DALTONIANA

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ICVS

Officers

ICVS 2022 Symposium Highlights

After a one-year pandemic hiatus, the Society was treated to a memorable scientific get-together in Heraklion Crete, 1-5 July 2023.

◊ Paul Martin, University of Sydney, delivered the Verriest Medal Lecture, *Pathways to Colour in the Eye and Brain.*

◊ Professor Karl Gegenfurtner, Giessen University, presented an invited lecture on *Colour from Pixels to Objects.*

◊ Dr. Stella Katsarou, Hellenic Ministry of Culture, Athens, presented an invited lecture on *Colour in Greek Prehistory.*

◊ Dr. Sophia Sotiropoulou, Foundation for Research and Technology, Heraklion, delivered an invited lecture on an *Analytical Approach to Cultural Heritage Polychromy.*

◊ The Optica poster prize was awarded to Dylan Watts, University of Sussex.

◊ The Robert WG Hunt award from the Colour Group of GB went to Ian Pennock, University of Sussex.

◊ The ICVS prize for best poster given by a travel awardee went to Carlo Martins Gaddi, University of São Paolo, and for the best talk by an awardee went to Megan Vaughan, University College, London.

◊ Neil Parry and Sérgio Nascimento were elected to serve four-year terms as Treasurer and General Secretary, respectively.

◊ On behalf of the Society, John Mollon repeated his thanks to Thanasis Panorgias and his colleagues for a superbly and flawlessly run symposium, a symposium in the best traditions of the IRGCVD and ICVS.

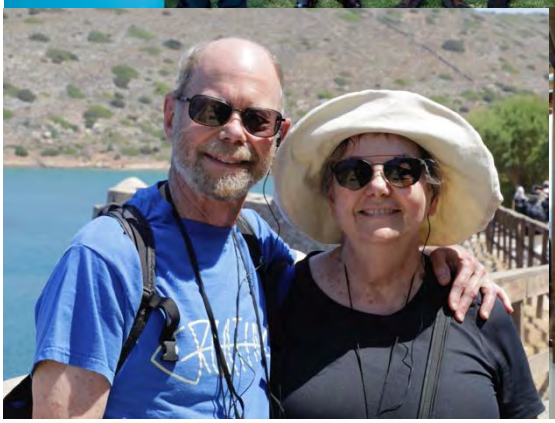
Contents

ICVS 2022 – Crete (Friday, 1 July – Tuesday, 5 July)

2022 Symposium Report (from Thanasis Panorgias)
Number of registrants: 87
Regular: 59, Students: 24, Invited: 4 (including Verriest Medallist)
Domestic: 3, Foreign 84
Number of presentations: 68 (oral, 53; poster, 15)
Support and sponsors: Optica, Cambridge Research Systems, Colour Group (GB)

Additional photos may be downloaded from: https://photos.app.goo.gl/jWujssnoXLqSwKng9


July 1-5 2022
Heraklion, Greece
ICVS 2022











Colour Naming in Ancient Greece

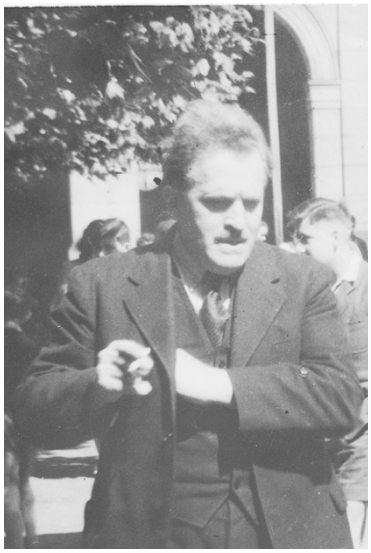
Abstract: *There is little doubt that ancient Greeks shared the same colour vision as our own. However, they expressed their perceptions and feelings of colours differently, not by solely relying on optical experiences based on the chromatic spectrum. For the Greeks the most important element appeared to be light. Colours modulated light perception depending on the brightness and intensity of their sources. Charles Mugler, a recognized academic in ancient languages and mathematician, published an extensive "Historical Dictionary of the Optic Terminology of the Greeks". He found no fewer than 18 adjectives for colours throughout his Greek literature investigations. Each of the colour denominations he found could be described as having different shades and could correspond to a given object or a certain condition of illumination. This explains the extraordinary richness of colour denomination by the ancient Greeks in comparison to our current colorimetric vocabulary.*

Sitting in Heraklion during the 26th symposium of the International Colour Vision Society inevitably brought up conversations about colours as named by the local inhabitants in ancient Greece. Our local hosts were and are undoubtedly the best experts regarding this topic. I would however wish to share my own views on the subject despite not being myself an expert philologist.

The colour vision of ancient Greeks brought much confusion to philosophers and scientists of the XVIII and XIX centuries. Some authors were surprised by the small number of colours mentioned, limited in Homeric poems to white, red , black and yellow without any mention of blue and green. On the contrary, others were impressed by the great variety of named colours. For some, colour vision of the ancient Greeks was defective, inferior to ours somewhat like a dyschromatopsia or even colour blindness (Gladstone, Nietzsche) [2]. Others, on the contrary, noted the extraordinary richness of the Greek vocabulary for colours in the philosophical, literary and scientific texts, even though their expression was very different to ours. (Goethe) [2,6]. Since the discovery of painted funeral sculptures during the second half of the XX century, no doubt remains that the ancient Greeks shared the same colour vision as all humans and primates of the old world. They did not however classify colours based on colorimetry such as introduced by Newton.

The Historical Dictionary by C. Mugler

Coincidently, one of my High school teachers in Strasbourg happened to be a renowned academic in the field of ancient languages, and more specifically ancient Greek as well as an excellent mathematician. Charles Mugler (born 1896) published several papers and books on Greek literature and sciences, among which is an extensive "Historical Dictionary of the Optical Terminology of the Greeks" (1964) [3,4].

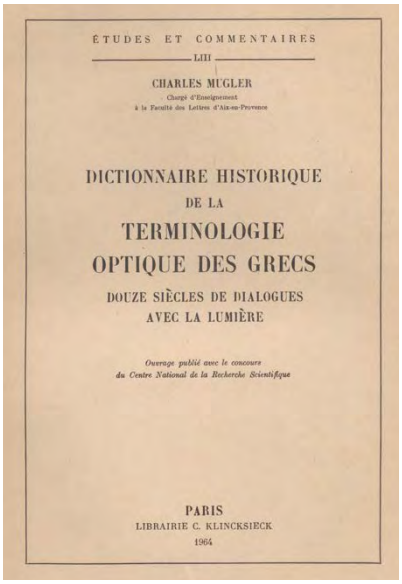


C. Mugler

The historical Dictionary by C. Mugler totals 459 pages (fig. 2). It makes an alphabetic inventory of the optic terms found in the ancient Greek literature. All terms are translated into four languages, Latin, French, English and German. Each term is characterized from a linguistic viewpoint and explained; its origin is mentioned in the French translation.

C. Mugler denominates at least 67 terms suggestive of colour perception. All colours however are named by a suitable substantive but for one exception, blue ισατις (isatis). The generic term χρομα (chroma/colour) is common. It defines in ancient Greek the colour of objects and subjects, with their verbal derivatives χρωζειν, χρωνυειν (to colour), χρως (colour). It reappears today in many modern languages as chromato ...gram, ...graphy, ...psia.

C. Mugler also found 18 adjectives for colours. The first syllable of them qualifies a colour with their masculine ending in ος (os) and indicates the shade of the colour of an object [3]. All other terms suggesting a colour sensation are indicated by qualifying compound words. The first syllable indicates the colour which is suggested by the object or action specified by following and last syllables. The number of terms is impressive: five colour adjectives become differentiated in multiple shades, nine for red, eleven for purple, twelve for white and gray, and nine for black. Eleven adjectives express the shades of blue to green and finally four for yellow. Moreover, some shades may be uni, bi, tri or multicoloured, or express rainbow colours. Each unique term describes the mode of being, becoming, acting and its induced colour shade. The ancient Greeks expressed their visual interpretation, among other characteristics with this rich vocabulary of colour shades.


ÉTUDES ET COMMENTAIRES
LIII
CHARLES MUGLER
Chargé d'Enseignement
à la Faculté des Lettres d'Aix-en-Provence
DICTIONNAIRE HISTORIQUE
DE LA
TERMINOLOGIE
OPTIQUE DES GRECS
DOUZE SIÈCLES DE DIALOGUES
AVEC LA LUMIÈRE
Ouvrage publié avec le concours
du Centre National de la Recherche Scientifique
PARIS
LIBRAIRIE C. KLINCKSIECK
1964

Consequently, the colour vision experience of ancient Greeks was most likely as refined as ours today, if not more. Their sensation of colour was however expressed in another fashion to our contemporary perception.

For the Greeks, the most fundamental vital element was not air but light as source and origin of life [2]. It depended on cosmic and meteorological phenomena. Light was emitted instantaneously, spreading straight from its source, diffusing, reflecting, refracting and piercing. At the same time, it was believed living beings saw the objects by radiating light out of their own eyes towards the object as probably suggested by the look.

Above all, colours were about life and light. The luminous impressions were modulated in fine-shades of colours according to the sense of luminosity, the quality gradation of lightness (perceived reflectance), brightness (perceived transient luminance), clearness and action of the light. They were rendered by subjective colour sensations. Therefore, the ancient Greeks did not name colours as a purely descriptive concept but as a global concept in its own right. Hence, their colour sensation couldn't only be described by words. They were, in fact, a human experience and not just a physical optical one alone, i.e. human colours, white, black, yellow and red, contrary to the colours of nature blue and green.

The colours were named in subjective comparisons with objects of reference. They represented the feeling of something else. The colours corroborate the meaning of an expression. Thus, the adjectives μελας (melas / black) and λευκος ((leukos /white), mean darkness and light ; their mixture resulting in the creation of colours. The term ερυθρος (eruthros / red) denotes every form or action of red. The term ξανθος (xanthos / yellow) from yellow to red and grey green, is a warm colour such as that of ripe grain or lighting at dusk. The term πορφυρυς (porphyrus / crimson) means a restless, bubbling up colour of purple to blue. The term κυανεος (kuaneos / blue) is a colour from azure to dark red and blue. The term γλαυκος (glaukos / glaukom) means shining, streaming with light, lightening, whitish as well as sky-blue, sea-blue, grey-green like the lower aspect of an olive leaf, like Athena's eyes, and ...like corneas of children suffering from congenital γλαυκομα (glaucoma) [1].

Experiencing colours as well as vision as a wholesome perception gives a person the ability to grasp the vital value of a given situation and creates meaning for whoever expresses himself. It constitutes a vital means of communication with the world which makes it present to him as the place of his life. It unites the perceiving subject with his environment [5,6]. The feeling of colours as an element of real life by the ancient Greeks is an extraordinary lesson of life for us today.

Conclusion: The ancient Greeks did not know about colorimetry. The approach of their rich wording of colours was subjective. They were aware that colours are manifold, variable, changing, unsteady finely-shaded, depending on the lightness and the brightness of the ambient light atmosphere, on the illumination of the subject or object on the subject or object itself. They saw colour as we do but expressed their feelings of it in a very different manner.

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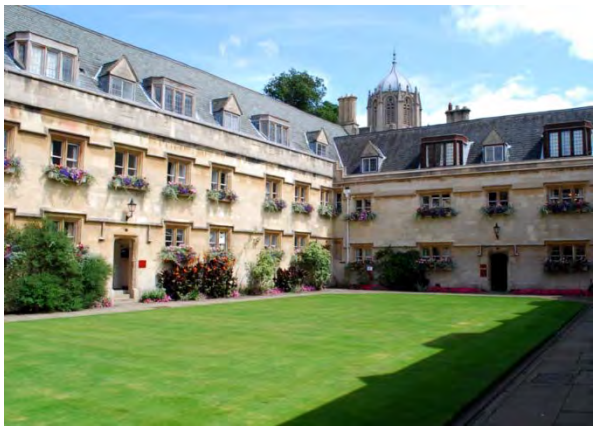
ICVS Summer School 2023



The Board of Directors approved a plan to host a summer school in 2023 at Pembroke College of the University of Oxford. The organizing committee for the School will include Hannah Smithson, Neil Parry, David Brainard and Allie Hexley. Lectures, labs and discussions will be held in the Department of Experimental Psychology. Further details will be announced early next year.

ICVS Symposium 2024

The 2024 ICVS Symposium will be held in Ljubljana, Slovenia, centrally located in Old Europe from 4-9 July. The main organizer will be Manca Tekavčič Pompe. The center of Ljubljana can be reached from its international airport Jože Pučnik (20 min. ride) as well as some airports located in neighbouring countries, e.g. Venice, Klagenfurt, Trieste, Zagreb and Graz (up to 2 hours' ride). CD Congress Centre Ljubljana organises individual transport to/from all said airports in arrangement with the participants. Further details will follow in due course.

Venice	240 km
Salzburg	300 km
Vienna	375 km
Munich	400 km
Budapest	570 km
Milan	500 km
Rome	750 km

Slovenia (and Ljubljana) was in 2014 proclaimed Lonely Planet's Best Place in Europe and one of Europe's most idyllic places to live by Forbes in 2008. Ljubljana is already one of Europe's greenest and most livable cities, boasting a friendly café culture by day, and vibrant nightlife after the sun sets. Slovenia is as picture-perfect as Switzerland but much easier on the wallet.

New Board Members Elected

The terms of half the Board ended at the close of the ICVS meeting in Heraklion, Greece. The newly elected Board members chosen through our online election were: Jenny Bosten, Jan Kremers, Galina Paramei, Keizo Shinomori and Jack Werner. In addition, Manca Tekavčič Pompe joins the Board by virtue of being the 2024 Symposium organiser. Continuing Board memberes are: Paul Martin, Yoko Mizokami, Maureen Neitz, Hannah Smithson, and Michael Webster.

Honorary Membership

Dora Selma Fix Ventura was elected to honorary status by unanimous vote at the General Business meeting in Crete. She is a professor in the Department of Experimental Psychology at the University of São Paulo. Dora was a stalwart at the ICVS meetings and co-organized the 19th ICVS Symposium in Belém. She has been an outstanding scholar in colour vision research for more than 50 years. Dora was often accompanied by students and young scientists from South America to ICVS Symposia, and her support for women in science is laudatory. She brought the Clarence Graham standards and traditions from Columbia University to a continent that did not previously have a significant presence in our field. Her own research covered a number of topics in colour science, but most often was concerned with acquired deficiencies of colour vision. Professor Ventura has published approximately two hundred papers, consistently contributing to the understanding of the physiological, structural, and more recently, molecular mechanisms involved in visual processing and chromatic discrimination. Dora is a member of the Brazilian Academy of Science and holds the Grand Cross of the National Order of the Scientific Merit.

Colour: Art, Science & Power

An exhibition, Cambridge Museum of Archaeology and Anthropology, until 9 April, 2023. Entry free. Closed Mondays.
Click for museum link

It rather regularly occurs to the curators of museums, and to the directors of galleries, that *Colour* offers a convenient theme to draw together miscellaneous objects or paintings. An exhibition of this genre has just opened in Cambridge, UK, and has assembled objects from several other Cambridge museums and libraries. It begins with some (fairly accurate) material on the physics of colour and on colour vision (although oddly, Maxwell's colour-matching disc and Rayleigh's anomaloscope, from the Cavendish Laboratory, are omitted). An anecdotal report that Edward Wilson, the Antarctic explorer, enjoyed absolute colour memory provides an excuse to show four of his watercolours.

There is a strong section on pigments, both those that have been costly and labour-intensive to produce, and the cheaper, artificial ones that were the product of nineteenth-century chemistry. We learn that laundry cubes of Reckitt's blue provided a convenient pigment for indigenous artists in Africa and the Pacific. The power and authority of colour is illustrated by the restriction of particular colours to political elites. Some splendid copes and headdresses have been drawn from the ethnographic collections. One section is devoted to polychromy of statues in the classical world: The suggestion is made that the traces of paint that survive today may indicate only a delicate colour wash that preserved the translucency of fine Parian marble. In keeping with our times, the exhibition ends with sections on skin colour and on the rainbow as a symbol of diversity. A print of 'Identity' by Emma Amos (2006) offers a lovely example of a perceptually ambiguous image.

The colour scientist will find this exhibition a bit of a jumble, but it's an interesting and visually attractive jumble. If you are in Cambridge in the coming months, it is well worth seeing; but probably, much as Johnson said of the Devil's Causeway, it is not worth going a distance to see.

John Mollon

Obituary for Barry Cole (1934 - 2021)

Graduating in 1954, Barry Cole followed his father into Optometry but chose the academic route. He spent time in private practice, then at the London Refraction Hospital, the School of Optometry, Indiana University and the College of Optometry, Ohio State University. In 1958 at the age of 24, Barry was the first full-time lecturer at the Victorian College of Optometry. He fought to have optometry recognised as a four-year degree course. This was achieved in 1962 with affiliation of the College to the University. In 1973, the Department of Optometry, University of Melbourne was created and the Department took over the teaching. The clinic remained as part of the College. Barry became a Reader and the first Head of Department. He was appointed the Foundation Professor of Optometry in 1978.

Courtesy of Australian College of Optometry

Barry had also established a research program and played a pivotal role in the establishment of the National Vision Research Institute in 1973. When Australian Optometry chose to go down the road of accreditation in the early 1990s, Barry wrote the first accreditation guidelines.This facilitated the national registration of Optometrists and became vital as the number of Optometry schools rose from 3 to 7. For many years he chaired the Editorial Board of *Clinical and Experimental Optometry*, the Optics and Radiometry Accreditation Advisory Committee of the National Association of Testing Authorities and Standards Australia Committee CS-053 Sunglasses.

Few writers pay appropriate tribute to his extensive contribution to colour vision, particularly in the occupational and practical aspects. He was active in the CIE and was on the committees that wrote CIE 2.2 1975 Colours of light signals and CIE 39-2 1983. Recommendations for surface colours for visual signalling and ISO 16508:1999/CIE S 006-1998 Road Traffic Lights – 200mm Roundel Signals Photometric Properties. He chaired the CIE committee that wrote CIE TR 143:2001. International recommendations for colour vision requirements in transport.

He published approximately 60 papers and reports addressing colour vision and a further 13 concerned with conspicuity, in which colour has a role, out of a total in excess of 120. He authored papers at the Annapolis (1987), Sydney (1991), Tübingen (1993) and Pau (1995) meetings of the, then, IRGCVD.

To pick out highlights in his publications is hard but I would include: Henry, Cole and Nathans (1963), The inheritance of congenital tritanopia with the report of an extensive pedigree, *Ann Hum Genet*. This was later followed by Smith, Cole and Isaacs (1973), Congenital tritanopia without neuroretinal disease, *Invest Ophthalmol Vis Sci*. Prior to these papers, it had been proposed that tritanopia was actually a manifestation of Dominantly Inherited Juvenile Optic Atrophy. The paper by Cole and Brown (1966), "Optimum intensity of red road-traffic signal lights for normal and protanopic observers, *JOSA* (1966), is representative of a number of papers on traffic signals that formed the basis of ISO 16508:1999/CIE S 006-1998.

There are numerous papers with Algis Vingrys on colour vision and aviation with particular reference to lantern tests. An exchange of letters in *Clin Exp Optom* on protans and driving safety between Barry, Vingrys and Wolfe is classic, in Barry's choice of words. Wolfe had taken exception to Algis likening the risk of a road accident for a protan being much the same as having a breath alcohol level of 0.05.

There were many papers on the practical and occupational consequences of colour vision deficiencies including one about William Harold Ponsford (1900 –1991), a famous Australian cricketer, who was reputed to have a colour vision deficiency. CVDs are generally considered problematic in cricket given the red ball on green grass.

Barry was always the best of mentors, he always had time and you always had his full attention. Barry also had a generosity of spirit in acknowledging others. The Australian College of Optometry clinic building in named in his honour. He is certainly one of the fathers of modern Australian Optometry. His last publication was a book on the history of Optometry in Australia.

In the field of the practical and occupational consequences of colour vision deficiencies, there can be few, if any, with a more extensive contribution.

Stephen Dain

Obituary for Arne Valberg (1938 - 2022)

We are saddened to note the passing of Arne Valberg from the Department of Physics at the University of Trondheim in Norway. In addition to his commitments to the technical side of colour vision, Arne was strongly interested in the functional aspects of colour processing using both psychophysical and electrophysiological methods.

Photo courtesy of Rune Valberg

After his physics degrees at the University of Oslo and the University of Basel, he worked in the laboratory of Karl Mischer on colour metrics. His first paper from there was on colour discrimination (*Nature,* 1969). Later, his doctoral thesis (1974) provided data for the suggestion that we are more sensitive to a percept mediated by colour induction than to the physical stimulus itself. He subsequently worked with Robert Boynton in San Diego and, together with Brian Tansley, showed that minimally distinct borders resembled a tritanopic purity function (*JOSA*, 1977).

Whilst keeping a base in Oslo, he worked with Bruno Breitmeyer and Lothar Spillmann in Freiburg (1974–80) in the Neurological Clinic, studying the psychophysical correlates of the 'periphery' or 'shift' effect (*Science,* 1979). In Oslo, he set up a goldfish laboratory with Thorstein Seim and Borgar Olsen for retinal studies. He made frequent visits to the laboratory of Otto Creutzfeld at the Max Plank Institute for Biophysical Chemistry in Göttingen. From 1981-1991, he had productive collaborations with Barry Lee, Jan Kremers, Paul Martin and David Tigwell among others. Some of their results were first published in the proceedings of the colour vision meeting held in Cambridge (*Colour Vision, Physiology and Psychophysics*). Efforts in the Göttingen lab were later buttressed by Vivianne C. Smith, Joel Pokorny and Peter K. Kaiser. He used electrophysiological responses of retinal ganglion cells in macaque to model the Bezold-Brücke hue shift, colour discrimination and colour scaling (with Seim, Lee and Tryti, *JOSA*, 1986).

Arne joined the Norwegian University of Science and Technology in Trondheim as Professor of Vision Science in 1991 and in 1993 became Professor of Biophysics and Vision Science at the University of Oslo. In Trondheim, he established close collaborations with Tambartun, a national center for the visually impaired. He also took the initiative to develop a cross-faculty interdisciplinary program in neuroscience. This was the foundation of what today has become the Kavli Institute for Systems Neuroscience in Trondheim. He was also an inspiration to and supporter of the National Centre for Optics, Vision and Eye Care that was established at the University of South-Eastern Norway in Kongsberg (2015), with strong support for clinical studies.

Arne participated in meetings in this Society (both as IRGCVD and of ICVS). He presented a paper at the meeting of the IRGCVD in Ghent (1997) on luminance and chrominance in natural viewing. Together with Seim, he published in the proceedings of our Symposium held in Sydney (1991), showing that simulation of cataract reduces chromatic contrast sensitivity very much less than luminance sensitivity.

Arne organized a number of influential meetings, most importantly in Røros, with Barry Lee. The theme of the meeting was 'neurons in search of perceptual phenomena' and the resultant book published by Plenum in1991 was titled *From Pigments to Perception.* In 2005 he published the English version of his 1998 book, *Light Vision Color* (Wiley and Sons). Arne received the Deane B. Judd award from the Association Internationale de la Couleur (AIC) in 2009. As well, he was a Fellow of the Optical Society of America, and very active in other international settings, such as the Commission Internationale d'lEclairage (CIE) and the AIC.

Rigmor Baraas, Jan Kremers and Barry Lee

All members are welcome to contribute to *Daltoniana.* Past issues may be accessed via www.icvs.info. Along with the Society's published Proceedings, they provide an historical record of many major advances in the field of colour vision.