Scene Colour Used to Extract Illuminant Information

- (h) Colour Constancy, Excitation Purity and a Test of the Coefficient Theory
- (i) Average Colour Constancy and Categorical Hues
- (j) Surface Colour and Colour Constancy
- (k) Age-related Changes in Saturation of Non-spectral Lights

Section 9: MODELS OF COLOUR VISION

- (a) Predicting Colour Appearance of Simple and Complex Stimuli
- (b) Coefficient Channels for Colour Constancy
- (c) Colour Sensations in Honeybees?
- (d) A Model of Spatial and Chromatic Processing in Early Vision
- (e) Invariant Relationship between Achromatic Colour, Apparent Illumination, and Shape of Surface: Implications for the Colour Constancy Theories
- (f) A Model of Cone Interaction for Coding Chromatic Information
- (g) Linear Models of Dichromacy
- (h) The Two Axes of the Human Eye and Inversion of the Retinal Layers: The Basis for the Interpretation of the Retina as a Phase Grating Optical, Cellular 3D Chip
- (i) Brightness, Hue and Saturation in Photopic Vision: A Diffraction-optical Result of Luminance and Wavelength in the Cellular Phase Grating 3D Chip of the Inverted Human Retina
- (j) 3D Grating Model of Colour Perception
- (k) A Zone Model for Colour Vision Based on Discriminability Optimisation

Section 10: COLOUR APPLICATIONS

- (a) Hyperchromatic Lenses as Potential Aids for the Presbyope
- (b) Revision of the CIE Recommendations for the Colours of Signal Lights
- (c) A Methodology for Producing Maximally Discriminable, Nameable Colours in
- (d) Control Room Displays
- (e) Qualitative Assessment of Compatibility of a Mixture of Disperse Dyes Using Colour Coordinates
- (f) Real-time Colour Recognition for Machine Vision Systems
- (g) A System for Precision Ophthalmic Tinting and its Role in the Treatment of Visual Stress
- (h) Optometric Characteristics of Children with Reading Difficulties Who Report a Benefit from Coloured Filters
- (i) The Magnocellular Defect of Dyslexics

(j) Visual Defense or Facilitation Processes Favoured by Alarming or Playful Colours

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Literature

(the following abstracts were provided by the authors)

A Chromatic-cancellation Property of Human Pupillary Response
Eiji Kimura and Rockefeller R.S. Young
Vision Res., **36**, 1543-1550, 1996

The pupil exhibits a response property somewhat analagous to perceptual red-green cancellation. Across a limited range of flash intensities near threshold, pupillary constrictions evoked by red flashes can be reduced, if not nulled, by the simultaneous addition of a green flash. The percentage of trials on which a stimulus-evoked response can be correctly discriminated from noise also falls to chance level as a green flash is added to the red flash. In terms of the quanta absorbed by L and M cones, the cancellation can be modeled as a function of $(.65 \times L - M)$.

Predominant affection of the blue cone pathway in Parkinson's disease

B. Haug, R. Kolle, C Trenkwalder, W. Oertel and W. Paulus
Brain (1995), **118**, 771-778

Luminance contrast sensitivity and colour contrast thresholds were determined in 26 Parkinson patients and 17 normal controls of comparable age. Stimuli consisted of Gaussian enveloped luminance modulated or colour modulated (protan or tritan axis) vertical sine wave gratings with a spatial frequency of 1 cycle/deg. Consistent and significant differences between normals and patients were found for tritan stimuli. Protan stimuli were much less apt to detect differences between the groups. We conclude that the retinal deficit of dopamine in Parkinson's disease is reflected in diminished center/surround inhibition and that these changes are primarily apparent when vision is tested along the tritan axis, because blue cones are sparsely distributed.

Adaptive Evolution of Color Vision Genes in Higher Primates

S-K Shyue, D. Hewett-Emmett, H. Sperling, D. Hunt, J. Bowmaker, J. Mollon and W-H Li
Science (1995),**269**, 1265-1267

The intron 4 sequences of the three polymorphic alleles at the x-linked color photopigment locus in the squirrel monkey and the marmoset reveal that the alleles in each species are exceptionally divergent. The data further suggest either that each triallelic system has arisen independently in these two New World monkey lineages or that in each species at least seven deletions and insertions (14 in the two species) in intron 4 have been transferred and homogenized among the alleles by gene conversion or recombination. In either case, the alleles in each species apparently have persisted more than 5 million years and probably have been maintained by overdominant selection.

Appendix

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