



COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION



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CIE - **UK** * CIE - **USA**

LIGHTING QUALITY & ENERGY EFFICIENCY

An international conference with this title was organized by the CIE in Vienna from March 14-17, 2010. Our motivation for doing this was as follows.

Lighting consumes on average nearly 20% of global electrical energy and is thus a significant factor in current regulatory and other programs to reduce world-wide energy consumption. The CIE is the oldest and most prestigious international organization dealing with light and lighting and has published under its name all the significant basic international standards dealing with light, optical radiation and colour. It is therefore logical that the CIE should want to play an appropriate role in international, regional and national efforts to reduce the electrical power consumption attributable to lighting.

This desire is motivated not only by the vast technical expertise in lighting that our organization can bring to the table for this endeavour, but also by our concern that proposed solutions should try to achieve their energy efficiency targets without sacrificing lighting quality and lighting's contribution to the safety, security, productivity and health of the population. The CIE feels strongly that modern developments in light sources, control gear, day-lighting and technology in general make it possible to achieve this dual goal. It is, however, concerned that this will only happen if all relevant players, including the CIE, are involved in this effort.

Since good intentions are not enough by themselves to bring about this desired goal, the CIE Board decided in late 2008 to organize a Conference on this topic in Vienna during early 2010. This decision went hand in hand with our ongoing reorganization of the CIE into a non-profit part (the traditional CIE of old) and a for-profit part called CIE Scientific Services Limited, in which the non-profit, traditional CIE has a 100% shareholding. The for-profit part is concentrating on organizing conferences and developing educational offerings relevant to the traditional CIE, but on a fully professional basis, in order to strengthen the financial base of its counterpart.

This reorganization of the CIE was not only done due to strategic and financial reasons, but also to

- comply with the regulations governing Associations under the revised Austrian Association law, under which the CIE operates in Austria, the country where it is registered AND
- protect the tax-exempt status of the traditional CIE in a clean and legally acceptable manner. The chosen route of a split into a non-profit, tax-exempt entity and a for-profit, taxed entity is one that had already been chosen by other international organizations based in Austria and was thus recommended to the CIE by its legal and financial advisors.

IN THIS ISSUE

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The international conference on “Lighting Quality and Energy Efficiency” was thus the first major conference to be organized by the CIE Scientific Services Limited. Although it only just managed to break even financially, it nevertheless made a big impact for the CIE in other respects:

- ? It brought together over 330 participants from 42 countries.
- ? There were 10 invited speakers, 66 conference papers, 8 workshop papers and 62 posters.
- ? Most of the participants were from outside the traditional CIE community and included international organizations, national and regional legislators and regulators, energy efficiency experts, architects, city planners etc.
- ? The hits on the CIE website doubled since the announcement of the conference.
- ? It produced Conference Proceedings, which will hopefully become an important background and reference document on the lighting aspects of national and regional energy policies.
- ? It established a first “product” for the CIE Scientific Services Limited, which intends to hold further conferences under this title in future at regular intervals, at different venues and on different continents.

The conference program spanned three days from Monday, March 15 to Wednesday, March 17 and the venue was the Vienna Hilton Hotel. Each morning and afternoon session started with a number of keynote addresses by invited speakers and continued after tea with three parallel paper sessions, each being focused on particular topics within the general theme of the conference. The afternoon paper sessions were followed with topical workshops to allow for general interaction amongst the experts in these fields. Posters could be viewed either in parallel with the workshops or in parallel with the sessions on the last day.

The subjects of the various parallel sessions included Efficiency and Quality, Lighting and the Environment, National and Regional Energy Savings Programs, International Energy Savings Initiatives, Colorimetry and Color Rendering, Visual Comfort, Circadian Photoreception/Photobiological Effects, Cost Effectiveness of Lighting Installations, Daylight, Daylight/Light and Safety, Applications, White/Yellow Light, Photometry and SSL, Mesopic Photometry and Outdoor Lighting, LEDs go for Quality, etc.

The workshops on the other hand dealt with

- ? How to integrate energy efficient street lighting systems and equipment in existing installations,
- ? Energy efficient lighting – from a marketplace for ideas to a showcase for solutions,
- ? Beyond the visual: Lighting and quality of life.

Delegates received a full set of papers in electronic form on a memory stick. As usual, the Proceedings will also become available for purchase to other interested parties through our webshop and other distribution channels.

I would like to express my sincere appreciation for the excellent organisation of the event to our hard-working professional staff at the Central Bureau, which is so ably led and motivated by our General Secretary, Mrs Martina Paul. They really did us proud, especially in view of the short time they had to organize this conference and in terms of the high standard in which it was presented. This was evident from the many congratulatory messages received afterwards. I would also like to thank all others who contributed to its success, not least the event management company, the presenters, the many delegates from all over the world and of course our sponsors.

Franz Hengstberger
CIE President

New CIE Members

We are happy to inform you that the following CIE (Associate) National Committees have been approved as new members:

Malaysian CIE National Committee
No. 5-B Jalan Gelugor
Off Jalan Kenanga
55200 Kuala Lumpur
MALAYSIA

CIE Associate National Committee of Singapore
Lighting Association of Singapore
c/o Stellar Corporate Advisory Pte Ltd
100 Jalan Sultan Suite 4
#03-17 Sultan Plaza
Singapore 199001
SINGAPORE

CIE-Taiwan (Associate National Committee)
c/o CMS/ITRI
attn. Hui-Chung Ma
Bldg. 16, 321, Kuang-Fu Road Sec. 2
Hsinchu, Taiwan
TAIWAN, ROC

News from the Divisions

Division 1 – Vision and Colour

<http://www.cie.co.at/div1/>

The following new TC has been established:

TC 1-80: Research Methods for Psychophysical Studies of Brightness Judgements (Chair: Steve Fotios, UK).

Terms of Reference: To report on research methods (both research design and statistical analysis) for psychophysical studies of spatial brightness judgements. The aim is to bring best practices from psychology into the wider awareness of people in the lighting community who wish to use such tools in their own work, to avoid errors that plague the existing literature.

Division 2 – Physical Measurement of Light and Radiation

<http://www.cie.co.at/div2/>

The next meeting of CIE Division 2 will be held in Bern, Switzerland on 1-3 September 2010 in conjunction with the CIE Tutorial and Symposium on "Spectral and Imaging Methods for Photometry and Radiometry".

Division 3 – Interior Environment and Lighting Design

<http://www.cie.co.at/div3/>

The following new TC has been established:

TC 3-50: Lighting Quality Measures for Interior Lighting with LED Lighting Systems (Chair: Martine Knoop, NL).

Terms of Reference: To review relevant CIE publications and standards to evaluate the suitability of existing lighting quality measures when applied to tertiary (commercial) interior light-emitting diode (LED) lighting systems. To identify the gaps and weaknesses in existing quality measures, exhibited in one of two ways: either the criterion is valid, but the evaluation method is not (e.g., colour rendering) or a new criterion needs to be taken into consideration (e.g., overhead glare, binning). 2) To prepare a Technical Report, which will include the findings of the review and recommendations for new lighting quality measures and evaluation methods, as well as suggestions for new research if appropriate quality measures and evaluation methods are missing.

The following TCs have been disbanded:

- ? TC 3-36: The Use of Satellite Images to Derive Daylight Data
- ? TC 3-37: Guide for the Application of the CIE General Sky

Division 4 - Lighting and Signalling for Transport

<http://www.cie.co.at/div4/>

The next meeting of CIE Division 4 will be held in Vienna, Austria on 5-9 September 2010 as joint meeting with Division 5.

Division 5 – Exterior Lighting and other Applications

<http://www.cie.co.at/div5/>

The next meeting of CIE Division 5 will be held in Vienna, Austria on 5-9 September 2010 as joint meeting with Division 4.

Division 6 – Photobiology and Photochemistry

<http://www.cie.co.at/div6/>

The next meeting of CIE Division 6 will be held in Providence, Rhode Island, USA on 14 June 2010 in conjunction with the 35th Meeting of the America Society for Photobiology.

Division 8 – Image Technology

<http://www.cie.co.at/div8/>

New CIE Publications

CIE Draft Standard

ILV: International Lighting Vocabulary

CIE DS017.2/E:2009

CIE has published Draft Standard CIE DS 017.2/E:2009 ILV: International Lighting Vocabulary.

It is an update and extension of the contents of the 4th Edition of the International Lighting Vocabulary, which was a joint publication of the CIE and the IEC (International Electrotechnical Commission) and provided definitions of some 950 terms related to light and lighting. The terms and definitions of this publication have been completely reviewed. In addition, a large number of new terms and definitions have been introduced.

The aim of this Draft Standard comprising some 1500 terms and their definitions is to promote international standardization in the use of quantities, units, symbols and terminology in this field.

CIE DS 017.2/E:2009 ILV: International Lighting Vocabulary has been approved by the Board of Administration of the CIE. It comprises 196 pages and

presents the definitions of nearly 1500 terms related to light and lighting.

The Draft Standard has been sent to CIE National Committees for comments and sales to interested parties. It is still subject to changes and may not yet be referred to as a CIE Standard. When approved by the CIE NCs, it will be published as a CIE Standard and later on as a joint ISO/CIE standard.

The price of this Draft Standard is EUR 40,- (Members of the CIE National Committees get 50 % discount).

Joint ISO/CIE Standard

Colorimetry - Part 5: CIE 1976 $L^*u^*v^*$ Colour Space and u', v' Uniform Chromaticity Scale Diagram

ISO 11664-5:2009(E)/CIE S 014-5/E:2009

This CIE Standard specifies the method of calculating the coordinates of the CIE 1976 $L^*u^*v^*$ colour space including correlates of lightness, chroma, saturation and hue. It includes two methods for calculating Euclidean distances in this space to represent the relative perceived magnitude of colour differences. It also specifies the method of calculating the coordinates of the u', v' uniform chromaticity scale diagram.

The Standard is applicable to tristimulus values calculated using the colour-matching functions of the CIE 1931 standard colorimetric system or the CIE 1964 standard colorimetric system. The Standard may be used for the specification of colour stimuli perceived as belonging to a reflecting or transmitting object, where a three-dimensional space more uniform than tristimulus space is required. This includes self-luminous displays, like cathode ray tubes, if they are being used to simulate reflecting or transmitting objects and if the stimuli are appropriately normalized. The Standard, as a whole, does not apply to colour stimuli perceived as belonging to an area that appears to be emitting light as a primary light source, or that appears to be specularly reflecting such light. Only the u', v' chromaticity diagram defined in Section 4.1 and the correlates of hue and saturation defined in Section 4.3 apply to such colour stimuli.

The price of this standard is EUR 38,- (Members of the National Committees of the CIE get 50% discount).

Chromatic Adaptation under Mixed Illumination Condition when Comparing Softcopy and Hardcopy Images (Including Erratum 1)

CIE 162:2010

ISBN 978 3 901 906 82 4

The chromatic adaptation transforms used in most colour appearance models assume that observers are fully adapted to a given set of viewing conditions. Unfortunately, the condition of complete chromatic adaptation usually does not occur in the consumer market and in more casual industrial use. Instead, these users tend to view softcopy in a room with sufficient ambient illumination to allow comfortable viewing and examination of hardcopy imaging. Further, users often desire to compare hardcopy and softcopy images using rapid successive binocular observations. The focus of this report is to determine how colour imaging experts can best accommodate the desires and practices of these more casual observers. It shows that accounting for mixed and incomplete chromatic adaptation produces more accurate results in colour appearance than not accounting for them. It includes a mathematical model for chromatic adaptation and provides appropriate parameters for the chromatic adaptation model under such viewing conditions.

This publication corrects and replaces CIE 162:2004 "Chromatic Adaptation under Mixed Illumination Condition when Comparing Softcopy and Hardcopy Images".

An Erratum is included that shows a corrected version of Equation 6.13 and a corrected Annex.

This Technical Report consists of 26 pages with 5 figures and 2 tables. The price of this publication is EUR 44,- (Members of the CIE National Committees get 50 % discount).

Reappraisal of Colour Matching and Grassmann's Laws

CIE 185:2009

ISBN 978 3 901906 78 7

The laws of additivity and proportionality of colour matches, Grassmann's laws, are the basis of all colour theory, but are not axiomatically true. The extent of departure of human vision from Grassmann's laws has been periodically examined. One exploration, by W. A. Thornton, found considerable failure of transformability of primaries - a symptom of Grassmann additivity failure. In the 14 years since Thornton's finding, several groups have formed to replicate and understand Thornton's results and the limitations of Grassmann's laws. CIE TC 1-56 is the latest of these. During the ten years of this committee's existence, statistical simulations

indicated that replicate matches by the same observer (not present in Thornton's data) are required to suppress random errors, and accordingly three laboratories generated intra-observer matching results in three different luminance domains. Two of the studies, respectively conducted at 300 cd·m⁻² and 30 cd·m⁻², confirm Grassmann additivity, but the third study shows failure of additivity at 3 cd·m⁻². In addition, Maxwell and maximum-saturation colour matches have long been known to be inconsistent even at high luminance levels and with intra-observer match replication to suppress noise. A practical consequence of the failure of additivity could be problems observed in cross-media colour matching, although cross-media studies also have other well known sources of imprecision when the colour-matching is asymmetric. Some suggestions are made for a covering theory of Grassmann's laws that might accommodate both Maxwell and maximum-saturation match data while still maintaining consistency with high-luminance success in experiments such as reported recently. Further investigations are indicated for a successor to TC 1-56.

This Technical Report consists of 20 pages with 3 figures. The price of this publication is EUR 38,-- (Members of the National Committees of the CIE get 50% discount).

UV-A Protection and Sunscreens

CIE 186:2010

ISBN 978 3 901906 80 0

CIE Technical Committee TC 6-24 was formed in 1992 due to the importance of the deleterious effects associated with exposure to UV-A radiation and because of a lack of existing guidance/regulations on tests for UV-A protection. The objective was to arrive at an international consensus on such tests. By 1997 the committee had identified one *in vivo* method worth pursuing, i.e. Persistent Pigment Darkening, and several *in vitro* methods that had not yet been validated. It was not possible to reach a consensus at that time, however. In the meantime the development of methods to assess UV-A protection continued and is still on-going, especially on *in vitro* methods. Furthermore, the computer-aided calculation of sunscreen performance - referred to as *in silico* - became more sophisticated and useful. Rather than trying to find a consensus on sunscreen testing the objective of the reactivated TC 6-24 has now been reduced to giving, in the form of a Technical Report, a comprehensive overview as well as an assessment and ranking of the UV-A methods currently under discussion. This report starts with the general principles of UV protection and an overview of UV-A and broad-spectrum UV filters. Then a description and assessment of *in vivo*, *ex vivo*, *in vitro* and *in silico*

methods is given.

This Technical Report consists of 56 pages with 13 figures and 10 tables. The price of this publication is EUR 56,-- (Members of the CIE National Committees get 50 % discount).

UV-C Photocarcinogenesis Risks from Germicidal Lamps

CIE 187:2010

ISBN 978 3 901906 81 7

Increasingly, UV-C (100 nm – 280 nm) mediated air disinfection (principally 254 nm radiant energy from low-pressure mercury lamps) is being used as a building environmental control to provide human protection from transmission of airborne pathogens such as tuberculosis bacteria, influenza viruses and other aerosolized agents. Some uses of UV-C energy require direct exposure of the volume room air in a horizontal plane directly above the heads of occupants. In these settings there is the potential of reflected or scattered UV-C radiation that could result in human exposure. Known side effects of overexposure to UV-C radiation include transient corneal and conjunctival irritation (photo-keratoconjunctivitis) and skin irritation (erythema), which disappear within a 24 – 48 hour period, not currently known to produce lasting biological damage. The ACGIH and ICNIRP threshold limit for 8 hour continuous exposure to UV-C radiation at 254 nm is 6 mJ·cm⁻² (60 J·m⁻²), and proper installation of well engineered UV-C systems meet this criteria. However, there have been incidents of poor installations resulting in accidental UV-C overexposures. General statements that all UVR is carcinogenic have raised safety concerns of open air UV-C systems. Although, from basic biophysical principles, UV-C radiation is carcinogenic for the same reason that it is an effective germicidal agent, the attenuation provided by the stratum corneum and epithelial tissues of the skin greatly reduces the risk relative to UV-B radiation. UV germicidal irradiation can be safely and effectively used for upper air disinfection without a significant risk for long term delayed effects such as skin cancer.

This Technical Report consists of 23 pages with 7 figures and 1 table. The price of this publication is EUR 44,-- (Members of the CIE National Committees get 50 % discount).

Performance Assessment Method for Vehicle Headlighting Systems

CIE 188:2010

ISBN 978 3 901906 84 8

This report has been produced to meet the need for a standardised, accurate and reliable method of

assessing the photometric performance of vehicle headlights. It considers the requirements of headlight performance in terms of road scene illumination and limitation of glare, and the assessment of performance in terms of lane guidance and the detection of pedestrians and objects. The work undertaken to define the assessment method is summarised along with the results of the validation testing. A standardised photometric assessment method and calculation procedure for use by manufacturers and assessment organisations is provided.

This Technical Report consists of 86 pages with 85 figures and 8 tables. The price of this publication is EUR 72,- (Members of the CIE National Committees get 50 % discount).

Selected Papers of the Light and Lighting Conference with Special Emphasis on LEDs and Solid State Lighting

27-29 May 2009, Budapest, Hungary

CIE x034:2010

ISBN 978 3 901 906 79 4

In May 2009 the Light and Lighting Conference took place in conjunction with the CIE Midterm Meeting. The conference dealt with all aspects of light and lighting, with special emphasis on LEDs and Solid State Lighting, covering vision and health as well as the measurement of these modern devices and their application.

From the large number of oral and poster presentations in the scientific program of the conference 24 papers were selected by CIE experts for this CIE publication. These selected papers cover the whole range of the conference topics, i.e. latest achievements obtained in light and lighting, their consequences in photometry and colorimetry, their health aspects, and applications, both indoor and outdoor.

This publication consists of 186 pages with 150 figures and 64 tables. The price of this publication is EUR 72,- (Members of the CIE National Committees get 50 % discount).

Proceedings of CIE 2010 "Lighting Quality & Energy Efficiency"

**14-17 March 2010, Vienna, Austria
(including Addendum 1)**

CIE x035:2010

ISBN 978 3 901 906 83 1

In March 2010 the Lighting Quality & Energy Efficiency Conference took place in Vienna, Austria. The event gave academics, lighting industry professionals, designers, researchers and representatives of regulatory authorities the opportunity to discuss best practice and the latest developments in the field of light and illumination. Recommendations were also made for reducing the amount of energy used for lighting. One of the hottest topics at the conference was light emitting diodes (LEDs), which offer significant environmental and energy-efficiency benefits compared with conventional light bulbs and energy-saving lamps.

The Proceedings of this Conference include invited papers and contributed papers as well as papers on the poster presentations.

The publication consists of 845 pages including 146 contributions with some 700 figures and 223 tables. CIE x035:2010 is readily available on CD-ROM. The price of this publication is EUR 180,- (Members of the national CIE organizations get 50% discount).

In Memoriam

We grieve for

**Prof. Dr. rer. nat. Dr. h.c. mult
Hans-Walter Bodmann 
1.7.1928 – 1.12.2009**



Hans-Walter Bodmann rendered great service to research and education in the field of applied lighting technology. His dedication regarding the practical implementation of scientific findings in lighting, in national and, above all, in international organizations found its appraisal in 1987 when he became President of the International Commission on Illumination (CIE). The German Lighting Society (LiTG), the work of which Hans-Walter Bodmann supported for more than

50 years, appointed him to their honorary member in 1994.

After his studies of physics and following conferral of a doctorate at the University of Kiel Hans-Walter Bodmann was working for the Philips Research Laboratories in Hamburg and Aachen from 1956 for more than 10 years.

In 1967 he accepted a chair at the University of Karlsruhe where he had the professorship for applied lighting technology and light measurement and the leadership of the Lighting Institute until his retirement in autumn 1993. During this time he served in several academic functions, among others he was dean of the faculty of electrical engineering from 1974 to 1976. During his 26 years of teaching at the faculties of electrical engineering and architecture he was in charge of some 30 doctorates and more than 120 diploma and seminar papers.

His research activities, in which, among others, he dealt with the visual basics in lighting, problems of radiation transfer as well as the relationship between light and the energy balance, are documented in a large number of publications.

Besides that, his technical competency was in demand of many research projects of the Deutsche Forschungsgesellschaft (DFG) and other project executing organizations. National and international scientific journals appreciated his scientific knowledge as editor or correspondent.

It was always of high importance for Hans-Walter Bodmann to transfer scientific findings into practice. This was expressed by his participation in many national and international scientific committees.

Since 1956 he was member of the German Lighting Society (LiTG) where he worked in the Technical-Scientific Committee (TWA) and in the Expert Committee for Interior Lighting. During his 5 years as chairman of the Regional Section Karlsruhe of LiTG he organized the LiTG jubilee conference, which took place in Karlsruhe in 1972. In 1973 he became President of the LiTG. He had a considerable share in the establishment of a joint German speaking conference of the German, Austrian, Swiss, and later also Dutch Lighting Societies, which for the first time took place in Salzburg in 1974.

At the same time he worked in the Standardization Committees of DIN on Lighting (FNL) and Colour (FNF). From 1968 to 1974 he was chairman of the FNF and member of the Advisory Board of FNL and FNF.

From 1957 Hans-Walter Bodmann was member of the CIE and worked as chairman of Technical Committees, as coordinator in the Action Committee and as Division Director. In 1987 he was elected President of the CIE. In negotiations with the International Standardization Organization (ISO) he

achieved the recognition of CIE as an international standardization body and that CIE Standards are published as joint ISO/CIE Standards. Since 1991 he acted as Past President.

Since 1967 Hans-Walter Bodmann was member of the British and North-American Illuminating Engineering Society (IES). From 1974 to 1975 he was member of the Scientific Advisory Board of the Verein Deutscher Elektrotechniker resp. the Elektrotechnische Gesellschaft (VDE/ETG), and from 1984 to 1988 he joined the European Lighting Council (ELC) as a founding member.

Hans-Walter Bodmann received a number of awards for his commitment on international scale:

1992 Granted honorary doctorate of the Faculty for Natural Sciences of the National University of Tucuman, Argentina;

1993 Granted the Walsh-Weston Silver Medal of the Illuminating Engineering Society in Great Britain,

Nomination as honorary member of the University Society for Lighting Technology at the University of Karlsruhe,

1994 Granted honorary doctorate of the University for civil engineering of Bucharest, Romania:

Hans-Walter Bodmann has, through his research and university functions, considerably influenced the development of lighting technology over decades, and, through his activities in national and international bodies, has raised attention to the field of lighting technology.

We will not forget Hans-Walter Bodmann and will cherish his memory.

Yoshihiro Nayatani ✍️ **29.5.1927- 29.5.2009**



Dr. Nayatani was born in Kobe, Japan, on May 29, 1927. He received the B.S. and Dr. Eng. degrees in electrical engineering from Osaka University in 1951

and 1961, respectively. From 1951 to 1980, he was engaged in studying photometry, colorimetry, and human colour perception at the Electro-Technical Laboratory of the Ministry of International Trade and Industry. From 1974 to 1980, he served as the director of the laboratory's Osaka Branch. I first met him when I started to work there after the completion of my Ph.D. degree at Osaka University.

He not only was an able man as the supervisor of all measurement divisions, including the high frequency and radiation divisions, but also an active researcher. I often watched him write research papers on chromatic adaptation and colour harmony at the director's office. He encouraged me to produce achievements in not only colour research but also in the radiation field. This experience of radiation analysis turned out to be extraordinarily useful for my studies of spectral imaging in later years.

He moved to Osaka Electro-Communication University as a professor at the Management Engineering Department after I had already moved to the same university. He taught mainly quality management, his second specialty, to undergraduate students, and to graduate students he mainly taught colour science. He was held in high esteem by the entire university staff because of his excellent abilities in education and research, and his warm and considerate personality. His main research topic at the university was colour appearance modeling. He proposed a nonlinear colour-appearance model, which competed with Dr. Hunt's model. He served as Dean of Faculty of Engineering from 1995 to 1997, and continued to serve in some other important executive positions of the university. He retired from the university in 1998, when he was made professor emeritus.

Dr. Nayatani wanted to spend the remainder of his life as a researcher, even though he had been asked to accept the position of the university's president, as everybody there trusted him fully, including the chairman of the board of trustees. After retirement, his zeal for colour research was not weakened at all; he rather devoted himself to his colour-appearance studies, being relieved from teaching and administration duties. And quite recently he proposed the Nayatani theoretical colour system using three opponent-colours, and also fostered interest in application fields such as colour harmony and colour imaging. I often enjoyed discussions on the presence and future of various colour studies with him by telephone on Saturday afternoons. I am missing him as the Sensei (i.e. master) of my life.

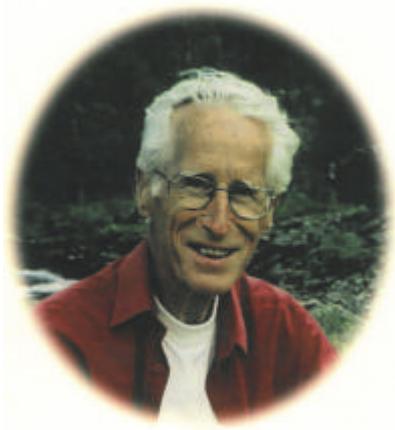
Shoji Tominaga

Dr. Nayatani will be remembered by the community of colour scientists for many valuable contributions to their pool of knowledge. My own association with him

was mainly in the field of models of colour appearance. During the last two decades of the last century we were both busy constructing models that could predict the appearance of colours under various viewing conditions, and we had many opportunities for discussing the problems that we encountered. I remember with much pleasure that Dr. Nayatani was always most gracious and helpful as we discussed our models. One of the outstanding, and very important, contributions that Dr. Nayatani made during this period was the concept of a non-linear function for the relationship between the magnitudes of a stimulus and of the corresponding cone response; this has proved, over the years since, to be a feature of fundamental importance in this modelling. It was at the AIC (International Colour Association) meeting at Kyoto in May 1997 that the CIE sought to adopt a colour appearance model that could be adopted for general use, but particularly in imaging. The committee had tabled four different models as candidates from which to choose, and the latest version of the model constructed by Dr. Nayatani was also available. As with many international meetings, a deadlock was reached in which different models were favoured by representatives from different countries. I will never forget the moment when Dr. Nayatani stood up and said that he would vote, not for his own model, but for another that had been tabled. This public-spirited stance immediately broke the deadlock, and the committee was able to adopt the model that became known as CIECAM97s, the CIE Colour Appearance Model adopted in 1997, the 's' indicating that this was a simple model that left unaddressed a range of effects that, it was hoped, could be included in a more comprehensive model in the future. The adoption by the CIE of such a comprehensive model is still awaited, but the work on which such a model must be based is well advanced. However, an improved simple model, CIECAM02, has been adopted by the CIE, and so Dr. Nayatani's legacy to this field is still bearing fruit. Like his close colleagues, and so many others in the field of colour science, I will greatly miss, not only his ongoing work, but also his gracious and charming personality.

Robert W.G. Hunt

Hans-Henrik Bjørset 
27.5.1920 - 6.4.2010



A dear friend and colleague is gone. Hans-Henrik Bjørset passed away April 6th 2010 in his ninetieth year.

Hans-Henrik grew up in Molde on the Norwegian west coast. After high school he moved to Trondheim and attended The Norwegian Institute of Technology (now Norwegian University of Science and Technology) where he graduated as an engineer from the electrotechnical department in 1952. After graduating he started working for the main board of NVE (now Norwegian Water Resources and Energy Directorate) where he stayed for two years.

However, it was light and lighting that was going to be Hans-Henrik's main focus throughout his working career. First through working for Glamox in 1954-1957, then as production manager for luminaires at IFA Electric in Bergen until fall of 1967. He then took a newly appointed position as laboratory engineer, and later associate professor at The Norwegian Institute of Technology in Trondheim. One condition for this position was to establish a photometric laboratory on which education and research was to be based. He had to start from scratch building lectures, demonstrations and lab experiments, as well as acquiring all necessary equipment. A respected photometric laboratory was then built in collaboration with SINTEF.

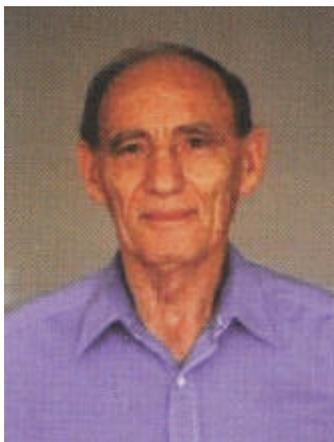
Hans-Henrik developed two comprehensive textbooks in lighting. Through his professional work, Hans-Henrik put a significant mark on the "lighting circles" in Norway, and he was a frequently used lecturer. He was for a number of years active in Lyskultur (The Norwegian Lighting Institute) and the Norwegian Lighting Committee. He acted also as a scientific advisor for the "lighting group" at Norwegian Electric Power Research Institute, EFI. The lighting communities around the World are typically small by themselves, and Hans-Henrik therefore had close contact with international colleagues and especially in collaboration with the universities in Sweden and Denmark.

He was also very active in CIE, The International Commission on Illumination, where he led Division 4,

which works with road- and tunnel lighting, for two four-year terms. He was also subsequently appointed Vice-President to CIE for a four-year period. The work in CIE led of many personal friendships of which his wife Bjørg also took part in. We are many that have lasting memories of Hans-Henrik. It is sad and difficult when such a significant person passes away, but the memories of Hans-Henrik will continue to shine!

Arve Augdal
Eilif Hugo Hansen
Odd Arnesen

Prof. Eliyahu Ne'eman ✍
1927-2010



Prof. Eliyahu (Mecky) Neeman (1927-2010) was born in Tashkent, Uzbekistan. At age 8 he immigrated with his family to Israel (then Mandatory Palestine). Since joining the CIE, in 1967, Professor Neeman was a highly active member in the organization. He was chairman and then President of CIE Israel since 1975. Mr. Neeman chaired TC 4.2 on Daylighting, TC 3-22 on Museum Lighting and Protection against Radiation Damage, TC 3-41 on Visual Quality of Displays in Museum Lighting. He was known by his nickname "Mecky" by his colleagues and friends, of which he had many in the CIE. His professional career was many faceted; a partial list includes research on the use of greenhouses in agriculture; analysis and authorship of building codes and lighting design of schools, hospitals, highways, tunnels and airports; pioneering research in the use of natural sunlight to improve buildings energy efficiency; and in later years a profound interest in museum lighting. He found great satisfaction in the many roles he held in the CIE, and above all cherished the CIE's mission of international cooperation between scientists and engineers from around the world in lighting research.

His family is deeply grateful to the many colleagues from the CIE, past and present for their support and friendship.

Alex Yarmolinsky

✍ **From the Lighting Journals**

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2010			
June 10-12	BulLight 2010	Conference Coordinator Ass. Orlin Petrov, PhD, MScE opetrov@ru.acad.bg http://Bullight2010.cie-bg.org	Varna, Bulgaria
August 30-31	CIE Tutorial and Expert Symposium on Spectral and Imaging Methods for Photometry and Radiometry	SLG Office reto.abaecherli@bvmbberatung.net	Bern, Switzerland
September 8-10	2nd CIE Expert Symposium on Appearance: When Appearance meets Lighting...	Light & Lighting Laboratory KaHo Sint-Lieven lichttechnologie@kahosl.be	Gent, Belgium
October 18-20	Licht 2010	LTG, Lichttechnische Gesellschaft Österreichs, Ilse Neyder ilse.neyder@ltg.at	Vienna, Austria
November 10	Light & Care 2010 Symposium on the Impact of Healthy Lighting in Healthcare	Light & Health Research Foundation SOLG schoutens@solg.nl www.solg.nl	Eindhoven, The Netherlands
November 11-12	NordLED 2010	DCL Kenneth Munck km@centerfolys.dk	Copenhagen, Denmark
2011			
July	27th CIE Session	www.cie.co.at (click on Conferences)	Sun City, South Africa

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