



Inter-Society Color Council *News*

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Mark your Calendars
ISCC/CMG Joint Meeting
March 28-29, 2008
Montreal, Quebec, Canada

July/Aug 2007

President's Column

With the Annual Meeting in Kansas City still a bright memory, attention is now turned to planning the Council's 2008 meeting calendar. The current focus is on two meetings for next year.

The first will be a joint meeting with Color Marketing Group. A member body of the Council, CMG forecasts color trends for its members; several members of the ISCC Board are also members of the CMG. Its mission is "to create color forecast information for professionals who design and market with color." CMG holds semi-annual conferences, which typically start with an education program.

At CMG 2008 Spring International Conference in Montreal, the ISCC and CMG will co-sponsor an education program on "The RGBs of Color." Conceived by Jim Roberts, an ISCC Board member and member of CMG, this theme has generated a lot of excitement within CMG. The program will cover the emotional impact, sustainability and reproduction of color—the red, green and blue aspects of color—in a day and a half long session that starts Friday afternoon, March 28 and concludes Saturday afternoon, March 29, before the start of the CMG Conference. Later on in this newsletter is a short announcement of the meeting.

Those who register to attend the joint meeting on Friday and Saturday will also be able to attend the opening Keynote for the CMG conference on Sunday morning. For those who wish to stay on and attend CMG's Spring Conference but aren't CMG members, CMG now has a special registration category called "Participating Guest," which allows non-members to attend CMG conferences. This registration includes all sessions except the Color Workshops.

The second meeting next year will actually be a pair of meetings: the Annual Meeting followed by a Special Topics meeting, much like what we did in Ottawa in 2006 and Cleveland in 2005. The current proposal is to meet in Baltimore in early September. Dates and details will be announced once the hotel arrangements are confirmed.

The theme of the Special Topics meeting will be Safety Colors. Among the topics to be covered at this meeting are safety colors for traffic, safety colors in buildings and on materials, and human factors in the use of safety colors. Carl Andersen of the US Department of Transportation (Federal Highway

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Administration) and Cameron Miller of the US National Institute of Standards and Technology have agreed to chair the meeting.

In other news, the AIC held its Midterm meeting held July 12-14 in Hangzhou, China; the ISCC is the regular member of the AIC for the United States. At this meeting, several modifications to the AIC Statutes were approved. Two seemed especially notable. According to one, a General Assembly will now normally be held every two years at each congress and midterm meeting; before it was every four years at each congress. The result of the other was to change the "observer" membership category to "individual member" and to open it up to anyone with an interest in the aims of the AIC and a knowledge of color, removing the restriction that the individual lives in a country without a regular national member. Paula Alessi represented the ISCC at the meeting, and voted on our behalf to approve the modifications to the Statutes.

A couple of other news items to close with. Xerox has become a sustaining member of the ISCC—the third sustaining member we've added this year. The IS&T/SID 15th Annual Color Imaging Conference will be held Nov. 5-9 at the Hotel Albuquerque in Albuquerque, New Mexico; the ISCC is a cooperating society for the conference. This is the first year the conference has been held outside Scottsdale, Arizona. The calendar on pages 10 and 11 lists additional meetings sponsored by some of our other member bodies.

Finally, the next ISCC Board meeting will be held October 20 at the offices of BYK - Gardner in Columbia, Maryland. On the list for discussion are the website and the membership directory. If you have comments on this or other new business you want to bring to the attention of the Board, feel free to contact one of the Directors.

Robert Buckley
Xerox Corporation

**ISCC Welcomes New
Sustaining Member**

Xerox Corp.

HUE ANGLES

(Send contributions to Michael H. Brill, mbrill@datacolor.com)

It's time for summer, picnics, and spectrophotometry. What's that? You want to dump out the beer and do *what* with the cooler??

Beer-Cooler Spectrophotometer

When measuring the color of a reflecting or transmitting sample, a spectrophotometer based on an integrating sphere causes the light incident on the sample to come from all directions, hence the measurement is robust to errors in repeatability. But an integrating sphere is an expensive device whose effectiveness depends on maintaining the highest possible reflectivity. Spheres are currently lined with magnesium oxide, barium sulfate, or powdered white polymers that are difficult to apply. One somewhat new material used for the purpose is a sintered polymer such as PTFE. But PTFE exaggerates the known vulnerabilities of other integrating-sphere material: It is costly (even as a sphere liner), and in the porous form needed to scatter light, it doesn't have the familiar "no-stick" quality we know from the Teflon® of cookware. On the contrary, it's a magnet for dirt, a condominium for microorganisms wherefrom eviction is virtually impossible. Isn't there an alternative that's cheap, clean, and easy to maintain?

What if an entire sphere were made of an inexpensive light-scattering material with good mechanical integrity? Well, polystyrene, the material known as Styrofoam® that comprises your beer cooler, fits the bill: It is white (spectrally nonselective and highly reflective) in the visible waveband (360-780 nanometers). In its usual form, it has hexagonal air-filled bubbles that scatter light efficiently in all directions without letting in dirt or bacteria. The reflectivity is so high, in fact, that the spherical shape of the cavity isn't critical to the omnidirectionality of the light hitting the sample. In fact, your beer cooler might do the trick even with all its inside corners. No need to do more than cut some holes in it, place the sample and optical components, and measure away. (Preferably the beer should be removed first.) The idea of using a beer cooler has been around for at least ten years, having been the subject of irreverent discussion by NIST's Ed Kelley when

discussing the fine points of display metrology [1,2].

Further to the advantages and design: Polystyrene can be made to comprise the entire integrating sphere of a spectrophotometer, including ports into which fixtures such as light pipes and samples can be inserted. It is light in weight but strong enough to hold its shape in a spectrophotometer. Local portions of the polystyrene can be further stiffened, by compressing out the air bubbles, to act as effective grommets for entry of optical apparatus such as light pipes and sample holders. Furthermore, polystyrene is easily molded into the desired shape (externally a rectangular solid, perhaps internally a sphere, with reinforced holes as needed), and the whole thing is easily replaced.

Dirt and bacterial discoloration shouldn't be the main cause for replacement. Polystyrene is admittedly more sensitive to heat than other materials, so instead of illuminating the sample with a traditional xenon flash lamp (which is very hot), you should opt for a cooler lighting technology such as white-light light-emitting diodes (LEDs). Also, I wouldn't recommend using your instrument in a paint laboratory because polystyrene is vulnerable to airborne solvents.

Oh, and try not to fall down on your beer-cooler spectrophotometer when you've consumed all the beer it once contained. The manufacturer doesn't warrant....

[1] E. F. Kelley, "Polystyrene Box Uniform Light Sources," Council for Optical Radiation Measurements, May 4-6, 1999.

[2] E. F. Kelley, "Flat Panel Display Measurements and Standards," Applications Seminar A4, 2001-SID International Symposium, Society for Information Display, San Jose, California, pp. A-4/1 through A-4/66, June 2001.

*Michael H. Brill, Alan Ingleson, and
David Slocum,
Datacolor*

2007 Nickerson Service Award

Citation for David R. Wyble

It is my great pleasure and honor to give the citation for the 2007 Nickerson Service Award to my good friend David Wyble.



Dave Wyble receives Nickerson Award from ISCC president Rob Buckley and Danny Rich

The Nickerson Service Award Committee selected Dave from a list of worthy candidates because he stands out as someone who has consistently demonstrated the level of service to the Council that was so characteristic of Dorothy Nickerson. Several years ago, the Board of Directors determined that the ISCC should have a web site where we could keep information about the activities of the Council, the names and contact information of our Executive Committee and Board of Directors and the list of publications and awardees. At the time, most of the Board had no idea how to accomplish this. Rich Riffel began the task, but Dave, who was a new member, rose to the occasion to volunteer both his time and some of the Munsell Color Science Laboratory's space on the computers at RIT. The rest is, as they say, "history".

Dave is an Associate Scientist in the Munsell Color Science Laboratory. He has received a B.S. in Computer Science from SUNY at Brockport, an M.S. degree in Color Science from R.I.T. and very recently, a Ph.D. in Color Science from Chiba University in Japan.

Dave joined the Munsell Color Science Lab in 1997 where his duties have focused on maintaining the instrument and computing facilities. Prior to joining the MCSL Dave was a member of the Corporate Research and Technology group of the Xerox Corporation for 15 years. Dave has more than 16 publications and 3 patents.

Since taking charge of the ISCC web site, Dave has consistently strived to improve the quality of the site, added new features and even volunteered to distribute the ISCC Newsletter electronically for us. Truly a work of service reminiscent of Dorothy herself. Please join me in congratulating Dave Wyble on his receiving the 2007 Nickerson Service Award.

Danny C. Rich,
Sun Chemical

Color Technology Short Course

The College of Technology at Eastern Michigan University in cooperation with the Detroit Colour Council, an ISCC member body, has announced a 2-day Color Education short course at the EMU Livonia, Michigan site, October 2-3, 2007.

The course objective is to provide fundamentals of visual color match evaluation and of color measurement for industrial color control and for color harmony teams. An experienced instructor will demonstrate use of the spectrophotometer and assist with team projects in which a variety of principles are studied. Elements of the design process and resulting effect on color quality will be discussed.

The principle instructor is Adjunct Professor Bill Longley of Color Match Consulting. Other instructors are Allen Brown of Ford Motor in visual evaluation, consultant Jim King for formulating and design issues, and Bob Santine of X-Rite in color measurement.

For more information call program administrator Sandy Tanner at EMU, 734-487-2203, fax 734-483-0085, email: Sandy.Tanner@emich.edu or Mr. Longley at 734.420.4920, wlongley@juno.com.

Also see www.emich.edu/public/coatings_research.

Past ISCC Society Award Recipients

The editors enjoyed reading Dr. Hunt's listing of previous Godlove award winners and decided to list previous winners of the other two ISCC Society Awards.

The past recipients of the Macbeth Award, which is given for one or more recent outstanding contributions in the field of color, are:

1972 Peter C. Goldmark	1990 Roy Berns
1974 Midge Wilson	1992 Jozef Cohen
1976 Richard S. Hunter	1994 Peter Kaiser
1978 Fred W. Billmeyer, Jr.	1996 Michael Brill
1980 W. David Wright	1998 David H. Alman
1982 Harry W. Levison	2000 Brian A. Wandell
1984 Ruth Johnston-Feller	2002 Mark D. Fairchild
1986 Max Saltzman	2004 Louis D. Silverstein
1988 Joy Turner Luke	2006 David Brainard

Previous recipients of the Nickerson Award are:

1983 Fred W. Billmeyer, Jr.	1997 Ann Campbell
1985 Dorothy Nickerson	Laidlaw
and S. Leonard Davidson	1998 Louis A. Graham
1986 George B. Gardner	1999 Danny C. Rich
1987 Harry K. Hammond, III	2000 Hugh S. Fairman
1988 Ruth M. Johnston-Feller	2001 Paula J. Alessi
1989 Walter Granville	2003 Ellen C. Carter
1990 Joyce S. Davenport	2004 Ralph Stanzola
1992 Bonnie Swenholt	2005 Gultekin Celikiz
1994 Terry Commerford	2006 Mary McKnight
1995 Allan B.J. Rodrigues	2007 David R. Wyble

2007 ISCC Godlove Award Citation

Robert W.G. Hunt

It is a privilege and honor for me to present Robert Hunt with the 2007 ISCC Godlove Award. He has had a long and distinguished career, having been active in the field of color in seven decades. Over that time, he has compiled an extraordinary record of contributions. With the Godlove Award having as its charter honoring "long term contributions in the field of color" Bob Hunt is a truly deserving recipient.

The Godlove Award also recognizes Bob for the influence he has had on multiple generations of color scientists, engineers and technologists through his writing and his lecturing. I expect each of us here has their own story to tell of how Bob has influenced their professional life in color.

My own story goes back to my days as a graduate student, doing a Master's degree in Electrical Engineering at MIT. My thesis topic was gamut compression, and the experimental setup required an understanding of color reproduction. The first book I bought on the subject was Bob Hunt's "The Reproduction of Color" for what was then the princely sum of thirty-five dollars. I suppose I should add that it was the third edition. The current edition is the sixth and this year's marks the 50th Anniversary of the first edition. A remarkable record.

It with fond memories then and with pleasure that I present the 2007 ISCC Godlove Award to Bob Hunt

"For his many seminal contributions to color science and color metrology, for his development of models of color appearance and for his efforts towards the education of generations of color scientists and technologists."

Robert Buckley
Xerox Corporation



Dr. Hunt is presented the Godlove award by ISCC president, Rob Buckley

The Godlove Award Acceptance Speech ISCC 2007 Annual Meeting

I am greatly honoured to have been given this very prestigious award. When I look at the names of the previous recipients, it makes me feel very humble to be associated with such a plethora of excellence.

1957 Deane B. Judd	1983 Eugene Allen
1959 Ralph M. Evans	1985 Franc Grum
1961 Dorothy Nickerson	1987 Charles D. Reilly
1963 David L. MacAdam	1989 W. David Wright
1965 Isay A. Balinkin	1991 Richard S. Hunter
1967 Edwin I. Stearns	1993 Fred W. Billmeyer, Jr.
1969 Harry Helson	1995 Joel Pokorny and Vivianne Smith
1971 Norman Macbeth	1997 Henry Hemmendinger
1973 Dorothea Jameson and Leo Hurvich	1999 Calvin S. McCamy
1975 Vincent C. Vesce	2001 Max Saltzman
1977 Hugh R. Davidson	2003 Rolf Kuehni
1979 Gunter Wyszecki	2005 Alan R. Robertson
1981 Robert M. Boynton	

I have had the good fortune to have known all the past recipients except one, many of whom I have been happy to be able to call my good friends as well as fellow workers in colour.

I note that I am only the second recipient from outside North America, the first having been David Wright, to whom I owe so much. It was he who first introduced me to the supremely fascinating subject of colour science, and his infectious enthusiasm for everything to do with colour has been a lasting incentive to me for over fifty years. David Wright's presentation of his Godlove Award was made at the Café Royal in London, because his health at that time precluded his travelling to America, and I was privileged to have been one of the guests on that occasion.

I never had the pleasure of meeting Isaac Godlove, but the ISCC records reveal that he was a much loved and very greatly respected member of the organisation, and an outstanding editor of the ISCC Newsletter. Incidentally, I must say that, as a Christian, I am very pleased that this award is called the Godlove award; that is very heart-warming!

The ISCC has done an excellent job over the years in providing a forum for the advancement of colour science in all its aspects, and I have many happy memories of a series of ISCC conferences that were held at Williamsburg years ago.

Finally may I congratulate those who have arranged this excellent conference, which I am sure we are all enjoying, and particularly Rob Buckley who has been so kind in making the arrangements for my wife and me to be here. I am also most grateful to Carl and Cindy Guyler, and to Steve Glasscock, for arranging such interesting visits for us while we have been in Kansas City.

Dr. Robert W.G. Hunt,
2007 Godlove Award Recipient

Book Review: Books on Colour 1500-2000: 2,500 Titles in English and Other European Languages

Compiled and Edited by Roy Osborne.
 Newly revised 2007: ISBN 1-58112-537-2 (240 pp)
 Boca Raton, Florida, Universal Publishers,
 Available from Universal Publishers,
[www.universal-publishers.com/
 book.php?method=ISBN&book=1581125372](http://www.universal-publishers.com/book.php?method=ISBN&book=1581125372).
 Paper \$25.95; pdf file \$9.00

Roy Osborne's background is on art and design, but *Books on Colour 1500-2000* includes titles from an astonishing array of disciplines ranging from engineering and science to philosophy and literature. He orders the titles in three ways: In the main sequence (containing all the bibliographic information, category classifications, and occasional cross-reference notes), the ordering is alphabetical by author. Prior to the main sequence is a compact listing (author and year) ordered chronologically within each category. After the main sequence is a compact listing (author and year) alphabetically by author within each category. The categories, by the way, are the following: Architecture, Chemistry, Classification, Colorants, Decoration, Design, Dress & Cosmetics, Dyeing, Education, Fauna & Flora, Food, Glass, Graphics, History, Lighting, Literature, Metrology, Music, Optics, Painting, Perception, Photography & Cinema, Printing, Psychology, Science, Symbolism, Television & Computing, Terminology, Therapy, and Vision. I was especially glad to see English translations of the non-English titles.

In a cover letter (whose material could be included as in Introduction to a future edition), Osborne notes that the 2007 edition is an update of the first (2004) edition: "The earliest reference is to Aristotle 1496 [obviously a republication], and the four newest titles are dated 2006 (Eiseman, Hyman, Stone, and Xin)." He also says aptly, "The book is intended to assist serious study of the subject, across the sciences and arts, and in design and technology." One gets an idea of Osborne's library resources from the comment, "Each entry also tells the researcher if a copy of the book is in the collection of the British Library, the Library of Congress, Yale University Library and/or the Royal College of Art Library, London." He notes that he has excluded children's books, and that "large numbers of popular books on colour healing and interior decoration have also been omitted." Could have fooled me on that last—there are many color-healing and color decoration books. Conspicuously absent are proceedings volumes from color conferences.

Some interesting titles include three books on painting and drawing by John Ruskin, a book by Johannes Kepler on *camera obscura*, an ASTM standard (1535-80 on the Munsell system, under the authorship of Richard

Hunter), and even an ISCC report (I.H. and M. N. Godlove, *Bibliography on color*). There's Leatrice Eiseman's *The Color Answer Book, from the World's Leading Color Expert*, and even a Prime Minister of England, William Gladstone, is included for his discussion of Greek color terms. Osborne was bold and insightful in some of his inclusions, e.g., *Sensory Communication* (edited by Walter Rosenblith, 1961), whose essays are about general perception (not particularly color) and contain the seeds of the first true invariance theories in perception. For a future edition, I would suggest adding *Edwin H. Land's Essays, Vol. III Color vision*, ed. Mary McCann, IS&T 1993.

I recommend Osborne's book as a valuable scholarly resource. It offers an entertaining hour of skimming titles, too.

Michael H. Brill
 Manager, Science and Technology
 Datacolor

AIC Midterm Meeting 2007 in China

The AIC Midterm Meeting, "Color Science for Industry," was held July 12-14, 2007 in Hangzhou, China, and organized by the Color Association of China. The meeting had more than 120 participants from 20 countries, and featured 88 presentations: 4 invited lectures (R. Hirschler, D.-S. Park, R. Berns, J. Schanda), the Judd lecture, 51 oral papers, and 32 posters.

Alan R. Robertson, who received the 2007 Judd Award, delivered a lecture on "Uncertainty, Simplicity and Reasonableness – Three Golden Rules of Modelling." His lecture was preceded by the citation of the award, by Roy S. Berns. Both papers are available in the Proceedings of the Meeting.

The session was chaired by AIC vice-president Berit Bergström and, in addition to the current AIC president José Caivano, three former AIC presidents joined the award ceremony: Lucia Ronchi, Mitsuo Ikeda and Paula Alessi.

The AIC Executive Committee approved the proposals for the Interim Meeting 2010 in Mar del Plata, Argentina, on the theme "Color and Food: From Production to Consumption," and for the Midterm Meeting 2011 in Zurich, Switzerland, on the theme "The Staging of Colour - Real and Virtual Environments." Details of both meetings were presented during the General Assembly, in addition to the presentations of the Interim Meeting 2008 in Stockholm, and the 11th Congress 2009 in Sydney.

As mentioned in the President's letter, during the General Assembly, a modification to the AIC Statutes was approved by vote of the regular members. The new Statutes and most of the Guidelines are already available at the AIC website, www.aic-color.org.

From AIC e-news, July 2007

MARK YOUR CALENDARS NOW FOR THE ISCC/CMG JOINT MEETING

“The RGBs of Color”

March 28 - 29, 2008

Montreal, Quebec, Canada

Back by popular demand, ISCC and Color Marketing Group (CMG) will once again hold a joint meeting; this time during CMG's 2008 Spring Conference in Montreal, Quebec, Canada.

The one and a half day program will begin on the afternoon of Friday, March 28 and will conclude at 3:00 p.m. on Saturday, March 29. The theme of the program, “The RGBs of Color,” will consist of the following three components:

- Are You Seeing Red? The Tying of Emotion to Color
- How Green is My Color? The Influences of Sustainability on Color
- Is That the Blue You Wanted? The Influences of Light and Media on the Color We See

Registration materials will be available in early January 2008. Contact Jenny Gibson at CMG, jgibson@colormarketing.org, or Cynthia Sturke, isccoffice@cs.com, for additional information or visit CMG's web site at www.colormarketing.org or ISCC's web site www.iscc.org for periodic updates on this meeting.

ISCC 2007 Annual Meeting Report

On April 29th and 30th, the 2007 Annual Meeting of the Inter-Society Color Council was held in beautiful Kansas City. The two days, for us, graduate students in Color Science at Munsell Color Science Laboratory, Rochester Institute of Technology, were quite exciting, since it was our first time to attend an ISCC annual meeting. The theme of the 2007 meeting was “Bridging the Creative and Production Sides of Color.”

The beginning of the meeting was taken up by the work of two project committees, PC52 and PC54. The purposes of these two committees were to update the version of the color terms and republish a set of colors of highest contrast, respectively. The two reports showed us the contributions that the active and persistent work of ISCC makes to developments in color.

Following the PC reports, the Interest Group III Session made a deep impression on us. The speakers provided us a chance to take a look at how creative people in art, design, and education describe, apply and develop color. As science students, this part provided us a completely new perspective when considering the applications of color, such as the color for children's toys, the natural language to edit color in the color graphics and design industries and the social meaning of greeting cards. Especially, the amazing video, “Translating Colors,” told us how a professional photographer, who is also color blind, could make a painting with more than ten colors.

The Interest Group II Session discussed the applications of color in industry. For industry, obtaining predictable color reproduction and keeping color constancy

through each device — digital camera, scanner, monitor, or printer — are very important. Thus, in this session, not only the basic ideas of color management, but also the specific technologies were discussed. In our opinion, this session was an exceptional experience for the students. Furthermore, in this session, Scott Butterfield presented the interesting keynote “Hallmark Trends Group Color Forecast 2008.” The terminology of color, for example, hue was given a new meaning, which is related with the culture and aesthetics. This is an interesting way to connect color science with art and fashion.

The Interest Group I Session, Basic & Applied Color Research, is the field with which we are most familiar. It was also a good opportunity to learn of the research developments of different institutes and companies and to communicate with them. For example, David Hinks from North Carolina State University described the possible factors that cause the disparity between the theory and the field-testing of CIEDE2000 color different formula and reported a series of new visual experiments to test the hypothesis. Finally, in a keynote presentation, the Godlove Award recipient, Dr. Robert W.G. Hunt not only reviewed the past activities, but also analyzed the present situation and future development of the CIE colorimetry.

In summation, the ISCC 2007 Annual meeting provided a good venue to show achievements in each related field of color. More importantly, it promoted communication between color scientists and artists so that both scientific and artistic applications in color can be widely disseminated and developed.

*Yang Xue and Ying Chen
Rochester Institute of Technology*

Color Research and Application

In This Issue: Volume 32, August 2007

Since this issue covers July 4 and our national celebrations, it is also an appropriate time to make note of another special celebration. This is Wiley's Bicentennial year. Founded in 1807 (Just think Thomas Jefferson was the president then!) Wiley has been a source of information and understanding for generations of readers. For two centuries, Wiley has endeavored to teach, inform, and enlighten. Our history is intertwined with the advance of publishing, the evolution of modern science, people's hunger for knowledge, and the growth of the global community. *Color Research and Application* is pleased to be part of the Wiley group of publications. Today, as new technologies are changing the way we live and learn, Wiley is providing scientists, professionals, entrepreneurs, students, teachers, and life-long learners with more access to more content than ever before in printed materials and electronic forms.

We start off this issue with four articles on various appearance issues. While scientists may want to consider why the sky is blue, the artist could be more interested in what blue is the sky. It all depends on our perspective. For our first article Ken Smith discusses "Sky Blue, But What Blue? A new evaluation of the colors of the sky for artists and designers." In this article Ken Smith describes the results of a study relating the perceptual analysis of the colors of the terrestrial atmosphere to currently available pigments used in artists' painting systems and describes how confusion over the bewildering choice of suitable pigments offered in the market place can be clarified.

From the appearance of blue sky in paintings, we move to "The Appearance of Metallic and Pearlescent Materials." How can the appearance of coatings including glints and sparkles effect pigments be visually assessed reproducibly? This is the question that Eric Kirchner, Geert-Jan van den Kieboom, Lan Njo, Rianne Supèr and Roel Gottenbos investigated. They identified two visual texture parameters: diffuse coarseness and glint impression, and found good results in terms of observer reproducibility and accuracy. The materials needed to be viewed under both diffuse and directional illumination to assess the parameters properly.

Next let us look at the appearance of textured materials. Shoji Sunaga and Yukio Yamashita wondered whether the appearance textured materials is an impression of one color or some sort of summation of the various colors that go into the texture or weave. In "Global Color Impressions of Multi-colored Textured Patterns with Equal Hue Elements" they report on an experiment that they designed to test those ideas. They found that a single color impression from the multi-colored texture pattern is determined by a mechanism integrating the color appearances, i.e. hue, saturation, and brightness (or lightness),

of the colors in the texture. They also conclude that the integration of color appearance is not simple, because the apparent saturation of the color impressions is higher than that of the colorimetric average and the average of the chromaticities of the colors in the texture.

Now let us look at the appearance of teeth. Byeong-Hoon Cho and Yong-Keun Lee undertook a study to determine the color distribution of natural teeth in terms of Hue, Value and Chroma with the aim to suggest a model for a shade guide. Since the color measurement of teeth is difficult due to variations in size, curvature and translucency, they hypothesized that it would be easier to categorize the teeth by Munsell system coordinates, then sorted into the shade tabs of a shade guide model. They report on their results in "Shade Guide Model Based on the Color Distribution of Natural Teeth."

Researchers have used the fact that, there is a constant ratio between cone excitation values for a broad group of materials under two illuminants to explain color constancy. On a different tact, other researchers have used the mechanisms in the human visual system to determine illumination changes on an object, and the observer's ability to recognize the object even though parts of it are a different color because of the different illumination. In our next article, "Sensor-response-ratio Constancy under Changes in Natural and Artificial Illuminants," Javier Romero, Daniel Partal, Juan Nieves, and Javier Hernández-Andrés go a step further. First, they aim to find a relationship between the constant ratios and the correlated color temperature of the illumination. Also they extend the sources examined to include fluorescent light sources such as CIE F2, F7, and F11. They feel that if they establish the conditions under which a von Kries transformation generates results that make the simulated scene colorimetrically almost indistinguishable from the original, they will have a simple method for synthesizing images, and it will be easier to understand other more elaborate algorithms.

Our next article, "Comparison of Methods of Parametric Correction for Evaluating Metamerism" is a thorough and thoughtful test of various methods of parametric correction as applied to Kubelka-Munk-perturbed metamers. As one reader commented, "It is in a way surprising that it has taken so long for somebody to come up with what is a fairly obvious idea. Since parametric correction involves the complete unweighted spectrum, it makes sense to use process primaries of some sort that relate to the unweighted spectrum." Readers will not want to miss this article by Zhaojian Li and Roy S. Berns that explains how to do it.

Twenty-five years ago Robert Carter and I proposed a method for selecting maximally distinct sets of colors for use on displays or other color coding purposes. Now it is time for an update. In the article, "Colour displays for categorical images," Chris Glasbey, Gerie van der Heijden, Vivian Toh, and Alison Gray formulate a method as an

optimization problem that can be solved using either a sequential search that produces nested sets of colors of increasing size or a simulated annealing that produces a single set of colors of a specified size.

Our next article deals with the colorimetric characterization of a display. The first step in the characterization is determining the relationship of the input signal of the monitor and the color produced on the screen. This may be accomplished in two ways: instrumentally with a spectrophotometer or visually. The difficulty with the spectrophotometric approach is that many end users do not have instrumentation. However, the visual approach is impossible to do on an absolute level. "Accurate Display Gamma Functions Based on Human Observation" describes how to obtain the tone reproduction curve of display devices without using a measurement instrument. Attila Neumann, Alessandro Artusi, László Neumann, Georg Zotti, and Werner Purgahofer describe a fast, simple characterization using an interactive process with the user and discuss the possible extensions of their system.

In the April issue, Carlotta Grossi reported on the effect of laser cleaning on granite color. Now she and her coauthors, Rosa M. Esbert, Francisco Javier Alonso, and

Peter Brimblecombe discuss "Color Changes in Architectural Limestones from Pollution and Cleaning." In particular, they investigate the impact of sulfur dioxide attack, the deposition of dark particles from urban environments, and the results of laser cleaning on buildings made of limestone.

Our Communications and Comments Section includes three letters. We start with very early (4000-2000 BC) and move forward. Ram Lakhon Pandey Vimal and Manju-Uma Chaturvedi Pandey-Vimal, propose that ancient historical research in color vision be revised based on Rig-Veda in "Ancient Historical Scripture and Color Vision." Moving up to the last few centuries, Ralph Pridmore offers "Corresponding colors as complementary sets: Corollary to Grassman's laws." Looking into the future in response to recent discussions in this journal about camera color gamuts, Roy S. Berns suggests, "Let's call it 'color-gamut rendering'."

We close the issue with Michael R. Nofi's review of *Reading through Colour* by Arnold Wilkins. Also we have a long list of CIE Publications that are briefly mentioned. They include CIE 170, 173, 174, 175, 176, S-014-1, S-014-2, x-030.

Ellen Carter, Editor,

Color Research and Application

Photos from the ISCC 2007 Annual Meeting, Kansas City, Missouri. More photographs can be found on the ISCC web site, www.iscc.org.



From top left, 2007 Annual Meeting Chairs, Scot Fernandez and Steve Glasscock.

From bottom left, outgoing Board of Director members, Britt Nordby and Frank O'Donnell, and Rob Buckley presenting an award of appreciation to Jerry Dimas, outgoing Chair of Interest Group II.



CALENDAR

Please send any information on Member-Body and other organization meetings involving color and appearance functions to:

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2007

- Sep 5-7** **2007 Technical Conference, Inkmakers and Printers – A Partnership for Success**, National Association of Printing Ink Manufacturers, Itasca, IL, 732-855-1525, www.napim.org
- Sep 16-21** **NIP 23 International Conference on Digital Printing Technologies**, IS&T, Anchorage, Alaska, 703-642-9090, www.imaging.org/conferences/nip23/index.cfm
- Sep 16-20** **Frontiers in Optics 2007, Laser Science XXIII**, Joint Optical Society of America (OSA) and American Physical Society (APS) Technical Conference, Fairmont Hotel, San Jose, California, 202-223-8130, www.osa.org/meetings/annual/default.aspx
- Sep 20-21** **The Color Now! Symposium of the Color Association**, 212-947-7774, ecaus@colorassociation.com, www.colorassociation.com
- Sep 23-26** **IESNA Street & Area Lighting Conference**, The Illuminating Engineering Society of North America, Westin Seattle Hotel, Seattle, WA, 212-248-5000, www.iesna.org
- Sep 30-Oct 2** **CAD RETEC® 2007**, “Remember the Color,” Hyatt Regency Hotel (Riverwalk), San Antonio, Texas, 203-775-0471, www.4spe.org/conf/cad07/0710cad.php
- Oct 2-4** **2007 AATCC International Conference and Exhibition (IC&E)**, Francis Marion Hotel in Charleston, SC, 919-549-8141, www.aatcc.org/ice/gen_info.cfm
- Oct 3-5** **2007 International Coating Expo**, Federation of Societies for Coatings Technology, Metro Toronto Convention Centre, Toronto, Ont., Canada, 610-940-0777, www.coatingstech.org/Programs/index.cfm?event=ICE
- Oct 12-16** **Color Marketing Group, Fall International Conference**, Tampa Florida, 703-329-8500, www.colormarketing.org
- Oct 28-Nov 1** **CRSS/ASPRS 2007 Specialty Conference**, “Our Common Borders - Safety, Security and the Environment through Remote Sensing,” OTTAWA, CANADA, 301-493-0290 www.asprs.org/ottawa07/index.html
- Nov 5-9** **IS&T/SID's Fifteenth Color Imaging Conference**, Hotel Albuquerque, Albuquerque, NM, 703-642-9090, www.imaging.org/conferences/cic15/

2008

- Jan 23-25** **ASTM E12 Color and Appearance**, Embassy Suites Hotel; Ft. Lauderdale, FL, www.astm.org
- Jan 26-31** **19th Annual Electronic Imaging Symposium**, IS&T and SPIE, San Jose, CA, 703-642-9090, electronicimaging.org
- Mar 16-19** **TAGA 2008**, Technical Association of Graphic Arts, Sheraton Fisherman's Wharf Hotel, San Francisco, California, www.gain.net/eweb/
- Mar 28-29** **ISCC/CMG Symposium, “The RGBs of Color,”** Montreal, Quebec, Canada, 703-318-0263, isccoffice@cs.com, www.iscc.org, or jgibson@colormarketing.org, www.colormarketing.org

2008, Continued

- Apr 27-May 2** **2008 ASPRS Annual Conference**, The Imaging and Geospatial Information Society, Oregon Convention Center, Doubletree Hotel Lloyd Center, Portland, Oregon, 301-493-0290, www.asprs.org/
- May 18-23** **SID 2008**, Los Angeles, CA, www.sid.org/conf/sid2008/sid2008.html
- Jun 10 - 13** **CGIV 2008: IS&T's Fourth European Conference on Color in Graphics**, Imaging and Vision Terassa, Spain, 703-642-9090, www.imaging.org/conferences
- Jun 15-18** **AIC Interim Meeting, Colour – Effects and Affect**, in Stockholm, Sweden, Swedish Colour Centre Foundation, Contact: Berit Bergström, berit.bergstrom@ncscolor.com, www.aic2008.org
- Jun 24 - 28** **Archiving 2008**, Society for Science and Technology, Bern, Switzerland 703-642-9090, www.imaging.org/conferences/

2009

- Sept 27-Oct 2** **AIC 11th Congress**, Sydney, Australia, Organizer: Colour Society of Australia, Contact: Nick Harkness, www.aic2009.org

Photography Credit: Pictures from the Annual Meeting were provided by Jim Roberts, BYK-Gardner USA.

Publications Available from ISCC Office

NEW PUBLICATION AVAILABLE:

ISCC 76th Annual Meeting Program and Abstracts, ISBN 978-1-4243-4273-0 \$25.00*

Color and Light by Fred W. Billmeyer Jr. & Harry K. Hammond., III. Authorized reprint from: ASTM Manual 17, Copyright 1996, ASTM International, 100 Bar Harbor Dr., W. Conshohocken, PA 19428.

\$5 ea or 20 copies/\$50.00

Demystifying Color by Bob Chung, 11 pages. Discusses and explains ten myths about color.

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ISCC 75th Anniversary Commemorative CD and Pin \$30*

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*Plus shipping and handling

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\$ 1,000	full page ad

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All submissions must be in English. Please submit materials by the first of each even numbered month. Materials submitted later may be printed in the following issue.

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 International Color Consortium (ICC)
 National Association of Printing Ink Manufacturers (NAPIM)
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