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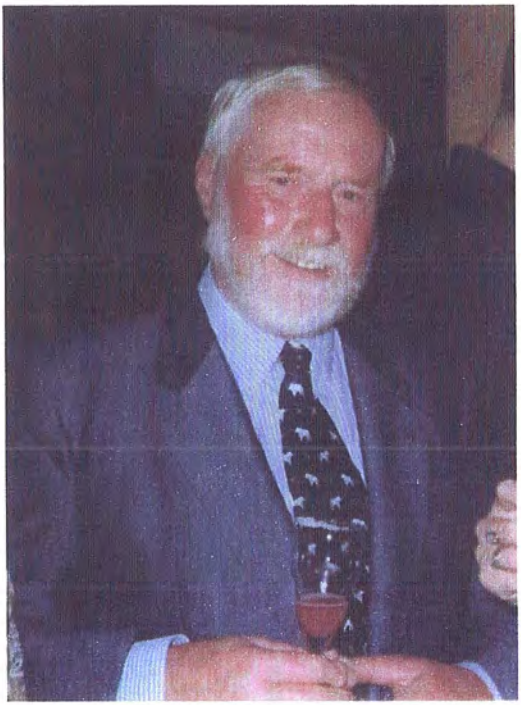
Report

2/01

Deutsche farbwissenschaftliche Gesellschaft e.V.

Herausgegeben vom Vorstand der DfwG

Verantwortlich: Dr. Gerhard Rösler



Deutsche farbwissenschaftliche Gesellschaft e.V.
im Deutschen Verband Farbe

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Mai 2001

Liebe Farbgemeinde,

So hat Sie in der Vergangenheit unser Präsident, Herr Prof. Heinz Terstiege an dieser Stelle begrüßt. Dies wird aber nie mehr möglich sein, da er am Ostersonntag, den 15. April 2001 plötzlich aus seinem so aktiven Leben gerissen worden ist. Unter großer Anteilnahme wurde er am 27. April 2001 im Waldfriedhof an der Heerstraße in Berlin beerdigt. Unser aufrichtiges Beileid haben der verbliebene Vorstand und viele Mitglieder der DfwG persönlich den Hinterbliebenen ausgesprochen. Als Zeichen unserer Anteilnahme haben wir einen Kranz gespendet und zusammen mit dem DIN Normenausschuß Farbe eine Anzeige im Berliner Tagesspiegel veranlaßt.
In diesem DfwG Report können Sie die Trauerreden von Herrn Feldhaus, der eine für uns weniger bekannte Facette des vielseitigen Lebens von Herrn Prof. Terstiege aufzeigt und von Herrn Willing nachlesen sowie den Nachruf in englisch, den Herr Witt für die ISCC und Color research and application USA verfaßt hat und den Nachruf den das DIN an alle Mitarbeiter des FNF versenden wird.
Wir werden Prof. Terstiege stets ein ehrendes Andenken bewahren.

Nun ist es unsere gemeinsame Aufgabe, die große Lücke zu füllen, die er hinterlassen hat. Sehen wir diesen harten Einschnitt als Herausforderung an uns alle, die Kommunikation untereinander auszuweiten und die DfwG als Plattform dabei zu nutzen.

Ende Juni findet im Rochester Riverside Convention Center, Rochester, NY, der internationale Farbkongress AIC 2001 statt. In diesem Heft finden Sie das umfangreiche Programm mit 276 Vorträgen. Im nächsten Heft und auf unserer Jahrestagung werden wir über die AIC Color 01 berichten. Wir wünschen den deutschen Rednern Hill, Jung, Büring, Herzog, Koenig, Witt, Gabel, Luebbe (alle DfwG Mitglieder) viel Erfolg und dieser Großveranstaltung gutes Gelingen.
Auf weitere interessante farbmetrische Veranstaltungen, wird im Veranstaltungskalender hingewiesen, z.B. die 5. Interdisziplinären Farbentage 2001 der technischen Universität Dresden.

Ist unser gemeinsames Thema „Farbe" fertig bearbeitet ? Meine Antwort ist ein klares NEIN. Die klassischen farbmetrischen Themen werden nur immer stärker angewandt und erscheinen daher vielen neuen Anwendern als feststehende Technik. So sollte es auch sein, die Farbmessung sollte einfach anwendbar sein und die Benutzer sollten schnell zu sinnvollen Ergebnissen und Auswertungen kommen. In der Vergangenheit wurde viel geleistet, aber nicht alle Anwender müssen die Historie kennen. Unsere Aufgabe in der DfwG könnte es aber sein, an der Erarbeitung und Einführung verbesserter Methoden mitzugestalten, das Gute durch das Bessere zu ersetzen..

Das Theme Farbe hat größte Bedeutung in der modernen Informationstechnologie. Daher wurde im letzten Jahr der Arbeitskreis „Farbbildverarbeitung" in der DfwG gegründet der das Spiegelgremium der CIE Div. 8 ist und den Herr Prof. Hill (deutscher Vertreter in der CIE Div. 8) leitet. Er wird auch die Zusammenarbeit mit DIN NI28 pflegen. In diesem Zusammenhang erfordert die multispektrale Bildaufnahme und -verarbeitung effektive Methoden zur Aufnahme, Auswertung und Kompression der großen Datenmengen. Wenn Sie das Programm der AIC Color 2001 Tagung durchsehen, werden Sie das große Gewicht erkennen, das dieses Themas auch neben dem Druckbereich für die moderne Informationstechnologie (Monitore, Drucker, Scanner, Internet, Software) hat. Die DfwG ist daher gut beraten, über die klassischen Themen hinaus das Thema Color Management aktiv zu bearbeiten.

Aber auch die klassische Farbmessung in der Industrie, z.B. Automobil-, Textil-, Farben und Lack-, Kunststoff- findet immer größere Verbreitung (auch durch QS Systeme wie ISO 9001). Die DfwG könnte sich daher auch noch mehr und vielleicht konkreter mit dem dringenden und täglich auftretenden Thema „Farbtoleranzen" beschäftigen. Volkswirtschaftlich geht es

dabei um riesige Beträge, daher ist die Anwendung der besten verfügbaren Methoden in der Industrie wichtig. Die Bündelung des in der DfwG verfügbaren Expertenwissens zur Anwendung und weiteren Verbesserung der Methoden ist daher eine sinnvolle Aufgabe.

Ein weiteres Arbeitgebiet könnte die Multigeometrie Farbmessung sein, die in der Zukunft eine wesentliche Rolle in der Farbmessung für die Mehrzahl aller Anwendungen spielen dürfte. Die Korrelation klassischer Farbmessung mit dem visuellen Eindruck leidet zur Zeit oft daran, daß visuell (aus guten Gründen) unter mehreren Geometrien abgemustert wird, meßtechnisch aber nur eine Geometrie verwendet wird. Wenn die visuelle und die meßtechnische Geometrie voreinander abweichen können Unterschiede in der Farbabstandsbewertung auftreten.

Ich hoffe, daß die Fachkompetenz der Mitglieder der DfwG ein aktives Netzwerk bilden und viele dieser interessanten und aktuellen Arbeitsgebiete abdecken kann. Dies gilt auch besonders unter dem Aspekt, daß viele erfahrene Experten im DIN FNF nicht mehr mitarbeiten. Daher bitte ich Sie, zahlreich an der nächsten Mitgliederversammlung am 18. Oktober, dem Vorabend unserer Jahrestagung teilzunehmen damit wir gemeinsam unseren Weg in die Zukunft besprechen und beschließen können. Am 19. Oktober 2001 werden wir dann auf unserer Jahrestagung interessante Vorträge hören, Diskussionen und Gespräche führen und interessante Produkte auf der begleitenden Ausstellung kennenlernen.

Bauen wir auf der Vergangenheit auf, gestalten wir die Gegenwart und damit die Zukunft.

Ihr Gerhard Rösler,
Vizepräsident der DfwG

DfwG Jahrestagung 2001

Am 19. Oktober 2001 (ganztägig)

Vortragsveranstaltung mit Ausstellung

Märkische Fachhochschule,
Labor für angewandte Lichttechnik,
Haldener Straße 182, 58095 Hagen,
Tel.: (0 23 31) 9 87 - 22 42

Am 18. Oktober 2001 ab ca. 16:00:

Institutsbesichtigung
mit Prof. Dr.-Ing. Horst Riechert

Mitgliederversammlung der DfwG

Beisammensein.

Referenten, die bereits mit Prof. Terstiege in Kontakt waren und neue Referenten bitte mit H. Rösler in Verbindung setzen. (roesler_gerhard@t-online.de, Tel. 0172 8944173, Brief: Bleichanger 5, 82256 Fürstenfeldbruck)

Inhaltsverzeichnis

Geburtstage von DfwG Mitgliedern

Der Vorstand der DfwG gratuliert unseren Mitgliedern zu Ihren „runden" Geburtstagen. Wir wünschen Ihnen gute Gesundheit, Erfolg und weiter viel Freude an unserem gemeinsamen Thema „Farbe".

40 Jahre	
Herr Dr. med. Thomas Kremer	* 07.08.61
Herr Dipl.-Ing. Stefan Amann	* 29.10.61
Herr Dr.-Ing. Benno Petschik	* 07.11.61
50 Jahre	
Herr Franz Sauerborn	* 14.01.51
Herr Dipl.-Ing. H.F. Blomberg	* 08.10.51
60 Jahre	
Herr Klaus Unterforsthuber	* 18.01.41
Herr Dipl.-Ing. Eckhard Bendin	* 10.05.41
Herr Prof. Dr.-Ing. Thomas Helbig	* 05.07.41
Herr Dipl.-Phys. Horst Römling	* 12.07.41
Herr Dipl.-Ing. Rüschenschmidt	* 22.09.41
Herr Dipl.-Phys. Fritz Friebel	* 23.09.41
Herr Prof. Dr. Lionel Magloire	* 29.09.41
Herr Dipl.-Ing. Klaus Todenhöfer	* 07.11.41
65 Jahre	
Herr Dr.-Ing. Johannes Fleischer	* 28.02.36
Herr Prof. Edgar Knoop	* 22.03.36
Herr Dr. Siegfried Kaufmann	* 26.06.36
Herr Dr. Wolfgang Erb	* 03.09.36
Herr Dipl.-Ing. Bernd Kranefeld	* 16.10.36
Herr Dr.-Ing. H.R. Gerdes	* 01.11.36
70 Jahre	
Herr Prof. Dr. -Ing. Stolzenberg	* 28.02.31
Herr Rolf Herold	* 07.04.31
75 Jahre	
Herr Reg. Dir. Manfred Tillack	* 19.01.26
Herr Dipl.-Phys. Heinz Willkomm	* 20.12.26
80 Jahre	
Herr Dr. Hans G. Völz	* 18.03.21
Herr Prof. Dr. H. Hauptmann	* 20.06.21
Herr Dr.-Ing. Fritz Rotter	* 17.10.21
90 Jahre	
Herr Dr. Konrad Hoffmann	* 12.12.11

* * *

Die Kosten für den farbigen Umschlag wurden von der Firma GretagMacbeth übernommen.

Rede für das Corps Saxo-Borussia und Alemannia Kiel anläßlich der Trauerfeier zur Beerdigung von AH Heinz Terstiege am 27.04.2001, gehalten von seinem Leibfuxen AH Bernd Feldhaus

Lieber Hein,

laß es doch bitte nicht wahr sein, so haben alle gedacht, die jetzt plötzlich und unwiderruflich auf die Gelegenheiten verzichten müssen, eine Begegnung mit Dir zu erleben, ein Gespräch mit Dir zu führen und ein geselliges Bier mit Dir zu trinken.

Deine Corpsbrüder, die Mitglieder der Saxo-Borussia und Alemannia Kiel, sind bestürzt über den viel zu frühen Abschied, den wir von Dir nehmen müssen. Wir sind jedoch gekommen, um Dir zu bezeugen, daß das uns verbindende Band auch weiterhin hält im Sinne unseres Lebensbundes.

Gerade Du warst mit ein Garant unseres Lebensbundprinzips. Du hast uns vorgelebt, was es heißt, auch die Pflichten unserer Gemeinschaft zu erfüllen. Wieviele jüngere Corpsbrüder hast Du an Tradition, Stil und Würde der Corpsgemeinschaft herangeführt und dennoch die Lebensfreude nicht vergessen.

Deine westfälische Herkunft konntest du nicht verleugnen, da Du sie doch durch Verläßlichkeit, Disziplin, Präsenz, Entscheidungsstärke, eigene Standpunkte mit bestimmender Einflußnahme und oft unbequemen, hartnäckigen Diskussionen bewiesen hast. Gleichermaßen verstandest Du es, zu verbinden, zusammenzuführen, Geselligkeit zu verbreiten.

Wer Deine Sympathie gefunden hatte , dem warst Du ein treuer Freund.

In der frühen Studentenzeit noch von einer Rastlosigkeit getrieben, sah Dein Corps Dich später als Unermüdlichen und Zielstrebigen, als Realistischen und, trotz Deiner großen beruflichen Erfolge, als Bescheidenen, der mit Offenheit, Bereitschaft für den anderen und manchem guten Rat Bestätigung und Anerkennung gefunden hat.

Dein Corps war Dir wichtig, Du warst dem Corps wichtig.

Was gäbe es nicht für Geschichten zu erzählen über gemeinsame Erlebnisse, wer schreibt das Buch..... es würde eine wesentliche Beschreibung Deines Lebens und ein unauslöschlicher Teil unserer Erinnerung.

- da sind die denkwürdigen Erlebnisse in der Leibfamilie mit Deinem Leibburschen AH Klünder und seinem Boot im Potsdamer-Yacht-Club
- da war die spontane Bereitschaft, nach der gewaltsamen Trennung unseren Corpsbrüdern im Berliner Osten durch kontinuierliche Besuche die Zusammengehörigkeit zu demonstrieren und die Einsamkeit zu nehmen
- da werden Erinnerungen wach an Deine Gastfreundschaft und Dein offenes Haus für jeden Corpsbruder zu jeder Tages- und Nachtzeit, immer unterstützt von Deiner lieben Joyce.
- da denken wir an Dein Eintreten für unsere ausländischen Corpsbrüder, deren Mentalitäten Du gut nachempfinden konntest durch Deine internationale Erfahrung.
- da sehen wir Dich als Lebensgenießer, der manchen Genuß mit fast philosophischen Akzenten versah.

Bei vielen dieser Geschichten würdest Du, wie es Deine Art war, verschmitzt lächeln, ein Lächeln, das wie ein Schmunzeln auch nach innen ausstrahlt.

Wir verlieren in Dir einen Menschen, der uns vieles gegeben hat. Wir danken Dir für alles.
Unser Abschied heute ist mit einer großen Trauer, aber auch mit der Gewißheit verbunden, daß Du in dem Gedenken Deiner Corpsbrüder weiterleben wirst, in Anekdoten, Bonmots und vielen Gesprächen. Die Geschichte des Corps ist untrennbar mit Dir verbunden.

Rede am Grabe von Prof. Dr.-Ing. Heinz Terstiege

gehalten von Herrn Dr. –Ing. Achim Willing

Es ist schwer Abschied zu nehmen von einem Menschen, der für so viele von uns so viel bedeutete.

Bei keinem ist Heinz Terstiege ohne Resonanz geblieben, sei es als Freund oder als Gegner, denn Respekt und Anerkennung war das Mindeste, was man ihm entgegen brachte. So kannte man ihn in seinem Beruf - für ihn eher Berufung - nie als Vertreter einer Institution, sondern immer als Person Heinz Terstiege.

Um über ihn berichten zu können, muss man nicht unterscheiden zwischen Beruf und privat.

Er hatte die Erkenntnis, dass wissenschaftlicher Fortschritt immer an Personen gebunden ist, meist wegen ihrer Kreativität besonders interessante Personen, und so hat er das berufliche Netzwerk in ein Netzwerk freundschaftlicher Verbindungen und Freundschaften gewandelt mit weit über das Berufliche hinausgehender Bandbreite.

Ganz besonders waren es die internationalen Aktivitäten, die ihn interessiert haben.
Heinz Terstiege hatte fachliche und persönliche Freunde in allen Regionen der Welt, in denen über Farbe und Licht nachgedacht wurde.
So war es konsequent, dass Heinz Terstiege aus einem für uns so fernen Land wie China zum Gastprofessor für das Fachgebiet Farbmetrik an die Universität in Hangzhou berufen wurde.

Ausgehend von der Plattform als Direktor und Professor in der Bundesanstalt für Materialforschung, war er in vielen bedeutenden nationalen und internationalen Organisationen seines Fachgebietes an maßgebenden Stellen tätig, verbunden mit vielen Ehrenmitgliedschaften.

Seine Tätigkeiten sollten ihn eigentlich voll in Anspruch genommen haben, aber dennoch hatte er darüber hinaus immer Zeit für seine Freunde aus dem nicht-beruflichen privaten Umfeld, seiner Corporation und seines Lions Clubs. Vor allen Dingen aber hat er die Verbindung zu alten Freunden nie abreißen lassen und immer wieder neu aufgenommen.

Der größte Glücksfall in seinem Leben war die Begegnung mit seiner Frau Joyce. Sie hat seine Stärken verstärkt und seine Schwächen gemildert. Auch der Zeitkonflikt zwischen Beruf und Familie wurde dadurch aufgelöst, dass er Joyce und zunehmend auch seine Kinder in die fachlichen und sowieso in die privaten Freundschaften mit einbezog.

Heinz Terstiege war ein brillanter Lehrmeister, der geduldig und wirksam Wissen vermitteln konnte.

Er liebte die Auseinandersetzung genauso, wie den Kompromiss und er war ein engagierter und absolut verlässlicher Verbündeter, wann immer es darauf ankam.

Bei aller Streitlust aber vergaß er nie die menschliche Seite eines Problems.

Ich bin stolz, dass wir Freunde waren.

Keiner der hier Anwesenden und keiner der heute in Gedanken hier ist wird ihn vergessen.

Du, Heinz Terstiege, wirst uns fehlen, aber die Verbindung zu Deiner Familie wird bleiben.

Nachruf für Prof. Dr. Heinz Terstiege

von Dr. Gerhard Rösler

Am Ostersonntag, den 15. April 2001 endete plötzlich das Leben von Prof. Dr. Heinz Terstiege - ein erfülltes, vielseitiges, entschlossenes, energiegeladenes, ruheloses Leben, ein Leben voller Kontakte, Freundschaften, Zielen, Reisen. Ein Leben im Dialog, in der Diskussion, mit klaren Positionen, mit Differenzen, nie langweilig, nicht immer einfach und harmonisch, aber immer mit Resonanz und auch mit sozialem Engagement.
Wir trauern um eine prägende Persönlichkeit, die vielen von uns nur aus dem Bereich Farbe und Licht bekannt war, die aber neben der Familie auch in anderen Bereichen ebenso aktiv war - in der Corpsgemeinschaft und im Lionsclub.

Heinz Terstiege wurde am 18.Juni 1934 in Münster geboren, studierte an der TU Berlin, promovierte dort 1966, wurde Nachfolger von Prof. Manfred Richter an der Bundesanstalt für Materialforschung. Als Regierungsdirektor war er Fachgruppenleiter „Optische Materialeigenschaften". In dieser Funktion hatte er vier Laborleiter: Farbmessung (Dr. D. Gundlach), Glanz (Dr. W. Czepluch), Farbtechnologie (Dr. K. Witt) und Farbwiedergabe (Dr. K. Richler).

Die aus dieser Funktion erwachsenen internationalen Aufgaben hat Prof. Terstiege gerne wahrgenommen und erweitert denn er liebte es zu Reisen, Kontakte zu knüpfen und zu pflegen, er war in der ganzen Welt zuhause. Er war Berater der UNO und der Karl Duisberg Gesellschaft in Buenos Aires, Teheran und Shanghai im Bereich Farbmessung. Er war Gastprofessor für das Fachgebiet Farbmetrik an die Universität in Hangzhou.

Er war in Deuschland u.a. Vorsitzender des Beirats des Normenausschuß Farbe im DIN von 1979 - 2001, Mitglied im Beirat der NA Lichttechnik im DIN von 1975 - 1999, NA Anstrichstoffe im DIN von 1987 – 2001, NA Pigmente im DIN von 1987-2001 sowie Vorsitzender der Normenprüfstelle im DIN von 1983 – 1987. Er war erster Träger des Manfred Richter Gedenkpreises des FNF im DIN. Er war Präsident und Motor der Deutschen farbwissenschaftlichen Gesellschaft seit 1982 und langjähriger Mitgestalter der Fachzeitschrift „Die Farbe".

Seine fachlichen Arbeiten umfaßten unter anderem die Bereiche „Sicherheitsfarben im Straßenverkehr und in der Sicherheitskennzeichnung", „Farberkennung – Farbwiedergabe", „Farbmesstechnik", zu denen er über 100 Publikationen verfaßte.

Prof. Terstiege war Sekretär der "Commission Internationale de l' Éclairage" CIE (1979 – 1991), Vizepräsident und Präsident der „Association Internationale de la Couleur" AIC (1982 – 1989) und Träger des Judd Preises der AIC (1995), Organisator von mehreren erfolgreichen internationalen AIC Tagungen (niemand hat mehr AIC Tagungen organisiert als Prof. Terstiege !), Schatzmeister, dann Vorsitzender des deutsches nationalen Komitees der CIE (1975 – 2000), Ehrenmitglied der Grupo Argentino del Color (1980), der slovenischen Farbvereinigung (1998).
Er war Mitglied in der „Optical Society of America" OSA seit 1965, des „Inter-Society Color Council" ISCC seit 1970, der „Conference on Optical Radiation Measurement" CORM seit 1987.

Nach seinem Ausscheiden aus der BAM im Jahr 1999, einem Jahr in dem der FNF sein 50 jähriges und die DfwG ihr 25 jähriges Bestehen feiern konnten, in den (Un-) Ruhestand war Prof. Terstiege weiterhin aktiv mit all seinen nationalen und internationalen Kontakten und Aufgaben. Er war weiterhin gern gesehener Teilnehmer an Tagungen, Meetings und hatte weiterhin einen randvollen Terminkalender und viele Pläne. Jetzt hat dieses Leben ein Ende gefunden, es war ein Leben voll Arbeit und Freude, Disziplin und Lebenslust.

Wir werden Prof. Dr Heinz Terstiege stets ein ehrendes Andenken bewahren und auf seinen Leistungen aufbauen.

Dr. Gerhard Rösler
Vorsitzender des Beirats des Normenausschusses Farbe (FNF) im DIN und stellvertretender Vorsitzender der DfwG.

Obituary

von Dr. Klaus Witt

Heinz Terstiege (1934-2001)

Heinz Terstiege, a long time representative of Germany's colour science and internationally well renown , died suddenly on Easter , April 15, 2001 at his home in Pausdorf Northern Bavaria/Germany.
He was born on June 18, 1934 in Münster Northrhine-Westfalia/Germany, where he grew up and left high-school 1954. He afterwards studied electrotechnique engineering at the Technical University of Berlin where he received a diploma 1962. At that time he took up contact to Prof. Manfred Richter who was head of the Division of Colorimetry at the Federal Institute of Materials Testing (BAM) (later the word "Research" was added to the institute), and professor at the Technical University. Heinz Terstiege started work on a Ph. D. thesis at BAM investigating effects of high retinal illuminances on the validity of the persistence and coefficient laws after von Kries, and finished in 1966.
Meanwhile he became employee of BAM, and in 1967 he took over the chair of the laboratory on colour measurement within the Division of Colorimetry. After three years Manfred Richter retired and he got the chance to follow him as head of the Division. He served for a broadening of the scope of the Division of Colorimetry at BAM by filling up the positions of four chairs of laboratories: colorimetry (Dr. D. Gundlach), gloss (Dr. W. Czepluch), colour engineering (Dr. K. Witt), and colour rendition (Dr. K. Richter). However, the total number of employees did not exceed 15. So, the research work at BAM was focused on selected aspects of colorimetry and photometry only, and could not touch the complete broad scale of colour science. An essential issue very soon became research work in connection with international standardisation needs.

This was the start of broad career in international contacts. Heinz Terstiege was adviser for UNO and Carl Duisberg Society in Buenos Aires, Teheran and Shanghai in the field of colorimetry. He became member of a variety of technical Committees in CIE and ISO dealing with all parts of colorimetry and photometry. He engaged himself in CIE Technical Committees on Signaling Colours, on Colours in Road Traffic, in ISO-Committees of Warning and Safety Colours where he could add his experience with ordinary colorimetry, and with retroreflecting and fluorescent colours for traffic, identification and safety. Another research project was the quantification of colour rendering properties of light sources with respect to colour matching. A practical application in Germany was the standardisation of light sources for the illumination of meat at the butcher's shop. By the end, his list of publications extended to more than 100. Another aspect of scientific output was the position of a co-editor of the scientific German journal Die Farbe since 1975. In 1990 he became editor when Manfred Richter passed away.

His main activities concentrated on the representation in different organisations in part as member, in part in the chair. He became head of the German standardisation group on colour within DIN (FNF) from 1979 to 2000, and served as advisor in different other such groups in DIN. He was the first recipient of a Manfred-Richter FNF-Award connected with a golden pin in 1994. In 1974 he founded the German scientific society on colour together with Manfred Richter and others, and was elected vicepresident 1974-1982 and president since 1982. He was treasurer of the German National Committee of CIE 1975 – 1991 and chairman since 1991. For CIE he was secretary 1979 – 1991. He served as vicepresident for AIC 1982 - 1985 and as president 1986 – 1989. He became member of the Inter-Society Color Council (ISCC) in 1970. Especially his international contacts made him friends world wide. He became honourable member in 1980 of the Grupo Argentino del Color , and in 1998 for the Colour Association of Slovenia. Outstanding was the receipt of the Deane B. Judd-AIC Award during the AIC midterm conference in Berlin 1995. He was honoured because of his contributions to a variety of colorimetric aspects brought up while formulating technical standards or technical reports as well in Germany as in international organisation such as CIE and ISO.

The AIC conferences organised 1981 as regular and 1995 as midterm meeting in Berlin were great successes because of his talent to manage such events very efficiently. Two smaller conferences organised by him were the AIC Stiles-Wyszecki Memorial Symposium on Color Vision Models 1987 in Florence, Italy, and the AIC Interim Symposium Instrumentation for Colour Measurement 1990 again in Berlin.

He was also engaged in teaching colorimetry firstly at BAM with two-weekly, and later weekly tutorials together with the employees of the Division, and started two-and-a-half-day tutorials at the Technical Academy in Esslingen, Germany, together with D. Gundlach. The audiences were filled by a variety of interested people, mainly from industry and federal departments. More than 2000 students may have passed during all the years. In addition, he received a professorship of Zhejiang University in Hangzu, Republic of China, where he taught for several years colorimetry.

His professional career at BAM ended with new duties which he overtook when BAM became reorganised. He had to manage the international contacts of BAM in standardisation work. This was a field for which he could supply great experience.

When he retired in June 1999 he remained still active with all his international contacts touring around from conferences to meetings etc. He was a well accepted partner in discussions on standardisation where he every time convinced people about the necessity to strictly obey once accepted rules. On the other hand he could become angry, if he felt that this understanding was missing. However, a special character of him was to take up social contacts with other people, and to find friends for relaxing meetings.

There was a great international family which liked to see him again, when he attended meetings or conferences. One personal attitude may be mentioned: he could fell asleep in every situation where he was not personally engaged. All of us knew about it and smiled at that. Now he fell in his last sleep. The colour family will miss him.

Klaus Witt

aic 2001 Tagung in Rochester

Gesamtprogramm

Nachdem im letzten DfwG Report das Kongressprogramm mit den Symposien vorgestellt wurde, folgt diesmal das Gesamtprogramm mit allen Vorträgen. Die zum Teil umfangreichen Kurzfassungen stehen im Internet unter: http://www.iscc.org/aic2001/abstracts/

Schedule of Oral Papers and Symposia

* Indicates Invited Speaker

Monday, June 25 8:30 am - 10:30 am	**Opening Session and Special Lecture**
Color Appearance **Monday, June 25** **11:00 am - 12:00 noon**	Session chair: Mark Fairchild Moroney, *Background and the perception of lightness* Juan, Luo, *Magnitude Estimation for Scaling Saturation* Li, Luo, *A Uniform Colour Space Based upon CIECAM97s*
What is Color? **Monday, June 25** **11:00 am - 12:00 noon**	Session chair: Rolf Kuehni Roberson, *Color Categories are not universal: New evidence from Traditional and Western cultures* Tillberg, *The Russian Avant-Garde and Colour as Worldview* Maund, *A Pluralistic Framework for Thinking about Colour*
Vision **Monday, June 25** **1:00 pm - 3:00 pm**	Session chair: Mitsuo Ikeda Ishida, *Assessment of color search performance in photopic and mesopic illuminances based on color identification data* Okajima et al., *Age-Related Changes in Color Appearance Depend on Unique-Hue Components* Shaw & Fairchild, *Evaluating the 1931 CIE Color Matching Functions* Shinoda, Ikeda, *Transition between color contrast and assimilation by perceived size manipulation* Vienot, *Rating of tinted ophthalmic lenses* Yamauchi, Williams, Brainard et al, *What determines the unique yellow, L/M cone ratio or visual experience?*
Monday, June 25 **1:00 pm - 3:00 pm**	**The Why's and How's of Color Management: A Tutorial** **Coordinator: Rob Buckley, Xerox** **Why Color Management?** ***James C. King** **Principal Scientist, Adobe Systems Incorporated**
Art & Design **Monday, June 25** **1:00 pm - 3:00 pm**	Session chair: Menu, Colinart, Elias, *Colour studies in Encaustic Fayum Portraits* Lazaro, *Renaissance: The color between the ideals of Beauty and reasons of Freedom* Carrabot, Lewis, *A Method of Simulating Paint Mixing on Computer Monitors* Albert-Vanel, *Optical Fusions and Proportional Syntheses* Melita, *Applications of the Three Color Zone System: A cinematographers tool to understand color* Charnay, *Colour, light and altruistic creation*
Vision **Monday, June 25** **4:00 - 6:20 pm**	Session chair: Joel Pokorny Ayama et al, *Whiteness Perception in Japanese and Finnish under Cool and Warm Fluorescent Lamps* DaPos, Sponga, *Fluorescence thresholds for some reddish colours* Nakano et al, *A Uniform Color Space Based on Color Vision Mechanisms* Ripamonti, Westland, *Perceptual Transparency* Sagawa, *Visual Comfort Evaluated by Opponent Colors* Guth, *ATD01 Model for Color Appearances and Differences* Aoki, Shinoda, Ikeda, *Floating phenomenon and Mode of Color Appearance*
Symposium	**What is Color?**

Monday, June 25 4:00 pm - 6:00 pm	**Coordinator:** Paul Green-Armytage **School of Design, Curtin University of Technology, Western Australia** **Moderator:** Larry Hardin **Emeritus Professor of Philosophy, Syracuse University** ***Introduction*** Paul Green-Armytage, **Curtin University of Technology, Western Australia** ***Color Experience and the Humal Animal*** *C.L. Hardin, **Emeritus Professor of Philosophy, Syracuse University** ***What is Color?*** *Lois Swirnoff, **Feltman Professor of Light and Color, Cooper Union for the Advancement of Science and Art** ***Color vision is form and object vision*** *John S. Werner, **Ophthalmology Department, University of California** ***On the nature of colours*** *Osvaldo da Pos, **Department of General Psychology, University of Padua, Italy** ***Color: what could it be?*** *Rolf G. Kuehni, **Color consultant**
Symposium Tuesday, June 26 8:30 am - 10:30 am and 11:00 am - 12:00 noon	**Imaging Techniques of Spectral Estimation (Spectral Imaging)** **Moderator:** Roy Berns **MCSL, Rochester Institute of Technology, Rochester, NY** ***Welcome and Overview*** *Roy Berns, **Rochester Institute of Technology** ***Optimization of total multispectral imaging systems: Best spectral match versus least observer metamerism*** **Bernard Hill, Aachen University of Technology** ***Gonio-Photometric Imaging for Recording of Reflectance Spectra of Three Dimensional Object*** *Yoichi MIYAKE, H. HANEISHI, Norimichi TSUMURA, and Junichiro HAYASHI[1] **Chiba University, Japan; [1]Mitsubishi Electronic Microcomputer Application Software** ***Spectral estimation from laser scanner data for accurate color rendering of objects*** Réjean Baribeau, **National Research Council Canada** ***A New Procedure for Capturing Spectral Images of Human Portraiture*** Qun Sun, Mark Fairchild, **Rochester Institute of Technology** ***Representation of Spectral Images in Data Communications*** Markku Hauta-Kasari, Juha Lehtonen, Jussi Parkkinen, and Timo Jaaskelainen, **University of Joensuu FINLAND** ***Spectral estimation of artists oil paints using multi-filter trichromatic imaging*** Francisco Imai, Roy Berns, **MCSL, Rochester Institute of Technology** ***Wrap-up***,Roy Berns
Symposium	**The Artist and Digital Media**

Tuesday, June 26 **8:30 am - 10:30 am**	**Moderator** Wade Thompson **Assistant Head, Art and Design, Southwest Missouri State University** ***title TBD*** *Donna Cox, **Beckman Institute, University of Illinois<** ***Painting by Numbers*** *Liz Lee, **State University of New York at Fredonia** ***The Paperless or Vanishing Society?*** *Joy Luke, **Studio 321**
Architecture **Tuesday, June 26** **11:00 am - 12:00 noon**	Session chair: Jin-Sook Lee Billger, *Colour Appearance in Virtual Reality: A Comparison Between a Full-Scale Room and a Virtual Reality Simulation* Toda, Ishida, *How does our visual system interpret the color of light filled in a three-dimensional space?* Oberascher, *"LUMINOS 3" - A New Tool to Explore Colour and Light in 3-D*
Architecture **Tuesday, June 26** **1:00 pm - 3:00 pm**	Session chair: Monica Billger Metcalfe, *Gender, Color and the Domestic Sphere* Servantie, *Color: Architectural Dimension* Schindler, *Color in Present Culture of European Architecture* Ural, *An Analysis on Architectural Coloring Process* Cler Cler, *CHROMATICTOWNSCAPE and Colour Words* Minah, *Color Constellations in the Seattle Cityscape*
Color Appearance **Tuesday, June 26** **1:00 pm - 1:40 pm**	Session chair: Paula Alessi Mizokami, Shinoda, Ikeda, *Degree of color constancy yielded in a photograph perceived as 3D space* Yamauchi, Ikeda, Shinoda, *Demonstration of the Light Source Color on a Photograph*
Symposium **Tuesday, June 26** **1:00 pm - 3:00 pm**	**Color Issues for Digital Archives** **Moderator:** **Franziska Frey, Image Permanence Institute, Rochester Institute of Technology** ***Introduction*** ***Franziska Frey, Rochester Institute of Technology** ***Accurate colour images: from expensive luxury to essential resource*** ***David Saunders, Scientific Department, The National Gallery, London, U.K.** ***Color Strategies for Image Databases*** ***Sabine Susstrunk, Audiovisual Communications Laboratory, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland** ***Digital Slide Reproduction using Densitometry*** **Peter R. Fornaro, *Rudolf Gschwind[1] and Pip Laurenson[2]** **1) University of Basel, Scientific Photography Lab, 2) Tate Gallery London** ***Spaces of probability distributions and their applications to color based image database search*** **Linh Tran, Reiner Lenz, Linköping University, Sweden**

Color Difference **Tuesday, June 26** **1:40 pm - 3:00 pm**	Session chair: Klaus Witt Hong & Luo, *Perceptually based colour difference for complex images* Klassen, *Colour Difference Metrics and Surround Effects: Preliminary Results* Zhu, Cui, Luo, *New Experimental Data for Investigating Uniform Colour Spaces* Xin, *Comparative Study of Visual Colour Differences Using Reflective and Self-luminous Colour Stimuli*
Color Difference **Tuesday, June 26** **4:00 pm - 5:20 pm**	Session chair: Jim Nobbs Cui, Luo, Rigg, *Investigation of the* Crispening Effect; *on Lightness Differences* Berns, *Derivation of a hue-angle dependent, hue-difference weighting function for CIEDE2000* Kuehni, *Uniform color space is not homogeneous* Gay, Hirschler, *Determination of Industrial Colour Tolerance Limits - Case Studies in the Textile Industry*
Symposium **Tuesday, June 26** **4:00 pm - 6:00 pm**	**What is Color For** **Organized by ISCC Interest Group III, Art, Design and Psychology** **Co-moderators:** Georgia Kalivas, Meg Miele, **Fashion Institute of Technology, NY** ***The Aesthetics and Commercial Value of Color*** ***Margaret Walch, Associate Director of the Color Association of the United States (CAUS)** ***Color in Home Furnishings*** ***Catharine Stein, Director of the Color Council for the Home Furnishings Industries** ***Color as a Language in Architecture*** ***Grete Smedal, Centre for Form and Colour in the Art and Design School, Bergen, Norway** ***Color and the Worldwide Web,*** ***Ray Kinlock, Surface Design Department,Fashion Institute of Technology, New York**
Industrial Color **Tuesday. June 26** **5:20 pm - 6:00 pm**	Session chair: Robert Hirschler Hutchings et al., *Food Colour and Appearance Measurement, Specification and Communication, can we do better?* Simon, *The Process Industries- Graphic Arts, Paint, Plastics and Textiles: All Cousins under the Skin*
Wednesday, June 27 **8:30 am - 9:30 am**	**General Assembly**
Color Physics **Wednesday, June 27** **9:30 am - 10:30 am**	Session chair: Hernandez-Andres, Romero, Nieves, *Daylight Spectral Power Distribution Recovery Through a Linear Model and Few Filters* Callet, Seve, *From mean diffuse external reflectance to color and visual appearance representation* Liu, *The Iridescence Color of Shells*
Art & Design **Wednesday, June 27** **9:30 am - 10:30 am**	Session chair: Grete Smedal MacDonald, *Effective Colour Design for Displays* Guan, *A Study of color harmony relating with area ratio* McGinley, *The Development of a Large Colour Range for a Paint Company*

Industrial Color **Thursday, June 28** **8:30 am - 10:30 am**	Session chair: Ralph Stanziola Kettler, *Complex refractive index and colour of quinacridone pigments* MacDougall, *Discontinuity, bubbles and translucence: major factors in food colour measurement* Chong, *The Role of Digital Printing and Color Technology in the Digital Revolution for the Textile World* Simeonova et al., *Colored Light Application in Retail Display* Xu, Luo, *Evaluating the Quality of Daylight Simulators Using Metameric Samples* Viggiano, *A Perception-referenced Method for Comparison of Radiance Ratio Spectra and its Application as an Index of Metamerism*
Symposium **Thursday, June 28** **8:30 am - 10:30 am**	**The State of the Art and Future of Color Management** **Moderator:** Rob Buckley, **Xerox** ***The Evolution of the ICC Profile Connection Space*** *George Pawle **(Eastman Kodak) and** Lars Borg **(Adobe Systems)** ***Quality Evaluation of current ICC profile-Generation-Tools for CMYK-output*** *Eggert Jung **(NexPress);** Hendrik Büring **(ITE),** Patrick G. Herzog **(ITE)** ***CMS for Digital Photography,A Case Study*** Bob Chung, Darunee Sa-areddee, **Rochester Institute of Technology** ***Image-dependent Color Mapping for Pleasant Image Renditions*** Hiroaki Kotera, Mitsunori Suzuki, Takeshi Mita, and Ryoichi Saito, **Chiba University, Japan** ***Image State Architecture*** Geoffrey J. Woolfe, Kevin E. Spaulding, **Eastman Kodak, Rochester, NY** ***Trends in Color Imaging on the Internet*** **Giordano Beretta (Hewlett Packard), Rob Buckley (Xerox)**
ECD / Architecture **Thursday, June 28** **8:30 am - 10:30 am**	Session chair: John Hutchings Herneoja, *Colors of Home* Basoçlu, *Color Scheme Preferences of Elementary School Children in their School Environments* Smith, *RED or READ? — Built Environment Coloured* Inagaki, *A Study on Evaluation of Exterior Colors of Buildings with Effects of Colors of Foreground Buildings* Rizzo, *Works on color design installed in a urban environment* Avila, *The colour and urban image at the beginning of 21st century*
Color Measurement **Thursday, June 28** **11:00 am - 12:00 noon**	Session chair: Frank Rochow Eppeldauer, *A Reference Tristimulus Colorimeter* Miyazawa, Toyooka, Kurashiki, Hauta-Kasari, *Broad-band color filters with arbitrary spectral transmittance using a Liquid Crystal Tunable Filter (LCTF).* Nadal, *Standardization of Reflectance Colorimetry*
Teaching Aids **Thursday, June 28** **11:00 am - 12:00 noon**	Session chair: Javier Romero Tarrant, *Visual Color Matching Equipment for Teaching and Research* Gaudio, De Ponti, *Interactive Multimedia Systems as comunication chanels in color workshops* Sobotka, *CBT – a new approach for designing color teaching aids for the media industry*

Symposium Thursday, June 28 1:00 pm - 3:30 pm	How is CIE Helping Us Make Color Work Moderator: Michael Pointer, National Physical Laboratory, Teddington,, UK *CIE: Vision, Colour and Imaging* *Michael R Pointer, National Physical Laboratory, Teddington,, UK *Status of CIE Color Appearance Models* *Mark D. Fairchild, Munsell Color Science Laboratory, Rochester, NY *The CIE 2000 Colour Difference Formula: CIEDE2000* *M. Ronnier Luo, Colour & Imaging Institute, University of Derby, U.K. *Making Color Work in Image Technology* *Todd Newman, Director, CIE Division 8, Canon R&D Center Americas, Inc *Report on a fundamental chromaticity diagram with physiologically significant axes* *Francoise Vienot, chair of CIE TC 1-36 *Discussion and Wrap-up*, Michael Pointer
Symposium Thursday, June 28 1:00 pm - 3:30 pm	Environmental Color Design Moderators: José Caivano, Buenos Aires University, Argentina Leonhard Oberascher, KO-PSY, Austria *Report of activities of the ECD study group* Caivano, Leonhard Oberascher *Colour appearance in rooms lit by daylight: observations of hue shifts in sunlight and skylight* Maud Hårleman, Royal Institute of Technology, Stockholm *Colour contrasts in advertising* John Hutchings *Climate and coloured walls, in search of visual comfort* Malvina Arrarte-Grau, Universidad Ricardo Palma, Lima-Perú *What colour is the red house? Perceived colours of painted facades* Karin Fridell Anter, Royal Institute of Technology, Stockholm *Transformation of "paint" to "color" in urban space: Bursa example* Susan Habib, Nihal Cetinturk, Gazi University, Ankara, Turkiye *Black -meaning and connotation in Europe and Africa* Fatumata Oberascher, Leonhard Oberascher

Color Education **Thursday, June 28** **1:00 pm - 3:30 pm**	Session chair: Berit Bergstrom Linton, *Expanding Color Design Methods For Architecture And Allied Disciplines* Unver, *Color Education in Architecture* Kwon Kim, *A Study of Web-based Color Education* Colla, *Rainbow Solfege: A New Perspective for Color Theory and Music Education* Appell, *Colorimetry as a General Model of Observations in the Resolution of Quantum Paradoxes* Smith, *The Colour Studio in Crisis – Managing Change* Estevez, *How do we teach color?*
Color Measurement **Thursday, June 28** **4:00 pm - 6:00 pm**	Session chair: Gerhard Rosler White, Taylor, *The Effect Of Instrument Design On Diffuse Reflectance Measurements* Sakatani, Itoh, *The effect of gloss on perceived lightness* Baba Suzuki, *Study on Geometric Conditions for Reflection Measurement (2).- The Effects of Light Trap Size of Integrating Sphere* Hirschler Gay, *Industrial Colour Measurement - the State of the Art* Witt, *Colorimetric control of photographic prints: the problem of fluorescence* Schanda et al , *LED Colorimetry*
Symposium **Thursday, June 28** **4:00 pm - 6:00 pm**	**How Should We Teach Color?** **Coordinators:** Geoffrey Rogers, **Fashion Institute of Technology, NY** **Chair, ISCC Education Committee** Manuel Melgosa, **University of Granada, Spain** **Moderator:** Geoffrey Rogers ***Creative Colour education*** ***Berit Bergström, Scandanavian Colour Institute** **Chair, AIC Education Committee** ***Interactive bibliographical database on color*** **Jose Caivano, Buenos Aires University, Argentina** ***Distance Learning: A Discussion of the Implementation of a Graduate Course of Study Using Various On-Line Technologies*** ***Ethan Montag, Rochester Institute of Technology** ***Colour Zones – Connecting Colour Order and Everyday Language*** **Paul Green-Armytage, School of Design, Curtin University of Technology, Western Australia** ***Color Education as an Interactive Experience*** ***Margaret Miele, Fashion Institute of Technology**
Color Order Systems **Friday, June 29** **8:30 am - 10:10 am**	Session chair: Gunilla Derefeldt Brill et al , *The Color-Order Screen Book: A Softcopy-simulated color atlas with selectable observer and illuminant* Choi, *A Verificational Study of NCS (Natural Colour System) Notation - Validity of Colour Notation by NCS Three Attribute Diagram* Indow, *Uniformities in OSA-UCS and in NCS tested by color difference prediction based on principal hue components* Kobayasi & Yosiki, *An Effective Conversion Algorithm from OSA-UCS to CIEXYZ* Olearı, *Color Opponency and scale uniformity in the OSA-UCS system: the geometrical structure*

Symposium **Friday, June 29** **8:30 am - 10:30 am**	**The Future Role of Color in the Three Dimensional World** **Moderator:** Shashi Caan **Design Director, Skidmore Owings & Merrill, Architects** ***Introduction*** ***Shashi Caan, Design Director, Skidmore Owings & Merrill, Architects** ***Painting with Light: Enlightening Your Architecture with Color*** *Paul Gregory, **Focus Lighting Inc** ***From Dante's Inferno to a Garden of Paradise: How color affects this global World*** *Chris Rainier
Color Imaging Applications **Friday, June 29** **10:10 am - 10:30 am and** **11:00 am - 12:00 noon**	Session chair: Raja Balasubramanian Ingram, *Printing Processes-Opportunities and Limitation* MacDonald Morovic, Xiao, *Evaluation of a Colour Gamut Mapping Algorithm* Song, Luo, *Colour Difference Thresholds for Cross-media Colour Image Reproductions* Koenig, et al, *A multiprimary Display: Discounting observer metamerism*
Art & Design **Friday, June 29** **11:00 am - 12:00 noon**	Session chair: Joy Luke Sakamoto, Kato, *How do we find and handle colors with the same undertone? – A proposal of method to manage colors according to their color undertones* Martinson, Waldron, *Color in Graphic Design: An Analysis of Meanings and Trends* Cheng, Xin, Taylor, *Colour Planner for Designers to Select Colours based on Colour Emotions*
Image Analysis & Synthesis **Friday, June 29** **1:00 pm - 3:30 pm**	Session chair: Janos Schanda Bouzit, MacDonald, *Does Sharpness Affect the Reproduction of Colour Images?* Takemura et al., *Developing a new psychophysical experimental method to assess image quality* Wesolkowski, Fieguth, *Color Image Segmentation Using a Region Growing Method* Kobayasi & Suzuki, *Mathematical Analysis of Color Combination and Color Composition of Images* Tominaga, Ishida, Wandell, *Illuminant Estimation of Natural Scene Using the Sensor Correlation Method* Meyer, Westland, Walker, *A Computer Graphic System for Rendering Gonio-Apparent Colors* Tanaka, Tominaga, *Estimation of a 3D Spectral Reflection Model for Color Image Rendering*
Color Preference **Friday, June 29** **1:00 pm - 3:30 pm**	Session chair: Elena Fedorovskaya Buss, *A Paler Shade of White* Saito, Date, et al., *A Comparative Study in Japan and China Concerning Aspiration of Asian Women Towards Quality of Skin Fairness* Camgoz, Yenner, *Effects of Hue, Saturation, and Brightness on Preference* Lee, KJ, *Cross-cultural Differences in Color Preferences: Implications for International Film distribution* LeeTR, *How Life Associated with Colors in Chinese Culture -- Utilizing Colors Based-on Chinese Five-Essence Theory* Ohno, Koizumi, *A Study on the Mood-Perception of Interior Colors Using Chromatic and Achromatic-Colors in an Exercise Room - A relationship between subjects aged in their twenties and forties to fifties* Sato, Kajiwar, Xin, *Numerical Expression of Colour Emotion and its Application*

Symposium Friday, June 29 4:00 - pm - 5:30 pm	The Future of Color Coordinator and Moderator: Jack Ladson, ISCC President *The Future of Color in Design* *Melanie Wood, Design Consultant, Mannington Mills, Inc. *Where have come from, where were we all week, where do we go from here?* *Paul Green-Armytage, School of Design, Curtin University of Technology, Western Australia *Robert Hunt, Consultant
	Closing Session

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

CIE DIVISION 1: VISION AND COLOUR

Active Committees

(V) - Vision (C) - Colour

TC1-19 (V) Specification of Visibility for Real Tasks

Terms of Reference:
To prepare a review of all methodologies for evaluating the visibility (threshold or suprathreshold) of real tasks.
Chairman: W K Adrian CA

TC1-21 (V) Testing of Supplementary System of Photometry

Terms of Reference:
To test existing methods of photometry to evaluate lights for assessing comparative brightness relationships.
Chairman: K Sagawa JP

TC1-26 (V) Individual Variation of Heterochromatic Brightness Matching

Terms of Reference:
To analyze existing data on heterochromatic brightness matching in terms of individual variation.
Chairman: H Yaguchi JP

TC1-27 (C) Specification of Colour Appearance for Reflective Media and Self-Luminous Display Comparison

Terms of Reference:
To study and make recommendations for the specification of a colour appearance match between a reflective image and a self-luminous display image.
Chairman: P J Alessi US

TC1-30 (V) Luminous Efficiency Functions

Terms of Reference:
To prepare a Technical Report on luminous efficiency functions which classifies and specifies the existing functions $v_{b,point}(l)$, V(l), $v_{b,2}(l)$, vM(l) and $v_{b,10}(l)$, and the colour matching function $y_{10}(l)$ if appropriate, in their photometric use.
Chairman: M Ikeda JP

TC1-36 (V) Fundamental Chromaticity Diagram with Physiologically Significant Axes

Terms of Reference:

To establish a chromaticity diagram of which the coordinates correspond to physiologically significant axes.
Chairman: F Viénot FR

TC1-37 (V) Supplementary System of Photometry

Terms of Reference:
To recommend a system of photometry to assess lights in terms of their comparative brightness relationships at any level.
Chairman: K Sagawa JP

TC1-38 (C) Compatibility of Tabular Data for Computational Purposes

Terms of Reference:
To prepare guidelines for tabulating CIE spectral data to provide compatibility of sets of data for computational purposes, considering such factors as spectral range, spectral interval, function, truncations, interpolation, extrapolation and number of digits.
Chairman: C McCamy US

TC1-41 (V) Extension of vM(l ll l) Beyond 830 nm

Terms of Reference:
To write a report on the feasibility of extending the vM(l) function beyond 830 nm, and the possible amendment of vM(l) on the long wavelength side.
Chairman: P L Walraven NL

TC 1-42 (V) Colour Appearance in Peripheral Vision

Terms of Reference:
To prepare a technical report on colour appearance zones for coloured lights in terms of unique hues in peripheral vision.
Chairman: M Ayama JP

TC1-44 (C) Practical Daylight Sources for Colorimetry

Terms of Reference:
1. To intercompare existing daylight simulators for colour measuring instruments and colour matching booths
2. On the basis of this intercomparison, to recommend practical methods for simulating daylight sources.
Chairman: R. Hirschler BR

TC 1-46 (V) Concept and Application of Equivalent Luminance

Terms of Reference:
To write a technical report describing the fundamental concept of equivalent luminance and to provide guidelines on how to apply these concepts.
Chairman: Y Nakano JP

TC1-47 (C) Hue and Lightness Correction to Industrial Colour Difference Evaluation

Terms of Reference:
To investigate the hue and lightness dependence of industrial colour difference evaluation

using existing experimental data.
Chairman: D. H. Alman US

TC1-48 (C) Revision of CIE Document 15.2 Colorimetry

Terms of Reference:
To produce a revised edition of CIE Document 15.2 taking into consideration other relevant
CIE recommendations
Chairman: J Schanda HU

TC1-50 (V) Disability Glare Formula

Terms of Reference: 13
To prepare a technical report describing a formula for disability glare that revises the Stiles-Holladay formula including dependencies of wider angular part and age.
Chairman: J J Vos NL

TC1-51 (V) Visual Acuity

Terms of Reference:
To write a technical report to provide, on the basis of data collected from the literature, standard functions on visual acuity defined by the Landolt-ring as a function of luminance, contrast, presentation time, age colour.
Chairman: HJ Schmidt Clausen DE

TC1-52 (C) Chromatic Adaptation Transform

Terms of Reference:
To review the chromatic adaptation transforms with a view to make a recommendation.
Chairman: MR Luo GB

TC1-53 (C) A Standard Method of Assessing the Quality of Daylight Simulators

Terms of Reference:
To prepare a CIE Standard for the assessment of daylight simulators
Chairman: C McCamy US

TC1-54 (V) Age-Related Change of Visual Responses

Terms of Reference:
To establish luminous efficiency, visual acuity, and contrast sensitivity as a function of age.
Chairman: K Sagawa JP

TC1-55 (C) Uniform Colour Space for Industrial Colour Difference Evaluation

Terms of Reference:
To devise a new uniform colour space for industrial colour-difference evaluation using existing experimental data.
Chairman: J Nobbs GB

TC1-56 (C) Improved Colour Matching Functions

Terms of Reference:
1. To compare results based on the current CIE colour matching functions, colour matching functions proposed by Dr. W. Thornton's laboratory, and those of CIE TC1-36.
2. To initiate experiments to obtain data for such comparison in different laboratories.
3. To report to CIE Division 1 on the results of the above investigation and make an eventual recommendation for future CIE colour matching functions.
4. To report to CIE Division 1 an eventual recommendation for the use of the new colour matching functions in specifying colour spaces and colour-difference formulas.
Chairman: M Brill US

TC1-57 (C) Standards in colorimetry

Terms of Reference:
To prepare a series of CIE/ISO/IEC Standard(s) that describe:
1. The method of calculating CIE tristimulus values and chromaticity coordinates
2. A uniform colour space and its associated metrics
3. A formula for industrial colour difference evaluation.
Chairman: M Pointer UK

TC1- 58 (V) Visual Performance in the Mesopic Range

Terms of Reference:
To define visual performance and related terms. To investigate performance based on photometry and colorimetry in the low photopic to scotopic region. To investigate and establish a relationship between performance and equivalent luminance.
Chairman: J Taylor GB

TC1- 59 (V) Standard Photometric 10° Observer

Terms of Reference:
To adopt the CIE $y_{10}(l)$ as the spectral luminous efficiency function of the standard photometric 10° observer.
Chairman: J Schanda HU

Reporters

R1-11 (C) Cognitive Aspects of Colour: G Derefeldt SE

Terms of Reference:
To survey and present a report on cognitive functions of colour in terms of behavioral, neuropsychological and neurophysiological data

R1-15 (C) Lighting Terminology: M. Pointer GB

Terms of Reference:
To provide liaison between Division 1 and TC7-06 'International Lighting Vocabulary' and support the preparation of a new edition of the 'Lighting Vocabulary'. (TC 7-06 no longer exists.)

R1-16 (V) Visual Adaptation to Complex Luminance Distribution: H Shinoda JP

Terms of Reference:
To survey state-of-the-art research on visual adaptation to complex luminance distribution and to judge whether CIE should establish a new Technical Committee on this issue.

R1-18 (C) The Use of Colour Identification under Various Illuminance Levels: T Ishida JP
Terms of Reference:
1. To survey the state-of-the-art of colour codes under various illuminance levels
2. To judge whether the CIE should establish a Technical Committee on this topic
3. To establish liaisons with CIE Divisions 3 and 4.

R1-19 (V) Specification on Individual Variation in Heterochromatic Brightness Matching: H Yaguchi JP
Terms of Reference:
To report on the possibility to develop a simple test of individual characteristics for heterochromatic brightness matching.

R1-20 (V) Visual Performance in the Mesopic Range: J Taylor GB
Terms of Reference:
1. To survey researchers and needs for specifying visual performance in the range of mesopic vision.
2. To report to Division 1 whether a TC on some specific visual performance should be established.

R1-22 (V) Constrast Sensitivity Function for Detection and Discrimination
E Martinez-Uriegas US
Terms of Reference:
To survey the literature on human spatial contrast sensitivity function under defined viewing conditions including luminance levels, surround, adaptation state, and geometry.

R1-23 (V) Guidelines on Planning a Mesopic Photometry Investigation
23
P Trezona GB
Terms of Reference:
With several new mesopic photometry investigations being contemplated, the impact of theory of other considerations on the experimental design will be reported.

R1-24 (C) Colour Appearance Models M Fairchild US
Terms of Reference:
To monitor the progress and development of colour appearance models.

R1-25 (C) Liaison with ISO/TC35: Paint and Varnishes Colorimetry K Witt DE
Terms of Reference:
To cooperate with ISO/TC35 in their production of a series of ISO standards for the colorimetry of paints and varnishes.

R1-26 (C) CIE Encyclopaedia on Colour - P Walraven NL
Terms of Reference:

To investigate the feasibility of producing an encyclopaedia on Colour as a CIE publication. The study should include the consequences of a publication by CIE, being its own publisher, and of a publication by CIE in cooperation with a well-known publisher.

R1-27 (V) Measurement of Pupil Diameter – P Trezona UK
Terms of Reference:
To examine the reported variation of pupil diameter with both photopic and scotopic luminance.

Liaisons

Association International de la Couleur: - P J Alessi
The AIC 200 Interim Meeting on Color and Environment was held in Seoul, Korea on November 6 and 7. The Korean Society of Color Studies put together an outstanding scientific and social program. There were 234 attendees in all; 162 from Korea and 72 from abroad. This Interim Meeting featured 33 oral and 45 poster contributed papers. The published proceedings will be available in February, 2001.
Three new national colour groups have been recently accepted for AIC membership: The Color Group of Thailand, The Asociacion Boliviana Del Color, and The Associacao Brasileira da Cor. Two new observer members have been added to AIC: Dr. Leonhard Oberascher (Austria) and Ms. Susan Habib, Architect (Turkey).
The next meeting of the AIC will be its quadrennial 9th Congress in Rochester, New York from June 24-29, 2001. This Congress will feature 10 symposia with approximately 40 invited speakers. Over two hundred papers will be presented in the areas of What is colour?, What is colour for?, How does colour work?, How can we control colour? and How can we teach colour? Please visit the website, www.iscc.org/aic2001 for more details.

ISO/TC35: Determination of Colour Bias of Achromatic Near White Paint Films: H Terstiege
ISO/TC38/SC1: Textiles: Colour Fastness & Measurement: J Nobbs
ISO/TC42: Photography: H Yaguchi
ISO/TC187: Colour notations: C S McCamy
ISO/TC6/3: Paper, Board and Pulp - Optical Properties: J C Zwinkels CA
CCPR (Comite Consultatif de Photometrie et Radiometrie, BIPM : R. Kohler

Recent Publications

CIE Collection 1999 – Vision and Colour, Physical Measurement of Light and Radiation
CIE Publication No, 135
135/1 Research note: Disability glare
135/2 Research note: Colour rendering, TC1-33 closing remarks
135/3 CIE TC1-45 report: Supplement 1-1999 to CIE 51-1981, Virtual metamers for assessing the quality of simulators of CIE illuminance D50
135/4 Research note: Reporter's report: Some recent developments in colourdifference evaluation
135/5 Research note: Reporter's report: Visual adaptation to complex luminance distributions

CIE Division 2:
Physical Measurement of Light and Radiation

2001 Division 2

TC2-16 Characterization of the performance of tristimulus colorimeters (M L Rastello)
TC2-25 Calibration Methods and Photoluminescent Standard for Total Radiance Factor Measurement (J Zwinkels)
TC2-39 Geometric Tolerances for Colorimetry (D Rich)
TC2-42 Colorimetric Measurements for Visual Displays (C Wall)
TC2-43 Determination of measurement uncertainties in photometry (G Sauter)
TC2-45 Measurement of LEDs -Revision of CIE 127 (K Muray)
TC2-46 CIE/ISO standards on LED intensity measurements (J Scarangello)
TC2-47 Characterization and Calibration Methods of UV Radiometers (G Xu)
TC2-48 Spectral responsivity measurement of detectors,radiometers,and photometers (G Eppeldauer)
TC2-49 Photometry of Flashing Light (Y Ohno)
TC2-51 Calibration of diode-array spectrometers (R Austin)

Norbert Johnson:*

Metrology of Retroreflective Materials

In the last 50 years the metrology of retroreflective materials has progressed from minimal descriptions to a sophisticated metrology system. Metrology here is considered in the context of the photometric and appearance measurements of reflective materials. In this time period, refinement of angular systems, terminology and application analysis has been standardized. These systems are used in specifications world wide. They have found applications in research, product development, and descriptions of the unique properties of retroreflective materials. In the future, this refinement process is expected to continue, especially using computer modeling and computerized measurement systems to better describe real world applications.

Introduction

One cannot begin a discussion about metrology without a precise definition of the quantity being measured. In the case of retroreflection, this definition has been massaged over the years. The latest definition, which is found in the 1999 draft revision of CIE (International Commission on Illumination) publication 54, follows:

"Reflection in which reflected rays are preferentially returned in directions close to the opposite of the direction of the incident rays, this property being maintained over wide variations of the direction of the incident rays."

There are several key considerations in the definition. The obvious one is the use of the word "opposite" for the direction of the reflected rays, which implies retroreflection. Many materials do reflect some light opposite to the direction of illumination, so the use of "preferential" separates the retroreflectors from a diffuse materials. The use of the term "maintained over wide variations of the direction of the incident rays" separates retroreflection from ordinary mirror surfaces. Finally the definition uses "rays" in place of "light" to make it applicable over a wide range of wavelengths. Visible light retroreflection is still, however, the most important commercially. Figure 1 is a common way of illustrating Retroreflection showing the cone of returned rays.

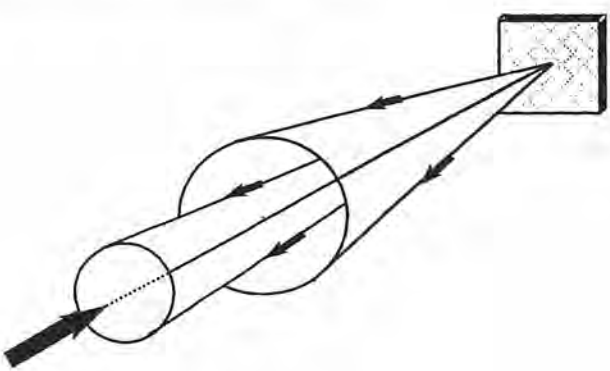

Figure 1. Retroreflected Cone of light.

* 3M Company, St. Paul, MN USA
Chairman of CIE 2-19: " Measurement of Spectral Coefficient of Retroreflection"

Metrology Basics.

The measurement of the properties of a retroreflective surface can be considered in terms of three concepts: geometric issues, spectral issues and the measurement quantity.

Geometric Issues.

In the analysis of the appearance of a surface the common practice is to use spherical coordinates to describe the direction of illumination and the direction of viewing, separately, relative to the surface normal. Coordinates of this type are described in CIE publication 38.

In the metrology of retroreflective materials it has been found more useful to use coordinate systems that relate to the direction of illumination. Therefore, the most fundamental reference direction is the illumination axis. Since the important characteristic of these materials is the nature of returned light in the direction opposite to the direction of illumination, it is natural to consider the angle between the direction of view and the direction of illumination as the most important angle. Figure 2 illustrates these fundamentals.

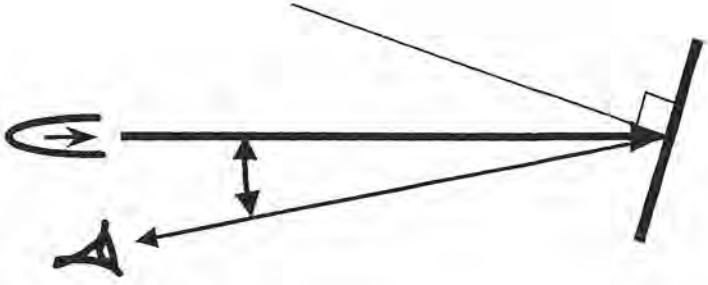

Figure 2. Illustration showing the reference direction of illumination and angle between direction of illumination and direction of viewing.

In the basic descriptions for diffuse materials, a total of 4 angles are required to fully describe the illumination and viewing of a surface. Four angles are also required to fully describe the geometry of retroreflectance measurement. Much of the activity in the last 50 years has been about choosing and naming these four angles.

Spectral Issues.

In all photometric measurements, including the metrology of retroreflectors, the wavelength distribution of the illuminating source and the spectral sensitivity of the viewer is critical. By convention, for most retroreflective measurements, CIE standard illuminant A has been used. This is based on the common application in signing where the source of illumination is a tungsten incandescent headlamp. The spectral responsivity of the photopic observer (CIE $V(\lambda)$ function) has been standardized as the spectral sensitivity of the receptor. For a more complete spectral description of retroreflection, the quantity "spectral coefficient of retroreflection" is used. Spectral considerations will become even more important as high intensity discharge lamps become more common in automotive lighting. In addition, the description of nighttime retroreflected color can readily be calculated from spectral retroreflectance.

The photometric measurement quantities.

The fundamental quantity describing retroreflection is the ratio of the reflected "light" divided by the incident "light". The incident light is usually considered to be measured at the retroreflector in a plane perpendicular to the direction of illumination. There are three important variations of this ratio. The simplest example is the ratio of candelas reflected to incident lux. This quantity treats the retroreflector as a point source independent of its area. It is commonly used in describing delineators. The quantity which treats the retroreflector as an apparent point source and takes into account the actual area of the material is the second variation. This quantity, coefficient of retroreflection, is often used for engineering specifications. The ratio of the surface luminance to the incident illumination is commonly used in describing retroreflective road markings. In addition, equivalent spectral ratios can be defined. These three photometric quantities are defined by the equations which follow using the symbols of the draft revision of CIE Publication 54.

$R_I = I/E_\perp$ (Coefficient of Luminous Intensity)

$R_A = R_I/\text{Area}$ (Coefficient of Retroreflection)

$R_L = L/E_\perp$ (Coefficient of Retroreflected Luminance)

Some History of the development of the metrology of retroreflectors.

Over the past fifty years, the standards describing retroreflection have evolved from minimal descriptions to a detailed and refined methodology. Early methods were described in Germany in DIN standards and in the USA in Federal, ASTM and SAE documents. The CIE has played a leading international role in the harmonization of these descriptions. Some examples of these efforts over the past 50 years are given. No effort has been made to be all-inclusive.

SAE testing methods.

Early on, the SAE (Society of Automotive Engineers) provided testing procedures for the testing of automotive tail-light "reflex reflectors". These are currently described in SAE J594. These early retroreflection testing methods tend to be an outgrowth of the procedures SAE used in testing automotive headlamps and tail-lamps. SAE J594 requires the use of a 30 meter test distance, the use of a circular source aperture and a rectangular photometer head aperture. The angles, relative to the direction of illumination, are described as "up and down" or "right and Left" and either a type A or B goniometer is allowed. The photometry is in terms of a device; that is, R_I (candelas per lux) is the measured quantity. These procedures have had an influence on the international standardization efforts of the CIE and, likewise, recent editions of the SAE document have been influenced by CIE and ASTM terminology for retroreflection.

US MIL-R-13689A, 1956.

This document published 43 years ago represented the first in a series of United States testing methods for retroreflective materials; it was followed by the US Federal LS300 series of specifications. The quantity described was "reflection factor" and the term "divergence angle" was used to describe the angle between the direction of illumination and the direction of viewing. The term "incident" angle was applied to what is now almost universally described as entrance angle. This document did not fully account for the need for 4 angles to totally describe the relation between illumination and viewing in the metrology of retroreflectors. At the time, most retroreflective sheeting materials were made with glass bead optical elements. With these materials, symmetry in the retroreflected cone of light reduced the need for sophisticated angular systems.

DIN 67 520 Blatt 1 Reflexstoffe zur Verkehrssicherung 1959.

In 1959 the DIN (Deutsches Institut für Normung) published a description of testing of retroreflectors which included three angles (Winkel γ, i und ε). This document described the photometric properties

using cd/lx/m^2 (Leuchtdichtefaktor). This document was a precursor to the modern DIN documents describing how to measure retroreflection. It influenced the direction of the CIE committee work.

CIE Brussels 1959

A detailed description of the apparatus for the testing of retroreflection was published at the 1959 Bussels meeting of the CIE. It included requirements for source and receptor apertures, source color temperature of 2850 Kelvin, and the CIE standard photopic observer. In addition, the uniformity of the illumination of the specimen was stated at 5 percent. This procedure required the position of the receptor to be above the source like in SAE and it required the testing goniometer to have two axes: a fixed vertical axis and a moveable horizontal axis. The unit C.I.L. (Coefficient of Luminous Intensity) is described (cd/lx). This work was, no doubt, a continuation of previous work. The aperture sizes of the source and receptor were specified at 10 minutes of arc which was suitable since the smallest observation angle then specified was 20 minutes of arc.

CIE Harmonizing Group in 1975.

After the Brussels meeting, advances in the testing of retroreflection centered around discussions of the differences between the Type I and Type II (types A and B in SAE J1330) goniometers and the proposal for an intrinsic geometric system (favored by the French delegates). These geometric systems were reviewed by German, French, English, and United States committee members. Both the Germans and the Americans adopted parts of this harmonizing work into their standards (US Federal Test Method 370 in 1977 in the USA and DIN 67520 Teil 1 1980 in Germany). Other issues such as residual Illumination and mirror effects from the front surface of retroreflectors were of concern to the CIE Harmonizing Group.

US Federal Test Method 370, 1977.

In this US standard, the Intrinsic geometry was standardized and a classic illustration of the system created. A simplified illustration is shown in figure 3. In the intrinsic geometry, one can think of the position of the viewer as described by polar coordinates about the source of illumination. In addition the terms, SI, SL and SIA were standardized for the photometric quantities in the United States. (These quantities correspond to R_I, R_A and R_L today.) (See Fig. 3)

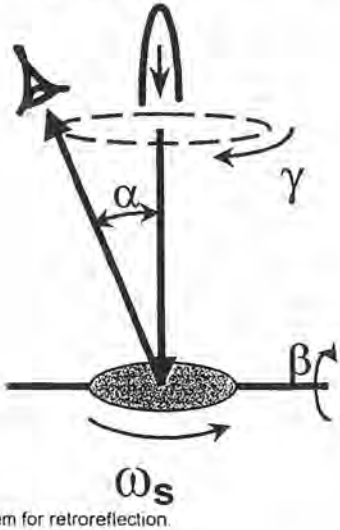

Figure 3. Intrinsic geometric system for retroreflection.
DIN 67 520 Teil 1, 1980

In the October 1980 version of this DIN standard, the two types of goniometers were clearly described as they applied to the measurement of retroreflectors.The subscripts V and H were used to differentiate the two axes using the component method of dividing the entrance angle into the parts, β_V and β_H. Description of the photometric quantities using the symbols R, R' and L were given in anticipation of the publication of the CIE report on retroreflection in 1982. Later revisions of this document followed the symbols and terminology of CIE publication 54 when finally adopted by the CIE.

CIE Publication 54, 1982.

This publication titled "Retroreflection, Definition and Measurement" issued in 1982, contained a new set of symbols (β_1 and β_2) for the components of the entrance angle using numerical subscripts. The use of numerical subscripts was intended to allow for thinking about these angles in a more general sense and did not directly connect them with the vertical and horizontal concepts associated with a practical goniometer. This has slowly taken place but has remained an area of confusion in thinking about the properties of retroreflective materials. The committee (under the older CIE TC system it was part of TC 2.3 and 4.7) members struggled over the final version of CIE publication 54. The author recalls a meeting in Berlin of the committee which included members Terstiege, Moerman, Stephenson, and Krochman. It was in the upper level library of the Technical University in Berlin where the German hosts skillfully helped to bring this work to a close.

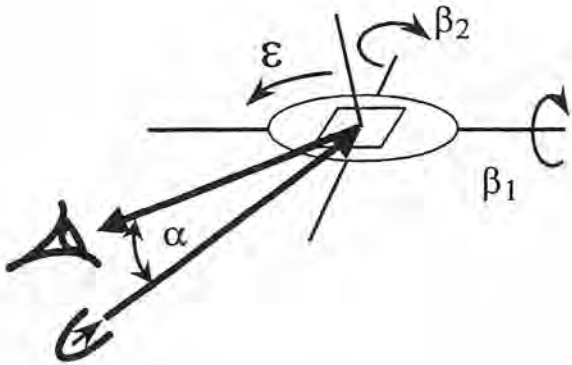

Figure 4. CIE goniometric system for retroreflection.

ASTM E-808-81

In 1981 ASTM (American Society for Testing and Materials) issued a standard that followed the proposals to be published in CIE report 54 on retroreflection. A 1994 revision of this standard used new symbols for the retroreflectance ratios, R_A, R_I, R_L. The 1998 version of this ASTM standard provided for a choice of a wider range of geometric systems including the goniometric, intrinsic, application and road marking systems. These are the systems which are currently expected to be adopted in the revision of CIE publication 54.

CIE TC 2-36 (Revision of CIE Publication 54)

About eight years ago the CIE established a committee to revise publication 54. This work is now nearly complete and the new edition has a broader range of metrology information than previously published and offers the framework to more appropriately and consistently specify the properties of these materials. The draft includes the application geometry, which was earlier introduced in the ASTM committees. The application geometry considers the datum axis as a principle direction with the observation plane and entrance planes defined in relation to it. See figure 5.

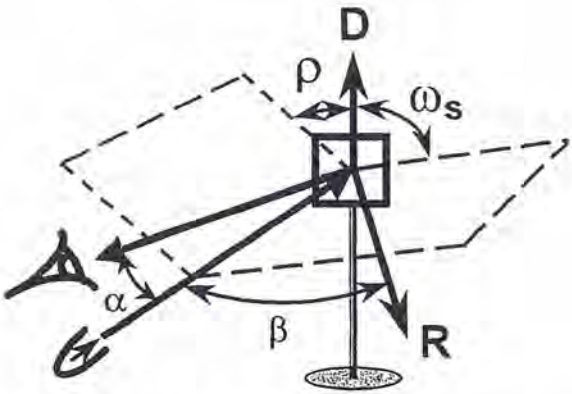

Figure 5. Illustration of the application geometric system.

Also, in this revision a complete explanation of the road marking system as it applies to retroreflective road marking is included. Transformations between systems are included. In the road marking system the observation angle is not directly specified. Instead, elevation of the illuminating source direction above the horizontal and elevation of the viewing direction above the horizontal are the basic angles. This system is similar to systems used to describe diffuse materials. See figure 6.

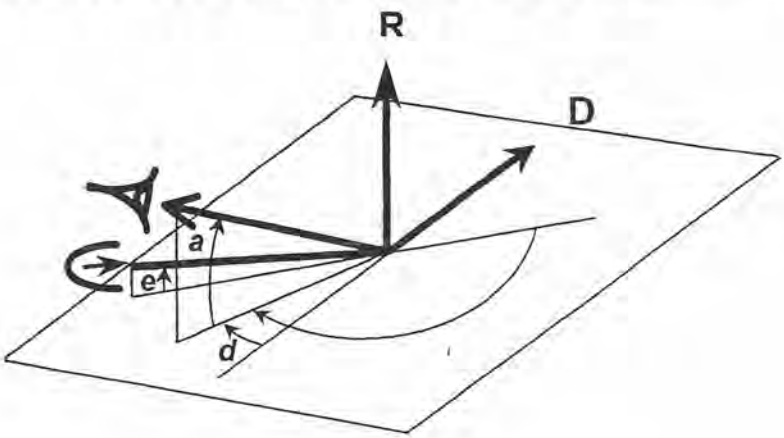

Figure 6. Illustration of proposed CIE Road marking geometry for retroreflection.

The revised CIE publication includes a wealth of additional information on tolerances, laboratory techniques, field measurements and transformations from the roadway geometry expressed in Cartesian coordinates to the various CIE geometric systems using vector calculations.

Prismatic Retroreflective Materials.

With the wider use of the higher performance microprismatic retroreflective materials, the need to specify orientation relative to the entrance plane has become more critical. The more recent DIN specifications include these rotation effects as part of their testing scheme. A simpler system is used in the ASTM standards. The combination effects of observer plane and entrance plane rotations are now being carefully considered in new specification proposals for these materials. At the present time, these specifications for describing microprismatic retroreflective materials for signing applications are still evolving.

Road Scenario Angle Calculations.

As the analysis of retroreflective materials becomes more sophisticated, the use of transformations from the actual roadway environment into coordinates for laboratory testing has become more widespread. These transformations are based on vector mathematics using four basic vectors from the roadway environment. The transformations can provide angles for laboratory testing machines that follow the geometry of a viewing scenario as a vehicle travels along on the road. The four basic vector directions for these calculations are shown in figure 7. Where E is the direction to the viewer in a vehicle, I is the direction to the left or right headlamp, R is the retroreflector axis and D is the datum axis.

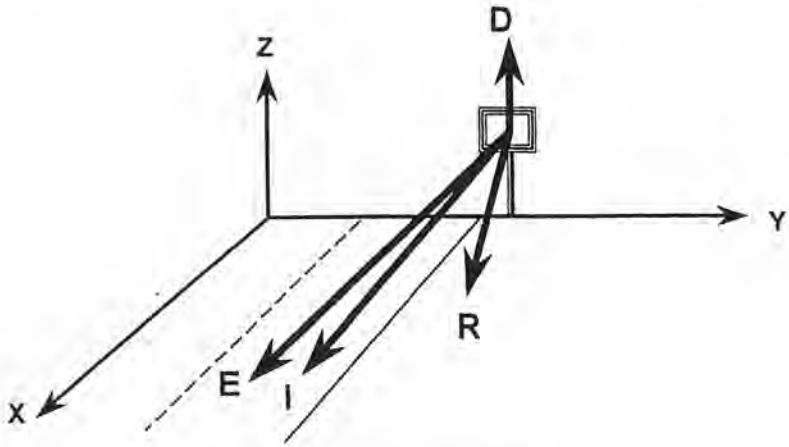

Figure 7. Basic vector directions for road scenario calculations.

Spectral Coefficient of Retroreflection.

CIE technical committee TC 2-19 did an international intercomparison of measurements of the spectral coefficient of retroreflection, which documents the state-of-the-art at national laboratories for these measurements. From the spectral coefficient, nighttime chromaticity can be readily calculated using ordinary colorimetric methods. There is now an increased interest in specifying the nighttime chromaticity based on this type of spectral data (or from filter methods that produce the same results). An example is the nighttime color specification being developed in CIE TC 4-32. The spectral procedures in-

clude the ability to calculate chromaticity from various light sources such as from the spectral output of high intensity discharge sources.

Field Measurements.

Laboratory methods require a long photometric range. However, bench, portable, and mobile instrumentation are now available for field and laboratory use. Most of these instruments trace their calibrations back to measurements in a standard photometric range. German, Dutch, French and American manufacturers, among others, make field photometers for the measurement of retroreflection based on substitution techniques. Field measurement systems are critical in the maintenance of retroreflective signs, road markings and devices on modern roadways.

Accurate Metrology.

Accurate metrology has always depended on the conformance of the measurement apparatus to the geometric angles specified, the spectral conformance to illuminant A and the photopic fit of the detector as well as system linearity or photometric calibration accuracy. Tremendous gains in these areas have taken place in the last 50 years to the point where a high degree of confidence is available in commercial instrumentation. System accuracy and traceabiltiy to referee testing facilities internationally is still be instituted.

Metrology in Progress.

At the present time there are at least 4 CIE committees, TC 2-36, TC 2-19, TC 4-32, TC 4-40, which are active in the metrology issues relating to retroreflection. DIN continues to work on its next revision of standards and ASTM has active committees to refine testing schemes using the principles described. National and regional specification committees draw on this metrology work.

Future Trends.

The next milestone will be the publication of the revision of publication 54 which is expected in the year 2000. Meanwhile, the relationship of the testing angle combinations to roadway scenarios and the study of the human factors aspects of retroreflection is continuing. CIE TC 4-40 is active in studying the complex combinations of factors relating to seeing signs. Specifications will become more detailed in their descriptions of materials, especially for microprismatic materials. In the future, one can expect new standards relating to nighttime color measurement and specification of reflective materials as well as new emphasis on how these materials should be tested with the newer generation of headlamps on automobiles. Perhaps even a new accounting for mesopic vision at low levels of reflection will be considered. Thus, the past 50 years has been an active period in this metrology area and it will be interesting to see what the future holds.

Interessante Adressen aus dem Internet

Deutsche farbwissenschaftliche Gesellschaft	DfwG	www.dfwg.de	
American Society for Testing Materials	ASTM	www.astm.org	
Applied Optics, Journ. Opt. Soc. of Am.	JOSA	www.osa.org	
Commission Internationale de lÉclairage	CIE	www.cie.co.at	(01.01)
CIE Division 1	CIE D-1	www.nml.csir.co.za/~cie1	(03.01)
CIE Division 2	CIE D-2	www.nml.csir.co.za./~ci2/	(02.01)
CIE Division 4	CIE D-4	www.ee.tut.fi/te/cie	(03.01)
CIE Division 8	CIE D-8	www.colour.org/tc8	(03.01)
Commission Européenne de Normalisation	CEN	www.cenorm.be	
Council of Scientific Industrial Research, SA	CSIR	www.csir.co.za	
Deutsches Institut für Normung	DIN	www.din.de	
International Standardization Organization	ISO	www.iso.ch	

Gerätehersteller:

www.byk-gardner.de
www.colour-control.de
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www.x-rite.com
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Veranstaltungen

07. – 09. 06. 2001	5. Interdisziplinäre Farbentage der Technischen Universität Dresden in Radebeul (siehe ausführliches Programm auf der nächsten Seite)
24. – 29. 06. 2001	AIC 2001 Tagung in Rochester USA (siehe Gesamtprogramm in diesem Heft)
Juli 2001	Tagung der International Color Vision Society in Cambridge
03. – 05. 09. 2001	XXVIII Colouristic Symposium, Tata, Ungarn
06. – 14. 09. 2001	CIE Midterm Meeting in Istanbul, Türkei, DIV 4
18. – 19. 10. 2001	DfwG Jahrestagung, Hagen
22. – 25. 10. 2001	NEWRAD, NIST, Gaithersburg, Maryland, USA
Herbst 2002	CIE Div. 1 und Div. 2 in Slovenien
01. – 10. 07. 2003	CIE Tagung in San Diego, Kalifornien, USA, Div. 2
2003	Tagung: International Color Vision Society in Seattle, USA

Bitte informieren Sie uns über weitere interessante Veranstaltungen die für die DfwG Mitglieder interessant sind, wir nehmen sie gerne in diese Liste auf.

5. INTERDISZIPLINÄRE FARBENTAGE 2001 DER TECHNISCHEN UNIVERSITÄT DRESDEN

Schnittstelle Farbe

Spuren im mitteldeutschen Raum

ZEIT 07. bis 09. Juni 2001, mit Vorprogramm am 06. Juni 2001

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PROGRAMM Fachvorträge, Ausstellungen, Fachliteraturangebot, Exkursion, Gespräche, Führungen u.a.:

Mittwoch, d. 06. Juni

Begrüßung am Vorabend mit Vernissage der Ausstellung
Beiträge zur Farbenlehre – Spuren im mitteldeutschen Raum' (u.a. Goethe, Schopenhauer, Hering, Baumann, Prase, Ostwald, Matthaei, Buchwald, Adam)

Donnerstag, d. 07.Juni,

Eröffnung der Tagung durch den Prorektor für Wissenschaft d. TU Dresden, Ganztags Vorträge: Positionen zur Geschichte der Farbenlehre.
Am Abend Open-air - Lichtinstallation

Freitag, d. 08. Juni,

Vormittag: Vorträge Farbe, Kleidung, Behausung / Architektur
Nachmittag alternativ: Architekturführung in Radebeul, anschl. Ausstellungseröffnung ‚Farbe im Bild',Gespräche im Atelier Oberlicht sowie Atelier 2 Freie Architekten
oder Exkursion zum Wilhelm-Ostwald- Archiv nach Großbothen,
Gemeinsamer Abend in der Vinothek des Schlosses Wackerbarth

Sonnabend, d. 09. Juni,

Vormittag: Vorträge Farbe und Stadtbild / Farbe und Kartographie
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Atelier 2 Freie Architekten und Atelier Oberlicht, Radebeul.

Kontakt und Tagungsleitung: Dipl.-Ing. Eckhard Bendin, TU Dresden, IGGD
bendin@rcs.urz.tu-dresden.de - dff- Information 03/2001 - Änderungen vorbehalten -

Deutsche farbwissenschaftliche Gesellschaft e.V.
im Deutschen Verband Farbe

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BLZ 680 800 30

Gültig für Mitglieder der DfwG
nur in Verbindung mit der
Einzahlungsquittung

30. Mai 2001

Bestätigung

über Zuwendungen an eine der im § 5, Abs. 1 Nr. 9 der Abgabenverordnung bezeichneten Körperschaft

Unser Mitglied (Name siehe Einzahlungsquittung), hat am (Datum siehe Einzahlungsquittung) der

Deutschen farbwissenschaftlichen Gesellschaft (DfwG) e.V.

einen Betrag von (siehe Einzahlungsquittung) zugewendet.

Die DfwG ist nach dem zuletzt am 4.9.1997 zugestellten Freistellungsbescheid des Finanzamtes für Körperschaften I, 10963 Berlin (Steuernummer 640/50896), wieder wegen Förderung der Wissenschaft als gemeinnützig anerkannt worden.

Mitgliedsbeiträge können nach § 10 EStG, § 9 Nr. 3 KStG und § 9 Nr. 5 GewStG wie Spenden steuerlich abgesetzt werden.

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Dipl.-Ing. Lutz Grambow
Schatzmeister der DfwG