



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

NEWS

NUMBER 46

June 1998

Comité Luminotécnico
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CIE Division 5: Exterior and other Lighting Applications

Division 5 was founded on a conference organised by CIE in Amsterdam in the year 1983. The following terms of reference have been decided there:

„To study procedures and prepare guides for the lighting for exterior working areas, security lighting, floodlighting, pedestrian and other urban areas without motorised traffic, areas for sports (indoor and outdoor facilities) and recreation and for mine lighting”.

The Division has established its Technical Committees on the basis of the above mentioned terms. In the last years the Division has published some documents of great importance. Without the aim of being complete, I would like to mention the three most important ones:

Nowadays, the most significant basis of planning and construction of sport lighting equipment all over the world and invitation for tenders is the „Guide for the lighting of sports events for colour TV and film systems” which was prepared by the Division. The other publication is a method elaborated by the Division and issued under the title „Glare evaluation system for use within outdoor sports- and area lighting” which is also well used today. There is another document, „Guide for floodlighting” which is dealing both with technical and artistic aspects of decorative lighting.

In the past weeks, following several years’ efforts of our technical committee, our new publication „Guide for lighting exterior work areas” has just come out which contains detailed calculating methods and proposed lighting values. In these days another report has just left the printing office, which is dealing with the topic of „Open-cast mine lighting”.

Two further documents of the Division are close to their end. One of them is called „Practical design guidelines for sports lighting installations for CTV”. Up to the present we can say that this is the most complete version of lighting criteria and practical planning suggestions suitable for CTV requirements.

The second document also gives proposals to practical questions arisen within the topic of „Maintenance of outdoor lighting systems”.

IN THIS ISSUE

CIE Division 5 – News from the National Committees – News from the Divisions – New publications – Meeting reports – Future meetings – Liaison – From the lighting journals – In memoriam – For your diary

In several questions there are technical debates between the Division members. The Division always tries to give a forum for negotiations and discussions of the different opinions. This June for example, a workshop is going to be organised within the Division meeting in Barcelona. On this workshop there will be several discussions and presentations in topics related to the Division.

Among others, the Division is also interested in the questions of „Tolerances in lighting design, obtrusive light, semi cylindrical illuminance“. We would be pleased and delighted if – besides the colleagues working in the Division – others acting in different areas of CIE could help the Division's work with their ideas and suggestions for new Division topics.

In the future we would like to extend our activities to new fields which are interesting for CIE peoples and other lighting experts as well.

Dr. József Horváth, Director of CIE Division 5

News from the National Committees

News from the Russian National Committee

On June, 19th, 1998 President of Russian NC-CIE and Director of VNISI Joint-Stock Company, Guennady Chakhparouniants will have his 60th birthday.

In 1961, he took a degree in lighting engineering at Moscow Power Institute. In 1967, he won a M. Sc. degree with the work entitled „Investigations of the quality of illumination for TV studios and creation of criteria for quantity estimation“. In 1961, he began to work at Lighting Research Institute (VNISI) in Moscow and from 1986 till today, is Director of VNISI. In 1993, he was elected a Corresponding Member to the Academy of Electrotechnical Sciences. In 1994, he became a D. Sc. in electrical engineering.

Mr. G. Chakhparouniants is well known as a specialist in television, outdoor, sports and architectural lighting. Being the person of high professional activity, he has been in the lead of many research projects in different areas of lighting. He has also written many publications and made inventions. He constantly gives much attention to the work in CIE. During 1987-1995 he was twice elected as Vice-President of CIE and has been taking an active part in its work.

At present G. Chakhparouniants is President NC-CIE and President of Russian Illuminating Engineering Society.

We wish him many happy years to come and hope to meet him in CIE work.

News from the Divisions

The following items have been summarized from full Activity Reports and Meeting Minutes received at the Central Bureau. Readers requiring more information are kindly requested to contact their National Division Representative through their National Committee.

Division 2 - Physical Measurement of Light and Radiation

The Division had its meeting on 18-19th May 1998 in Boulder, CO, USA. A report on this meeting will be published in the next CIE NEWS.

Division 3 - Interior Environment and Lighting Design

The Division had its meeting on 8th May 1998 in Ottawa, Canada. A report on this meeting will be published in the next CIE NEWS.

Division 4 - Lighting and Signalling for Transport

The following new TC has been established:

TC 4-40: *Requirements for Retroreflective Traffic Signs* (Chairman: Justin Rennilson, USA)

Terms of Reference: To recommend visual performance for retroreflective traffic signs, including the study of driving scenarios, vehicle geometry and headlight distributions.

Division 5 - Exterior and other lighting applications

The Division had its meeting on 3rd-5th June in Barcelona, Spain. A report on this meeting will be published in the next CIE NEWS.

New publications

New publications available from the Central Bureau:

CIE Standard Illuminants for Colorimetry

CIE Standard S 005/E-1998

This CIE Standard specifies two illuminants for use in colorimetry:

a) CIE standard illuminant A

This is intended to represent typical, domestic, tungsten-filament lighting. Its relative spectral power distribution is that of a Planckian radiator at a temperature of approximately 2 856 K. CIE standard illuminant A should be used in all applications of colorimetry involving the use of incandescent lighting, unless there are specific reasons for using a different illuminant.

The standard recommends laboratory realizations of the CIE standard illuminant A.

b) CIE standard illuminant D65

This is intended to represent average daylight and has a correlated colour temperature of approximately 6 500 K. CIE standard illuminant D65 should be used in all colorimetric calculations requiring representative daylight, unless there are specific reasons for using a different illuminant. Variations in the relative spectral power distribution of daylight are known to occur, particularly in the ultraviolet spectral region, as a function of season, time of day, and geographic location. However, CIE standard illuminant D65 should be used pending the availability of additional information on these variations.

Values for the relative spectral power distribution of CIE standard illuminants A and D65 are given in Table 1 of this International Standard, with an accuracy of six significant digits. Values are given at 1 nm intervals from 300 nm to 830 nm.

A French and a German translation (CIE S 005/F and CIE S 005/G) are also available.

Guide to the Lighting for Open-Cast Mines

CIE 128-1998

ISBN 3 900 734 860

Open-cast mines cover a large area and continually change their shape as mining proceeds. Effective illumination is required to achieve production and safe operation of various machinery at different work areas.

Mobile mining machinery is equipped with luminaires powered by on board generators. Movable lighting towers are used in the mine faces for general lighting. Deep, compact pits and permanent facilities such as stockpiles, conveyors and processing plant, can be lit from fixed lighting arrangements.

Illuminance levels are provided for each work area to meet the visibility requirements of equipment operators and other workers.

Luminaires must have a high degree of protection against ingress of dust and moisture due to the atmosphere prevalent in open-cast mines. Luminaire

design and installation must facilitate ease of maintenance. Strict adherence to agreed-upon maintenance schedules is important for prevention of undue loss of light with time and to avoid capital investment in higher initial lighting levels thus saving energy.

Lighting quality parameters like average illuminance, uniformity and glare limitation have been described. Further guidance can be obtained from existing CIE publications. Requirements for areas typical of open-cast mines have been given.

The report contains 30 pages.

Guide for Lighting Exterior Work Areas

CIE 129-1998

ISBN 3 900 734 87 9

The present document updates and replaces Publication CIE 68-1986 "Guide to the lighting of exterior working areas".

The values published are based on illuminance concept. Further to the average maintained illuminance and minimum to average ratio, the minimum to maximum ratio was introduced. Glare is limited by Glare Rating (GR). The values are "maintained" and determined to achieve efficient working conditions, safe movement and traffic and safety/security of people and property. Work areas are divided into twelve sections and listed in the Application Tables.

Attention is focused on design values. Other topics, as colour quality, maintenance, environmental aspects, design and measurement are only mentioned in this paper, detailed recommendations or standards are to be sought for in relevant CIE and ISO publications.

The publication contains 20 pages.

New publications in the field of light and lighting

Colour Appearance Models

Mark D Fairchild

Addison-Wesley Longman, Inc., Reading, MA
ISBN -201-63464-3

The book is a state of the art reference volume dealing with colour appearance models. Dr. Fairchild, the chairman of the CIE Technical Committee dealing with

"Testing of Colour Appearance Models", is certainly an expert in the subject and predestinated to write this book.

The first nine chapters of the book provide an introduction to the subject, dealing with the fundamentals of human colour vision, psychophysics, colorimetry and colour order systems; give an introduction to the terminology of colour appearance; discuss the phenomenon of colour appearance and some related phenomena, such as chromatic adaptation.

The next five chapters discuss some of the models, mainly those that were investigated by the CIE TC as well. Starting with the CIELAB colour space, Fairchild shows why this is not adequate as a colour appearance model. Then the Nayatani et al, the Hunt and the RLAB models are analysed. A short chapter provides a very condensed summary of Guth's ATD model and of the LLAB model. (Perhaps the shortness of this discussion - with some statements on the ATD model that might be misinterpreted as well - is the only part of the book where the referee could have hoped for a more detailed discussion).

The last four chapters discuss the question of testing the models, and provide some thoughts on their use in colorimetry and colour imaging, giving also an outlook on possible future progress.

An Appendix summarizes the most recent international recommendation, the CIECAM97s model.

A well-written Index and a bibliography of almost 300 entries help the reader to find answer to his or her question and further publications.

The book is certainly a worthwhile piece of reading for graduate students specialising in colorimetry and imaging technology, as well as engineers and scientists working in these subjects.

Color for Science, Art and Technology

Ed. by Kurt Nassau

Lebanon, NJ, USA

Azimuth Volume 1

Elsevier, ISBN 0444898468

The aim of this book is to assemble a series of chapters, written by experts in their fields, covering the basics of colour – and then some more. In this way, readers are supplied with almost anything they want to know about colour outside their own area of expertise.

Thus, the colour measurement expert, as well as the general reader, can find here information on the perception, causes, and uses of colour.

For the artist there are details on the causes, measurement, perception, and reproduction of colour. Within each chapter authors were requested to indicate directions of future efforts, where applicable.

Contents: I The Science of Colour

1. Fundamentals of colour science
2. The measurement of colour
3. Colour vision
4. The fifteen causes of colour

II. Colour in Art, Culture and Life

5. Colour in abstract painting
6. Colour in anthropology and folklore
7. The philosophy of colour
8. Colour in plants, animals and man
9. The biological and therapeutic effects of light

Addendum: Double blind testing for biological and therapeutic effects of colour

III. Colourants, the Preservation and the Reproduction of Colour

10. Colourants, Organic and inorganic pigments
11. Colourants: Dyes
12. Colour preservation
13. Colour Imaging: Printing and photography
14. Colour encoding in the Photo CD System?
15. Colour displays.

Color Vision, Perspectives from different disciplines

W GK Backhaus, R Kliegl, J S Werner

Walter de Gruyter, Berlin & New York 1998.

ISBN 6-11-016100-1 & 3-11-015431-5

The book is a well edited interesting summary of papers presented at the Einstein Forum in Potsdam in 1996. (This delay in publication is perhaps the main draw-back of the book, as colour science is progressing so rapidly that some monographs do not provide the latest information of the subject anymore.)

The editor's aim was to provide an interdisciplinary approach of the subject. The first paper bridges arts and sciences, analysing Monet's late works from the viewpoint of a visual scientist.

The next eight monographs deal with physiological and psychophysical issues of colour vision. Following an introduction to colour vision in humans and animals, papers deal with colour vision phenomena occurring in the retina, in the lateral geniculate nucleus and at higher levels of vision in the brain. Interesting monographs provide a good insight into the genetics of normal and abnormal colour vision, as well as of colour vision of simpler animals.

The next six papers discuss psychological and philosophical question of colour related items. Questions like colour categories and terms, the concept of blackness, the psychology of colour perception, colour contrast, infant colour vision are dealt with.

The last three papers discuss colour metrics questions. Among these also the current CIE work on colour metrics is discussed.

Many excellent colour pictures illustrate the book. It is a recommended piece of reading for both technically and artistically oriented scholars.

Museum and Art Gallery Lighting: A Recommended Practice

IESNA RP-30-96

The Illuminating Engineering Society of North America has published the draft standard IESNA RP-30-96 „Museum and Art Gallery Lighting: A Recommended Practice“.

Effective museum lighting must balance among the interests of several groups like designers, visitors, conservation staff and museum curators. This draft standard clarifies the basic needs and gives general guidelines for all these groups by detailing the mutual connection between artistic basics of form, colour, content, dimension and the technical parameters of light source spectrum, limiting exposure time, angle of incidence, accessibility.

The preparing committee dedicated special chapters to the damage of museum objects by radiated power, to the typical lighting categories at an exhibition, to the control of glare and to the coordination of architectural aspects and lighting or daylight.

The remaining chapters deal mainly with the technical questions of the different light sources, luminaires, maintenance, measurement of illumination and with lighting calculation and light control. A conceptual specification of museum lighting is outlined in the annex.

New Recommended Practices for Photobiological Safety of Lamps and Lamp Systems

**ANSI/IESNA RP-27.1-1996
General Requirements**

**ANSI/IESNA RP-27.3, 1996
Risk Group Classification & Labeling**

RP-27.1-96 covers the evaluation and control of optical radiation hazards from the electrically powered sources of radiation that emit in the wavelength range of 200 nm to 3000 nm and RP-27.3-96 covers the classification, labeling and informational requirements for the same radiation sources. Light emitting diodes and lasers are not included in these publications, they are described by earlier ANSI standards. The exposure limits, their defining equations and the spectral weighting functions of the different hazards (blue light, retinal etc.) are given. A philosophical basis for the classification of lamps was outlined and four risk groups were defined. The labeling is based on the risk groups and on the individual hazard. Examples show the way of labeling.

Public Lighting

**E. Širola
ESING, 1997, Zagreb, Croatia
(in Croatian language)**

The book is divided into ten chapters describing systematically by selected methodology most of the knowledge of this relatively young technical branch.

The first chapter deals with fundamentals of road lighting, its purpose, interrelation of its quality and road safety, light physical fundamentals, and visibility with road lighting on roads and in tunnels for motor vehicles as well as roads and spaces for pedestrians. The second chapter specifies individual standards of road lighting quality and indicates their recommended optimal numerical values. The third chapter deals with basic elements: light sources as a basis of every lighting, lanterns and road surface as the essential factor of road lighting quality. Usual and accepted light-technical calculation methods of luminance, illuminance and glare have been set forth in chapter four. Different systems of road lighting have been analysed in chapter five, and installation elements like lantern supports, supply and safety equipment, control and regulating units in chapter six. Basis of economics, light-technical measurements, and main suggestions during execution, running and maintenance of road lighting

systems have been stated in chapters seven, eight and nine. Chapter ten has been added to the book with definitions of basic terms, letter indications used, and a literature list.

Meeting Reports

First CIE Symposium on Lighting Quality

9-10 May 1998, Ottawa, Canada
Understanding and Promoting
Lighting Quality

The First CIE Symposium on Lighting Quality was convened in recognition of widespread interest in this topic. It was organised by Jennifer Veitch, National Research Council of Canada, Institute for Research in Construction; Warren Julian, Dept. of Architectural and Design Science, University of Sydney and Anthony Slater, Building Research Establishment with the major falling on Jennifer Veitch who was largely responsible for its success. Our hope for the event was that it would provide an opportunity for diverse groups to meet and discuss the issues, to discover areas of common interest, and to chart a course for further action for CIE and for the lighting community in general.

We set out goals, to review world-wide research, theory and practice related to lighting quality:

- to identify the various components of lighting quality
- to identify issues that could be emerging from technological change (non-visual effects from high frequency operation, narrow-band phosphors, hazards)
- to critically examine current recommended practice
- to determine what research is needed and to set priorities
- to determine a means to involve users (designers, manufacturers, legislators) in the process.

We recognized three perspectives and organized sessions around them: "Design", "Research" and the "Integration" of lighting quality, daylighting, electric lighting, energy efficiency and environmental issues. Each session was opened by a keynote address and prepared commentaries on it, and included both presented papers and posters, all of which will be contained in the Proceedings. The final segment of the weekend was devoted to group discussions of specific questions derived from the goals. Summaries of these will be reprinted at the end of the Proceedings.

The success of the event exceeded our hopes, with over 70 participants from 18 countries in attendance. The discussion and conversation were lively and participants departed with enthusiasm and hope that progress on this thorny problem would result from their work. Following the event, we have made this effort to distil from the notes, papers and discussions a framework for understanding lighting quality and for further steps to advance it. We propose it not as a final statement but as a starting point, with the next step being a workshop to be held at the 24th CIE Quadrennial Session in Warsaw, Poland, June 1999.

Warren Julian
(from the draft introduction to the
Proceedings of the Symposium)

Future meetings

International Symposium and Workshop on Measurements of Optical Radiation Hazards

1-3 September 1998
NIST, Gaithersburg, MD, USA

Organized and Co-sponsored by: CIE, International Commission on Non-Ionizing Radiation Protection, National Institute for Standards and Technology, US Army Center for Health Promotion and Preventive Medicine.

Objective: To promote improved, standardized radiometric measurements of optical radiation hazards from ultraviolet, visible and infrared radiation sources and assessment of protective measures such as sunscreens, clothing and eye protection.

A modest registration fee of less than \$ 150.00 will be charged. Overseas participants may register with NIST after March 1998.

The meeting will comprise the following Sessions:

Session I - The Photobiological Basis for Risk Assessment-Action Spectra

Session II - Photobiological Guidelines & Standards for Health Protection and Product Safety

Session III - Measurements Needed to Apply Photobiological Guidelines and Standards

Session IV - Laboratory Tour of Radiometric Physics Division, NIST

A detailed program can be found on the internet at:

<http://lazulite.nist.gov/cie/morh/>

Diploma Course on Visual Environment and Efficient Lighting - MAVILE

June-November 1998, Tucumán/Argentina

This is a programme for training of specialists in the field of visual environment and efficient lighting. It aims to obtain a source of competent professionals with the ability to manage tools typical of this kind of knowledge at the academic, private and industrial level in Latin America. This course for engineers, architects and designers of Latin America has been supported by the European Union through the program ALFA.

MAVILE deals with:

- a) visual relations between the human being and its environment;
- b) its improvement;
- c) the way people use the visual system in the acquisition and processing of information;
- d) the effects of light stimulus in productivity and behaviour;
- e) the characteristics of the visual environment, in order to optimise the interface with the human being.

The programme comprises three levels: Diploma, Master and Doctorate in Visual Environment and Efficient Lighting.

It is meant for engineers, architects, designers and physicists. Students from universities or firms no members of MAVILE should apply to:

Instituto de Luminotecnia, Luz y Visión,
Universidad Nacional de Tucumán.
Av. Independencia 1800
4000 Tucumán, Argentina
Tel./Fax:+54 81 361936,
e-mail: ilum@herrera.unt.edu.ar.

□ Liaison Matters

IEC has sent us the following documents:

34A/810/CDV

Amendment 2 to IEC 60968: Self-ballasted lamps for general lighting services - Safety requirements (parallel CDV/CENELEC enquiry)
Deadline for vote: 1998-08-17.

34A/811/CDV

Amendment No. 1 to IEC 60064: Tungsten filament lamps for domestic and similar general lighting purposes - Performance requirements (parallel CDV/CENELEC enquiry)
Deadline for vote: 1998-08-17.

34A/812/CDV

Draft revision of IEC 60432-1: Safety specifications for incandescent lamps - Part 1: Tungsten filament lamps for domestic and similar general lighting purposes (parallel CDV/CENELEC enquiry)
Deadline for vote: 1998-08-17.

34A/813/CDV

Draft amendment 12 to IEC 60357: Tungsten halogen lamps (non-vehicle) (parallel CDV/CENELEC enquiry)
Deadline for vote: 1998-08-17.

34D/499/NP

Proposal of the WG LUMEX: Draft amendment to IEC 60598-2-17: Luminaires - Part 2: Particular requirements - Section 17: Luminaires for stage lighting, television and film studios (outdoor and indoor)
Deadline for comments and vote: 1998-06-15.

IEC/76/173/NP

Proposal of the British Committee: Compilation of an informative Annex to IEC 60825-4: Ed. 1: Safety of laser products - Part 4: Laser guards: Guidance on the safe use of laser guards
Deadline for comments and vote: 1998-06-15.

IEC/76/174/NP

Proposal of the British Committee: Amendment to IEC 60825-4, Ed. 1: Safety of laser products - Part 4: Laser guards
Deadline for comments and vote: 1998-06-15.

IEC/76/175/CD:

IEC 60825-7, Technical Report Type 2, Ed.1: Safety of laser products - Part 7: Safety of products emitting "invisible" optical radiation, exclusively used for wireless "free air" data transmission and surveillance
Deadline for comments: 1998-08-31.

† In Memoriam

N.S. Chari †

We are very sad to inform you that Mr. N.S. Chari, a Founder Member, Governing Body Member since inception and Past Vice President of ISLE (Indian Society of Lighting Engineers) breathed his last on 3rd September 1997.

Nambi Sundara Chari was born on 6th July 1938, at Madras. He graduated in Electrical Engineering from Annamalai University of Engineering,

Chidambaram and subsequently qualified as a Chartered Engineer from the U.K.

His working life started as an Assistant Engineer at Neyveli Lignite Corporation. In the U.K. he worked with the Consulting Engineering firm R.W. Gregore and Partners. He joined Crompton Greaves Limited, Mumbai, in 1978 as Chief Engineer, Lighting Division. He was subsequently Chief Engineer, Lighting Advisory Bureau, General Manager and Group General Manager Technology. He was responsible for many important lighting projects and introducing new products not only in lighting but in other fields as well.

He was associated with number of professional bodies, was Chairman of the Indian Electrical and Electronics Manufacturers Association (IEEMA), Lighting Division, and also a Principal Member for ETD-23 and ETD-24, Bureau of Indian Standards, as well as a Fellow of Institution of Engineers - India, Member of the Illuminating Engineering Society of North America and Member of the Institution of Lighting Engineers, U.K.

Mr. Chari was also active with CIE: he was the member representing India in the CIE Division 7. He led the Indian delegation at the CIE Session in Venice in 1987 and was an Adviser member of the delegation at the CIE Session at Melbourne (1991) and at the mid-term CIE Session at Edinburgh (1993).

Nambi S. Chari married Kaushalya in 1969. They have two sons and a daughter.

N.S. Chari made many friends with his genial personality. He was very witty and humorous. He will always be remembered not only by ISLE members but the entire lighting fraternity.

David Lewis MacAdam †

1910-1998

Dr. David Lewis MacAdam, 87, died at the Fairport Baptist Homes in Rochester, N.Y., USA on March 9, 1998.

Born and brought up in Philadelphia, MacAdam attended Lehigh University and originally planned to study electrical engineering. At MIT, MacAdam entered the graduate studies program in optics, where he was appointed a teaching fellow under the direction of Arthur C. Hardy, then President of Optical Society of America (OSA). While at MIT, MacAdam taught optics laboratory and helped Hardy establish MIT's colour measurements lab. He received his Ph.D. in Physics from MIT (1936) and followed in Hardy's footsteps to become president of OSA in 1962. During his time at OSA, MacAdam also served as an

associate editor of the Journal of the Optical of America (1961-1965).

He was a member of the Eastman Kodak Research Laboratories in Rochester from 1936 until his retirement as senior research associate in 1975, and served as adjunct professor at the Univ. of Rochester Institute of Optics from 1975 until 1995.

MacAdam has been honored by national and international scientific bodies for pioneering research in colour measurement, human colour vision, colour television, photography, printing, and textiles. MacAdam also enjoyed reading great literary works and was an avid hiker. He was a member of the United States National Committee of CIE.

(from Optics & Photonics News, April 1998)

John E. Kaufman †

The US National Committee has informed us that our friend and colleague, former Vice-President of the CIE, has passed away unexpectedly on March 16, 1998, at his home in Stamford. The cause of death was cardiac arrest.

Mr. Kaufman, who retired in 1992, was formerly technical director of the Illuminating Engineering Society of North America, and editor of "The Lighting Handbook". During his lengthy service to the IESNA, he was the recipient of many society awards including: Marks, Fellow, Distinguished Service, and Presidential Award. He was also a member of the New York Academy of Science.

Mr. Kaufman graduated from Cornell University in 1949. He was a director of Camillus Cultery Co. a member of the ZBT fraternity, the Cornell Society of Engineers, the Senior Men's Association of Stamford, and the Retired Men's Club at the JJC. His wife, Betsy B. Kaufman of Stamford, died in 1986. He is survived by his mother, Fannye G. Kaufman, of Briarcliff, NY; his brother, Harold B. Kaufman Jr, of Somers, NY; his daughter, Gail K. Furgal of New York City; his son J. Gilbert of Coral Gables, Fla; and three grandchildren.

Robert Hargroves †

Bob Hargroves, who recently died aged 58, was well known in the lighting community for his outstanding research work, particularly in road lighting and tunnel lighting.

He took his physics degree at Imperial College, where he stayed on to do research work on road lighting for the Transport and Road Research Laboratory. It was while he was there that he met Judy, his future wife. Together they wrote a bibliography on flashing lights,

which amounted to over 100 pages and is an important reference work. He also wrote a history of road lighting, starting with the Romans and going up to present times. There was no doubt that he had a facility for putting over technical matters in plain English that the uninitiated could understand. This was combined with a relaxed and friendly delivery which made his lectures a pleasure to listen and was to serve him well in later years.

After gaining a Diploma of Imperial College he went to work at Lucas on vehicle lights. He then came to Thorn Lighting. He was first concerned with research on road lighting and accidents, and then branched out into other topics concerned with road lighting, including the design of road lighting luminaires. He became Lighting Applications Manager in 1991, a job he did with distinction.

During his career he built a reputation both nationally and internationally. In particular he did outstanding work for CIE, in recognition of which he was appointed to several high offices in that organisation. He was also involved in the work of CEN, ILE, BSI, and the Lighting Division of CIBSE. Last September he was presented with the Bronze Medal at the Annual Conference of the Institution of Lighting Engineers for the best presented paper in a region.

We must not forget Bob Hargroves the man. He was always friendly and approachable. He was a man of integrity. Outstanding was the way he cared for people in his department, particularly those who were new. He helped them to put down roots. We shall all miss him greatly. Our sympathy goes to Judy and her family.

(from CIBSE Newsletter May, 1998)

From the Lighting Journals

Colour Research and Application

Volume 23, Number 2, April 1998

Colorimetric analysis and performance assessment of the Hahn New Pseudoisochromatic Colour Vision Test
S. J. Dain, S. Gray, L. Tran

Field trials of the CIE chromatic-adaptation transform
H. Sobagaki, Y. Nayatani

Towards a more accurate and extensible colorimetry. Part V. Testing visually matching pairs of lights for possible rod participation on the Aguilar-Stiles model
W. A. Thornton, H. S. Fairman

Neugebauer revisited: Random dots in halftone screening
G. L. Rogers

International Journal of Lighting Research and Technology

Volume 30, Number 1, 1998

Illuminance in atria: Review of prediction methods
J. C. Wright, K. M. Letherman

Fluorescent lamp cathodes: Voltage-controlled preheating characteristics
M. Myojo, A. Waki

Fluorescent lighting: Application of "TL" 5 lamp to offices, shops and public buildings
P. van Cleef, J. M. G. Bex

Automobil rear signal lamps: Effects of realistic levels of dirt on light output
M. Sivak, M. J. Flannagan, S. Kojima

Visibility distances in a foggy atmosphere: Comparisons between lighting installations by Monte Carlo simulation
T. Girasole, C. Rozé, B. Maheu, G. Gréhan, J. Ménard

Mirror lightpipes: Daylighting performance in real buildings
L. Shao, A. A. Elmualim, I. Yohannes

Manual switching patterns in private offices
J. A. Love

International Lighting Review

Volume 48, Number 974

"Fibre Optics"

Journal of Light and Visual Environment

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For your Diary

Date	Title of Meeting	Organizer	Place of Meeting
1998			
June 28 - July 2	Optical spectrometry: Applications and instrumentation	CORM, Dr.Barnard The Pines,Larch Av.,Ascot SL5 0AW, UK	Surrey, UK
June 29 - July 3	XVI Intern.Conf.on Coherent and Nonlinear Optics ICONO '98	Russ.Ac.of Sciences, N.Koroteev, Moscow fax: (7095) 939-3113,	Moscow, Russia
July 19 - 24	Int. Symp. on Optical Science, Eng. and Instrumentation	SPIE sd98@spie.org	San Diego, CA, USA
July 27 - 30	ICAPT'98 Int. Conf. on Applications of Photonic Techn.	G.Lampropoulos fax: 416/923 9129 aug_sig@ netcom.ca	Ottawa, Canada
July 29 - 31	1998 Annual Conf. of the IES of Japan	IEI-J, fax:+813 5294 0102 ieijsomu@saturn.netspace.or.jp	Sapporo, Japan
Aug. 30 - Sep. 3	LS-8, Science and Technology of Light Sources	G. Babucke, Robert-Blum-Str. 8-10 D-17489 Greifswald	Greifswald, Germany
Aug. 31	CIE Division 6 Meeting	CIE Division 6	Rockville, MD, USA
Sep. 1 - 3	Measurements of Optical Radiation Hazards	NIST, CIE Div.6, USACHPPM, ICNIRP dslaney@aeha1.apgea.army.mil	Gaithersburg, MD, USA
Sep. 7 - 11	Biomedical Optics in Europe VI	EOS, BP 147 F-91403 Orsay Cedex	Edinburgh, UK
Sep. 7 - 11	Intern. Congress on Imaging Science	J. De Roeck, Agfa- Gevaert NV, fax: +32 3 444 7697	Antwerp, Belgium
Sep. 10 - 12	Intern.Symposium: Colour and colour measurement	Univ.Maribor fax: +386 62 220 7990	Maribor, Slovenia
Sep. 15 - 19	Intern.Congress on High-Speed Photography and Photonics	ICHSP 98 Ozernaya 46, VNIIOFI, 119361 Moscow, fax:(7095)4373147	Moscow, Russia

Date	Title of Meeting	Organizer	Place of Meeting
Sep. 16 – 18	Licht 98	LTG, Postfach 148 A-2340 Mödling	Bregenz, Austria
Sep. 21 – 23	Improving electricity efficiency in commercial buildings	Novem, Fax: +31 70 3562878	Amsterdam, Netherlands
Sep. 28 – 30	CIE Division 1 Meeting	CIE Division 1	Baltimore, MD, USA
Oct. 2 - 4	ISCC Annual Meeting	ISCC, 11491 Sunset Hills Rd., Reston VA 20190 iscc@compuserve.com	Baltimore, MD, USA
Oct. 5 - 9	Europ. Symp. Imaging & Information Serv.	EOS, BP 147, F-91403 Orsay Cedex	Lyon, France
Oct. 8 - 11	Colour between Art and Science - Oslo Intern. Colour Conference	NCAD Inst. of Colour Ullevalsveien 5, N-0165 Oslo	Oslo, Norway
Oct. 22 – 27	CIE Division 4 Meeting	CIE Division 4	Bath, Great Britain
Nov. 1 - 3	Biologic effects of light	Light Symp. Found., POB 35 CH-4125 Riehen/Basel	Basel, Switzerland
Nov. 17 - 20	IS&T/SID 6th Colour Imaging Conference	IS&T	Scottsdale, Arizona, USA
Nov. 26-27	National Lighting Congress	Turkish National Committee Maslak 80626 Istanbul Fax: +90 212 285 36 79	Istanbul, Turkey
Dec. 14 - 18	Int. Conf. on Optics and Optoelectronics	A.K.Gupta fax:91-135 687161, 687128, root@drirde.ren.nic.in	Dehra Dun, India
1999			
June 24- 30	CIE 24th Session	Session Secretariat Fax: +48 22 660 5616 CIE99@ee.pw.edu.pl	Warszawa, Poland
Aug. 2 - 6	ICO XVIII - Optics for the next millenium	ICO, SPIE, POB 10, Bellingham WA 98227-0010, USA	San Francisco, CA, USA
Oct. 6 - 8	Balkan Light-99, 1st Balkan Lighting Conference & Exhibition	Bulgarian NC-CIE fax: +3592 654883, e-mail: denima@omega.bg	Varna, Bulgaria

CIE NEWS is published by the

CIE Central Bureau
Kegelgasse 27, A-1030 Vienna/Austria
tel.: +43 1 - 714 31 87 0
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